How SUNY Matters

Economic Impacts of the State University of New York

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THE NELSON A. ROCKEFELLER INSTITUTE OF GOVERNMENT
UNIVERSITY AT ALBANY State University of New York

Regional Institute
University at Buffalo *The State University of New York*

SUNY spans New York State with 64 institutions and over 2.1 million students, alumni and employees

2,132,600

SUNY

463,800 Students *who originated from...*

92% *...within NYS*

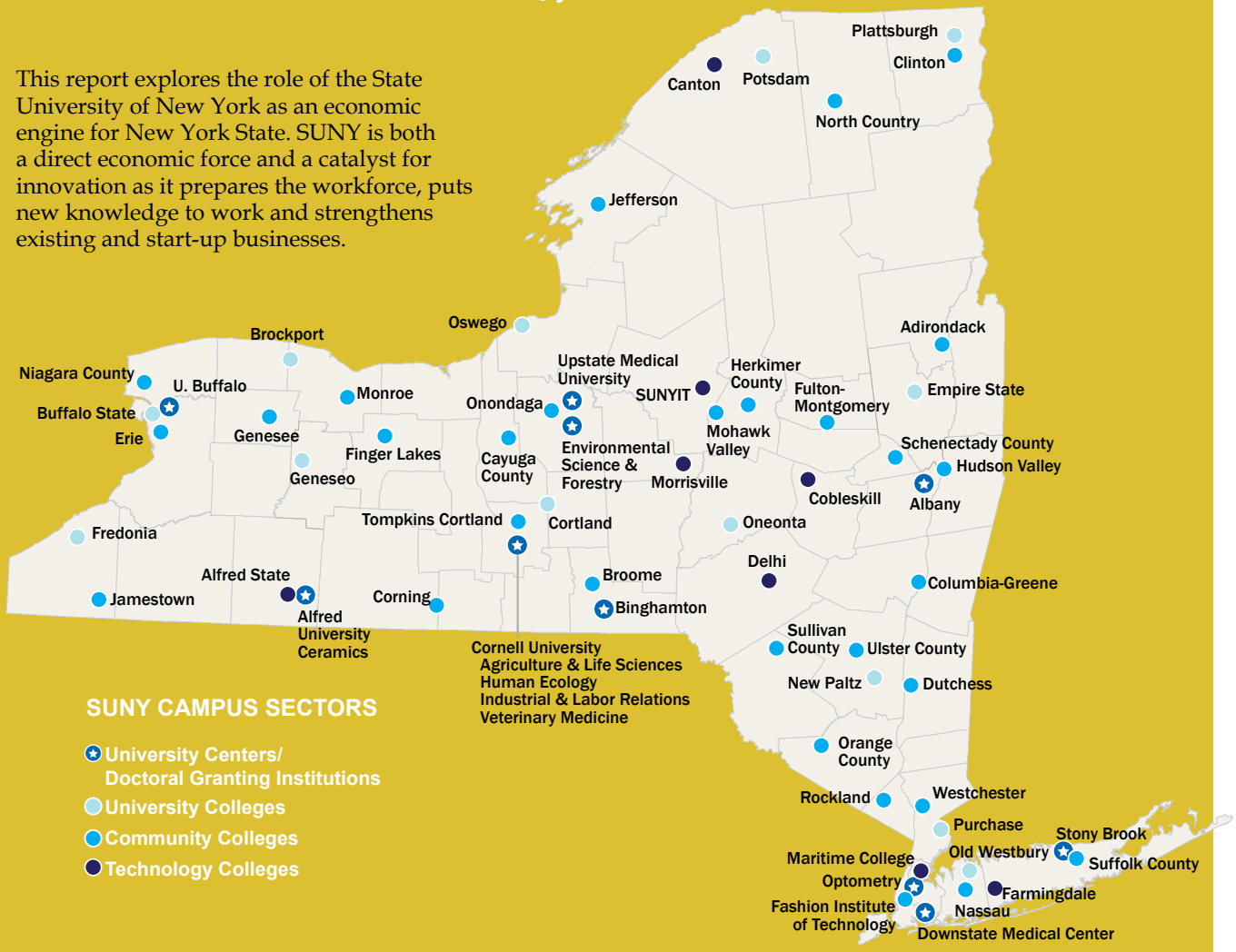
4% *...elsewhere in U.S.*

4% *...elsewhere in world*

1,585,000 Alumni *who live in New York State*

83,800 Employees

This report explores the role of the State University of New York as an economic engine for New York State. SUNY is both a direct economic force and a catalyst for innovation as it prepares the workforce, puts new knowledge to work and strengthens existing and start-up businesses.



SUNY CAMPUS SECTORS

- University Centers/ Doctoral Granting Institutions
- University Colleges
- Community Colleges
- Technology Colleges

How SUNY Matters

About This Report

The United States faces major challenges in the increasingly competitive, global economy — and New York State even more so. New York's job growth rate has been less than a third of the nation's over the past two decades, and the state has lost a quarter of a million jobs in the last three years. In the 2010 Census, New York ranked 46th of the 50 states for population growth rate. New York may still be thought of as a wealthy state, but upstate, per capita personal income is about 8 percent below the national average, and average wages per job are 12 percent lower.[i]

Among specialists in economic growth, there is widespread consensus that higher education institutions and systems are the key to surmounting challenges like these. Universities pack a double punch because they can be the sources of the new knowledge and new ideas needed to produce growth and high-paying jobs in the innovation economy — *and* because they are the key to developing a workforce prepared to take those jobs.

As a result, universities and higher education systems across the country are taking leading roles in their states' economic development efforts. They are putting their research and educational power to work by developing new ideas, helping to deploy inventions for commercial use, educating potential entrepreneurs, using their expertise to help businesses perform better, helping businesses prepare workers to carry out new tasks, and fostering a quality of life that is essential for economic growth.

This study examines the broad economic role of the university system and establishes a benchmark for measuring future progress.

SUNY and its new challenges

What role does the State University of New York play in meeting the state's new economic challenges? To find out, the Nelson A. Rockefeller Institute of Government of the University at Albany and the University at Buffalo Regional Institute joined in the most detailed analysis ever undertaken of the economic development impact of the entire SUNY system. Commissioned by the State University of New York, this study examines the broad economic role of the university system and establishes a benchmark for measuring future progress. The goal is to understand, describe and multiply the efforts of individual campuses and the SUNY system to promote economic growth in New York.

The study grows out of SUNY's strategic plan, "The Power of SUNY," which was launched by Chancellor Nancy L. Zimpher in 2010. The strategic plan seeks to strengthen SUNY's role as the engine of New York State's economic revitalization by enhancing its production of ideas, applications and a skilled and diverse workforce. One key goal of the Chancellor's going forward is to develop metrics for gauging the extent to which campuses are serving economic development goals; for tracking success or failure; and for motivating campuses to discover and implement new and bigger ways to promote economic growth.

The research draws from a 2010 study by the Rockefeller Institute of Government (*A New Paradigm for Economic Development*) on the economic development activities of institutions of higher education in other states, which included a literature review, data gathering on all 50 states and a closer look at programs and projects in about a dozen states.

Scope and methodology

By combining qualitative and quantitative analysis, the study provides a comprehensive estimate of the economic impacts of SUNY's campuses on their local communities, the system's overall economic impact on the state, survey data on campus support for innovation and business assistance programming,

and structured field observations of cases where SUNY institutions have encouraged economic development in their communities and regions.

A key task was developing a baseline estimate from 2008-09 of the economic impacts of SUNY campuses as well as of the system as a whole. Many campuses already report on their economic impacts, but the measures, methodologies and time frames have varied from one campus to another. This study provides a comprehensive, methodologically consistent and conservative estimate of SUNY's economic impact on the state and its local communities, as well as the separate impacts of 10 geographic groupings of SUNY institutions on their regional economies. To quantify basic economic and fiscal impacts, the University at Buffalo Regional Institute used IMPLAN (Impact Analysis for Planning), an industry-standard, computer-based input-output model tracing spending and re-spending within a local economy based on region-specific multipliers. In order to standardize data across 64 SUNY units, economic impact data were drawn from the Integrated Postsecondary Education Data System (IPEDS) compiled by the National Center for Education Statistics. Supplementary information from other national sources and SUNY campuses rounded out the data on area income, employment, population, industrial composition, diversity and quality of life.

The study also incorporates in-depth narratives designed to identify and provide relevant insights into SUNY's economic development role; draw lessons about the decisions, investments, systems and culture that produce success; and help identify measures for tracking economic development efforts and their performance. Case examples were selected from among a pool of campus economic development activities identified by surveys of SUNY officials and regional economic development specialists, as well as the project team. Each campus president was asked to report on standout initiatives that had the most significant impact on economic development in the region. Campus officials with economic development responsibility were surveyed on campus incentives to commercialize academic research, direct assistance to businesses in the region, metrics on tech transfer and the challenges to economic development activity at their campus.

The study illustrates the range of activities that campus faculty, administrators and students carry out to promote economic and community growth, by commercializing science and technology research, supporting business incubators on campuses, fostering start-ups, strengthening clusters, educating employees and providing many forms of business assistance to New York firms. It also describes efforts to encourage faculty in applying for patents or forming companies, develop specialized training programs and increase student and faculty participation in community institutions.

This report is intended to add to a growing awareness about the roles of colleges and universities in building the economy and enhancing the quality of life in our communities. The study provides a foundation to assist in identifying ways in which SUNY and its campuses can perform these roles with even greater vigor, effectiveness and public understanding.

Executive Summary:

The Economic Power of SUNY

$19.8 Billion

173,000 *jobs supported*

$460 M *in state and local taxes generated*

Minimum Annual Economic Impact of SUNY in New York State (2008-09)

Building an Innovation Economy

p. 6

Through its core mission — education, research and service — SUNY has traditionally supported the economy of New York State, generating and transferring new ideas and knowledge, preparing the workforce and serving the communities of New York State. Yet today, SUNY is taking its role in economic development to another level as its 64 campuses pursue a range of programs, policies and practices. These efforts can be categorized around three key approaches:

Advancing innovation by investing in research and new enterprises

Helping businesses perform better through training, consultation and other services

Fostering vital communities by sharing expertise and resources, from applied research to cultural amenities

From its six Centers of Excellence advancing research in exciting new fields to workforce development efforts from Jamestown to Farmingdale, SUNY is "at work" in this new role, and has many success stories to share.

SUNY AT WORK

The Broad Economic Reach of the University at Buffalo

Albany Nano: The Story of One Entrepreneurial Physics Professor

Downstate Medical Center: A Future in BioTech Grows in Brooklyn

Stony Brook's Innovation Footprint: From X-Rays to Supercomputing

Binghamton University: Strengthening the Southern Tier's High-Tech Industries

Keyed to the Potential of Minority-Owned Businesses

"Cases in Point" appear throughout the report, featuring select SUNY campuses for their economic development efforts and programs.

An Economic Force in its Own Right

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The 64-campus SUNY system, including 463,800 students, 83,800 faculty and staff, and a budget of over $11 billion, is a powerful source of economic activity in New York State. But SUNY's impact in the knowledge economy goes much deeper, advancing the research and ideas that are the foundation for new enterprises and economic growth, preparing the workforce with new skills, ideas and entrepreneurism, and building vibrant, diverse and culturally rich communities.

SUNY's economic impact

The fuel for this powerful cycle starts with the revenues SUNY generates to fund research, support quality academic programming, attract top-tier faculty and staff, offer community-enriching resources and develop and maintain capital assets, from classrooms to laboratories. As these dollars are injected into the economy, they fuel new economic activity and employment for the state and its regions.

These impact figures are based on a meticulous and prudent economic impact methodology calculating total economic output and employment impacts associated with SUNY.

What's Included? Spending associated with state operations at each campus, SUNY administrative offices and the SUNY Research Foundation, as well as off-campus spending by students, faculty and staff and overnight visitors. This scope encompasses spending for which data are centrally available across all 64 SUNY campuses.

What's Not Included? Spending by SUNY retirees and alumni, university associations, foundations, partner companies or start-ups and non-state operations (e.g., affiliated housing or health care facilities with finances reported separately from the college).

This analysis relies on standardized and centrally reported financial data from IPEDS (Integrated Postsecondary Education Data System), with a baseline year of 2008-09, the latest year for which comprehensive data are available. For more information, see "Economic Impact" in this report's Data Notes.

SUNY as a research enterprise

SUNY & the Innovation Economy

$1.3 billion in research revenues in 2008-09

In a typical year, SUNY generates...

- 360 invention disclosures
- 225 patent applications
- 79 patents
- 22 spin-offs
- 25 start-ups
- 60 licenses

$23 million in license income

SUNY is also a research enterprise, as the best and brightest faculty members secure major research awards to explore new ideas and advance the latest technologies. These dollars bring new jobs and economic growth, from patents and spin-offs to society-advancing discoveries.

Preparing the knowledge workforce

SUNY's network of over 1.6 million alumni living in New York State represents a vast supply of labor to fill jobs in every industry in the state. Every year, SUNY's diverse institutions reinforce the state's workforce with graduates steeped in knowledge and skills across hundreds of disciplines. SUNY provides the state's largest and fastest growing industries with the human capital they need to grow.

Catalyzing community vitality

SUNY institutions are landmarks in the cities, towns and villages of New York State, while SUNY faculty, staff and alumni are contributing community members across the state. SUNY changes the face of its host communities, fostering a relatively younger, more diverse and more highly educated population. SUNY also helps to build more economically vibrant places by providing cultural resources, physical assets and a critical mass of intellectual, civic and economic activity that filters into neighborhoods, businesses and public spaces.

9 SUNY Impact Communities

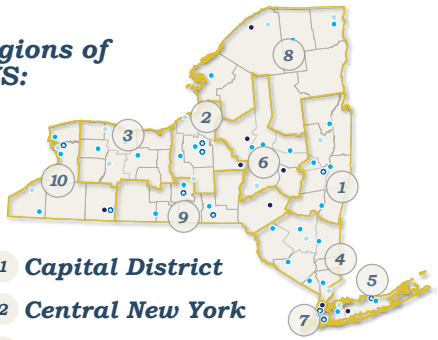
An analysis of nine SUNY host communities isolates SUNY's impacts on communities and shows their populations are ***younger****, more* ***diverse*** *and have* ***higher education levels****. These communities are also more vibrant places with* ***"walkable"*** *neighborhoods,* ***fewer residents commuting out for jobs*** *and* ***lower vacancy rates.***

SUNY and New York's Regional Economies

p. 48

The impact of SUNY extends across 10 diverse regions of New York State, leveraged by a unique SUNY footprint for every region. This mix of institutions, students, alumni, programs and services distinctly shapes the economies, workforces and communities of each region. This diversity also adds up to a public higher education system that is the most comprehensive in the nation.

Regions of NYS:



1. ***Capital District***
2. ***Central New York***
3. ***Finger Lakes***
4. ***Hudson Valley***
5. ***Long Island***
6. ***Mohawk Valley***
7. ***New York City***
8. ***North Country***
9. ***Southern Tier***
10. ***Western New York***

ALUMNI

SUNY alumni living in New York State **1.6 M**

...that's 4 SUNY alumni for every 10 jobs in the state requiring a college degree or advanced skill

SUNY degrees granted in '08-'09 **78,800**

...that's 30 percent of all college degrees granted in the state

Building an Innovation Economy for New York State

As competition in the global economy intensifies, innovation — the development and implementation of new ideas, new processes, new skills, new products and services — becomes the key to the growth and success of our regional, state and national economies.

That, in turn, means that higher education systems and institutions are playing an increasingly central role in building our future economy. New ideas are the key to success; higher education is both the source and the proving ground for new ideas. This role builds upon, but goes well beyond, higher education's traditional strengths in the educational preparation of students and in research. In ways large and small, universities and university systems are applying themselves to the challenging job of building our innovation economy.

This, then, is the new paradigm for economic development. And expectations are high. New York Governor Andrew Cuomo is reorganizing the state's economic development programs under 10 regional councils that will allocate incentives and program dollars. The whole process, he has said, must be "higher ed driven." State University of New York Chancellor Nancy L. Zimpher declared on her first day in the job that she wanted to make SUNY the engine of New York's economic revitalization.

SUNY at Work: Top Examples

The State University of New York is responding. A review of economic development efforts across the 64-campus system has found a broad array of initiatives. There are some spectacular success stories, such the College of Nanoscale Science and Engineering at the University at Albany, or Downstate Medical Center's record in fostering the fast-moving biotech sector in Brooklyn. SUNY institutions in Buffalo, Plattsburgh,

Farmingdale, Jamestown and elsewhere are helping manufacturers update processes and skills. Other institutions are finding ways to revitalize their communities because quality of life is a basic requirement for economic growth.

Economic development activities in higher education are as wide ranging as technology transfer, job training, business consulting and securing seed money for new businesses. The common thread that runs through all these diverse efforts is knowledge. It is knowledge that creates new products and services and industries; that makes workers more productive; that makes society work better.

Advancing innovation

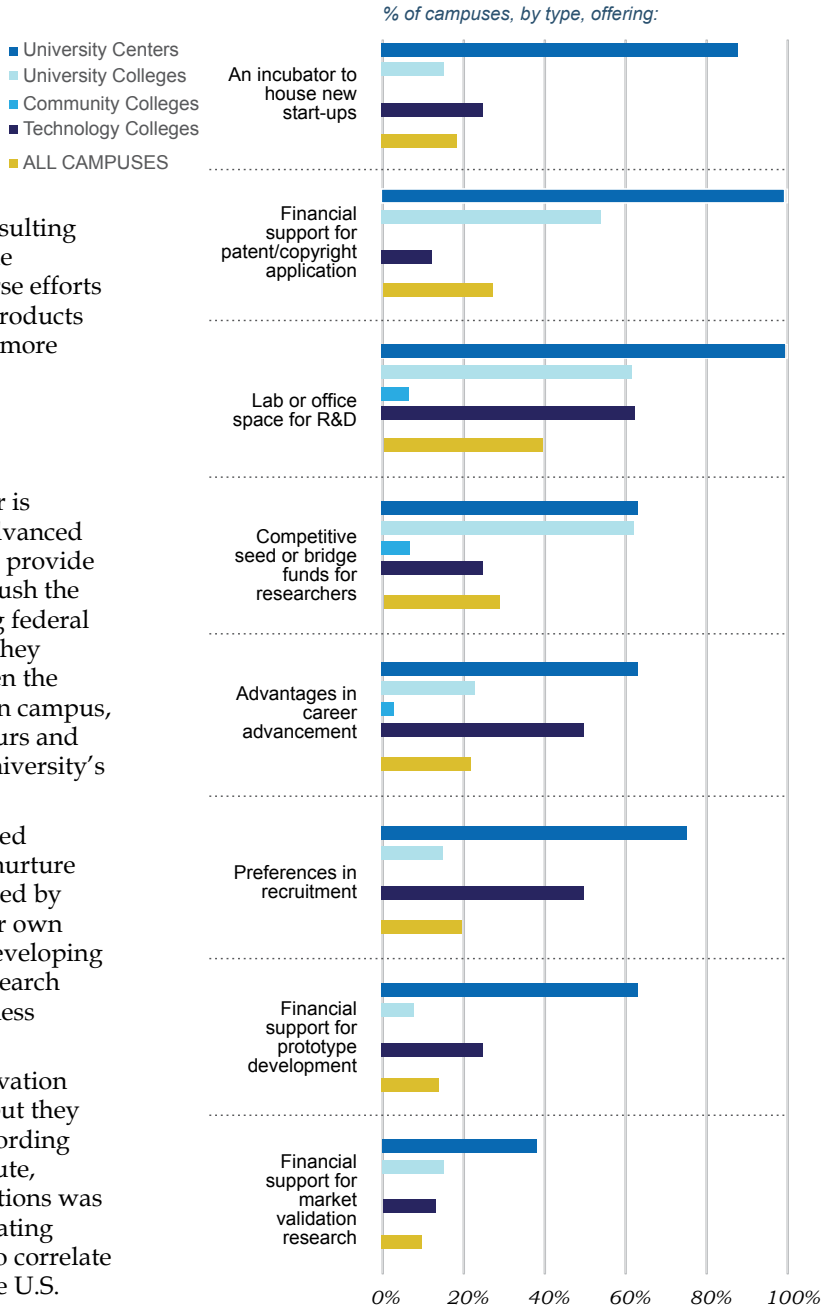
A critical mass of intellectual and research power is needed to come up with truly new ideas in an advanced society, which higher education institutions help provide and support in a number of ways. Universities push the frontiers of discovery in basic research, attracting federal and private investment in labs and equipment. They develop **research parks** to bridge the gap between the research and scientific discoveries taking place on campus, and the needs of existing companies, entrepreneurs and investors who see commercial potential in the university's research.

Many institutions of higher education have created **incubators** as special environments in which to nurture start-up businesses. In some cases these are formed by university faculty to advance products from their own research, in other cases by external companies developing commercial applications from research or via research facilities of the university. Some university business incubators help faculty become entrepreneurs.

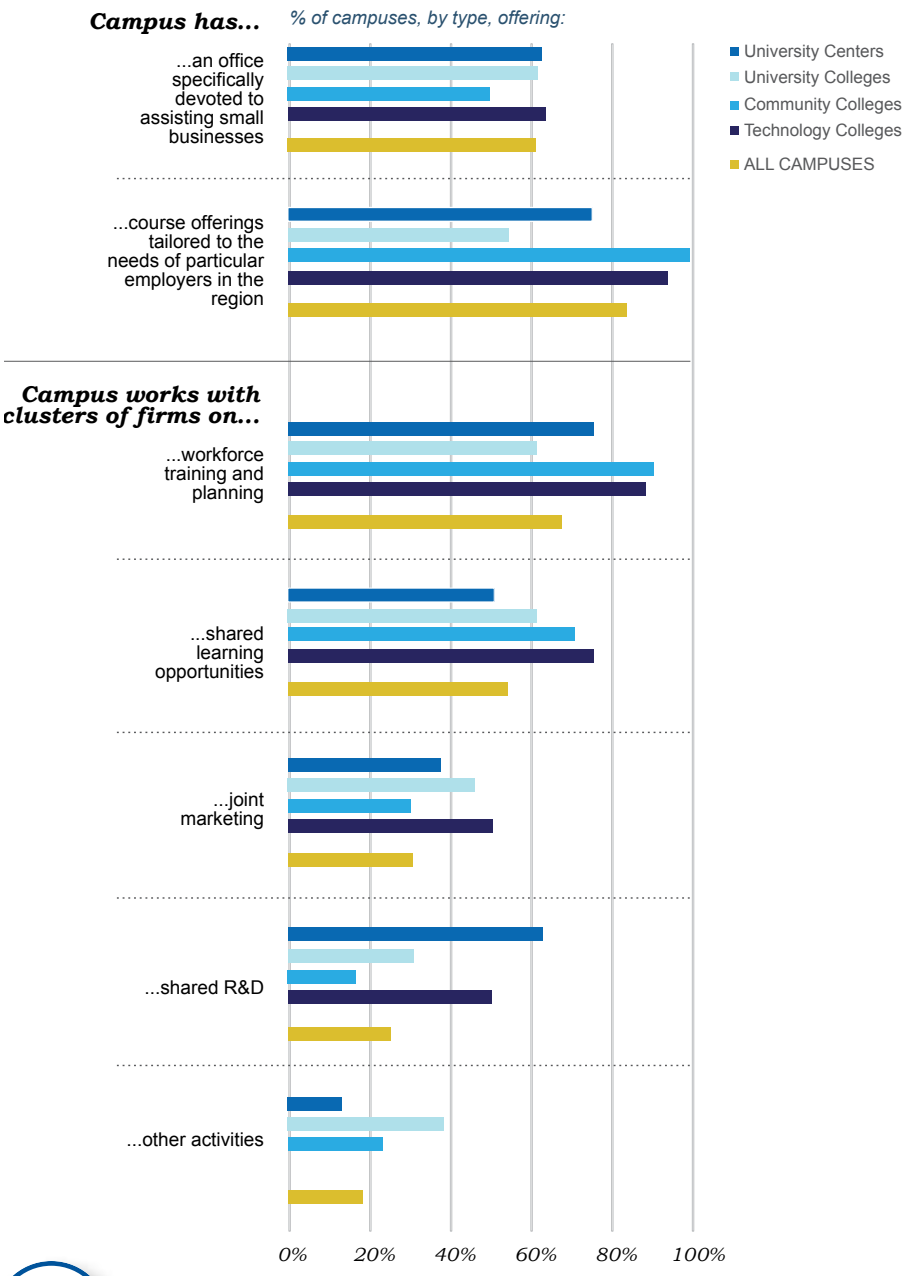
The consequences of university support for innovation may begin with individual firms and products, but they extend out to industrial sectors and regions. According to a widely cited 1999 study by the Milken Institute, fostering robust research universities and institutions was undisputedly the most important factor in incubating high-tech industries, which in turn were found to correlate with nearly two-thirds of economic growth in the U.S. metropolitan areas examined. The Federal Reserve Bank of New York has found that research universities attract **highly educated workers** to R&D activity in geographically concentrated areas and thus have a big impact on the demand for human capital in a region. University research facilities can help attract as well as retain top-flight scientists to a region, providing local stability during times of disruption and uncertainty in private firms.

Examples of university and university system support for innovation can be seen at SUNY campuses all across

SUNY Support for Innovation



SUNY Direct Assistance to Businesses in Region



New York. A comprehensive survey of officials with responsibility for economic development at each SUNY campus, conducted at the outset of this study in November 2010, revealed a variety of tools in widespread use, each designed to create additional opportunities for commercializing academic research. Nearly all SUNY university centers have at least one business **incubator** or similar facility to house new start-ups or other nascent businesses, as do one-quarter of the technology colleges and about one-sixth of the university colleges. **Lab or office space** for research and development is provided as an incentive for commercialization by every SUNY university center and by most of the SUNY technology and university colleges. Every university center and over half the university colleges report they provide **financial support** for patent or copyright applications. Five in eight university centers report that financial support for prototype development is provided. Competitive seed or bridge funds for researchers are provided as an incentive for commercialization at over three-quarters of SUNY university centers, and at about half of SUNY university colleges.

Helping businesses perform better

Innovation is of no value if not implemented successfully, and the connection between idea and practice doesn't happen automatically. As the Organization for Economic

SUNY & Worker Training

SUNY Canton provides training and workshops tailored to the needs of business, industry and the community, working with employers and residents to improve skills needed for certification, promotion and technical currency.

Corning Community College and **Columbia-Greene Community College** are examples of SUNY campuses that house and operate career one-stop centers in concert with state and federal workforce development programs for their region.

SUNY Empire State College is a New York State Department of Labor-approved training provider in almost every county of the state. It regularly partners with businesses that have growth potential and require a skilled workforce to meet their goals.

Herkimer Community College provides technical, workforce development and leadership training programs to help businesses and organizations in the region keep pace with the changing economy.

Cooperation and Development pointed out in 2007, higher education institutions have two separate, though related, roles in the innovation economy: knowledge creation through research and technology transfer, and **knowledge transfer** through education and human resources development.[i] Using the results of university research to drive innovation and establish new companies leverages knowledge creation. Business assistance, such as management counseling and workforce training, capitalizes on the broader educational strengths of the institution for knowledge transfer, and can occur both for companies based on research and ideas created at the university, and for firms with no such connection.

The most widespread, and arguably the most important, way in which higher education institutions help support the competitiveness and growth of employers in their communities is through **worker training programs**. Workforce training may not sound like "innovation" — but it is. Workers being trained are learning something that will enable their employer to adopt new processes or to produce new products or services in ways that will improve the efficiency, competitiveness and staying power of the firm. New skills may enable the workers themselves to hold a better job, get a promotion or move to a new position that will make them more productive. All of that supports innovation.

Workforce training may not sound like "innovation" – but it is.

Community and technical colleges offer credit-bearing courses that lead to **certificates and two-year degrees** and enable their students to transfer to four-year colleges. But much of the job-specific training they provide is in the form of **non-credit courses** developed outside traditional academic guidelines. Often these are put together to meet the needs of a specific employer for workers with a specific set of skills. In other cases, however, training is designed for a type of job or a career ladder to be shared by multiple employers — an economic "cluster" — in a community or region (training people to install solar panels, for example, or operate machine tools).

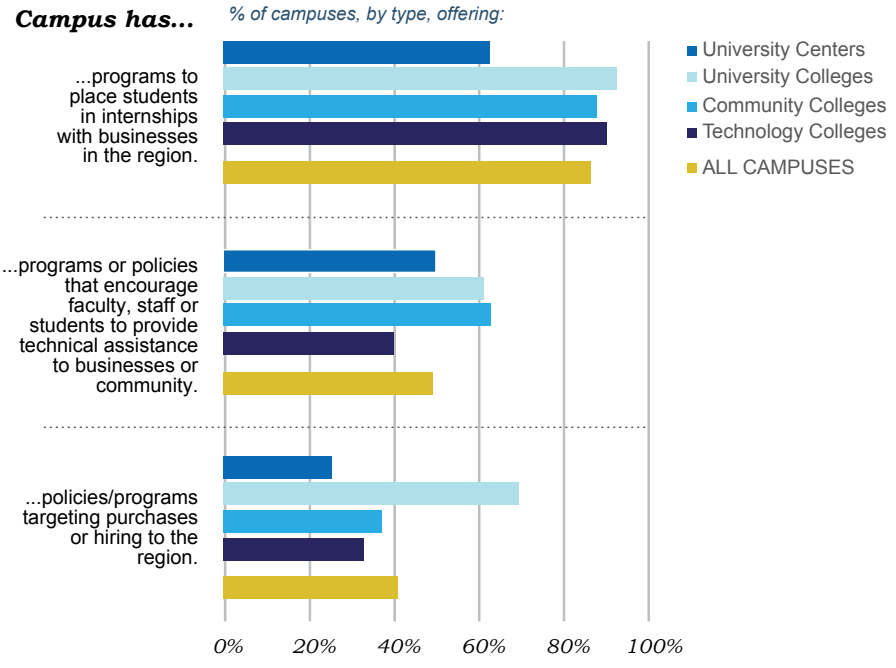
Leading analysts believe that strengthening the ability of enterprises to take advantage of best practices in terms of products, services and processes is at least as important for economic growth as is generating new discoveries. For example, Edward Glaeser of Harvard and Albert Saiz of the University of Pennsylvania concluded that generating new technologies locally does not seem as important as having the capacity to adopt them.[ii] How well businesses operate is critical to a local economy's ability to absorb and benefit from innovation.

Higher education institutions can help build the "take-up" capacity of firms — that is, help them incorporate new knowledge in their operations, products and services — with workforce development, business assistance and other forms of consultation. University systems around the country help local firms with

Jefferson Community College has added degree programs and developed targeted outreach and training for jobs in high demand, including phlebotomy, pharmacy and medical tech, nursing and respiratory therapy.

Mohawk Valley Community College's Airframe and Powerplant certificate program helps fill the workforce needs of upstate New York's airplane repair and maintenance industry. Providing a rigorous combination of classroom training and hands-on experience at Griffiss International Airport, the program boasts a 90 percent placement rate.

SUNY Activities in the Community



everything from business plans to personnel policy to keeping the books. **Business assistance** programs may include market research, financing, licensing, inventions and networking, and vary with the nature of the business being helped. Industrial extension programs provide consulting to existing, often long-established local firms, with services that include business consulting for competitiveness, quality, lean manufacturing, environmental compliance and energy efficiency.

Programs and activities offering direct assistance to businesses are widespread among institutions of SUNY. Particular attention is paid to **small business assistance programs**, such as the network of 22 Small Business Development Centers operated by 15 SUNY campuses across New York. Thirty-six SUNY campuses report they have an office specifically devoted to assisting small businesses. All technology colleges, almost all community colleges and three-quarters of the university centers report they have **course offerings tailored to the needs of particular employers**. And SUNY campuses report they work with clusters of like firms in the region on **workforce development and planning**, including nine out of every 10 community colleges and technology colleges and three-quarters of university centers. Other support offered by SUNY campuses to clusters of firms includes work on joint marketing, offered by six of the 13 university colleges and four of eight technology colleges, and on shared research and development, offered by five of the eight SUNY university centers and four of eight technology colleges.

Fostering community vitality

Higher education institutions also contribute indirectly to the economic health of their region by fostering the vitality of their surrounding community. Universities provide **cultural enrichment and recreational resources**,

SUNY & *Business Assistance*

SUNY Morrisville's Nelson Farms is a business incubator, food product processing facility and hands-on academic classroom that has helped nearly 600 businesses and has been involved in bringing more than 400 products to market.

Nassau Community College provides a range of flexible training programs for local employers, including GEICO insurance, featuring on-site and online courses in business law, accounting, marketing and other topics required for supervisory or management positions.

Export University, a joint effort of SUNY Old Westbury's School of Business and the U.S. Long Island Export Assistance Center, provides expert advice and training workshops to help businesses expand export trade.

serving as a hub for community and regional identity-building. Higher education institutions also engage faculty and students in applied research, community consultation and direct service activities, assisting local businesses, nonprofit organizations, local governments and others in local problem solving, particularly with respect to urban and regional planning, public and environmental health and needs assessment. Faculty members find that the **outreach programs** enable them to supplement their research with field work and provide internships for their students.

A strong majority of SUNY campuses report that they have programs to place students in **internships** with businesses in the region, including 12 of 13 university colleges, seven of eight technology colleges, 27 of 30 community colleges and five of the university centers. Roughly half report that they have programs or policies that encourage faculty, staff or students to provide technical assistance to businesses or community organizations in the region. This includes 13 of 21 university colleges and technology colleges, half of the university centers, and 12 out of 30 community colleges. Nine of 13 university colleges, about one-quarter of SUNY university centers and technology colleges, and one-third of SUNY community colleges report they target purchases of goods or services, or employment for open positions, to businesses or residents of the region.

Community Vitality

SUNY Potsdam has partnered with local businesses to accept the "Bear Express" SUNY Card, providing approximately $500,000 in support of the local economy. And the campus helped to start an initiative to purchase locally grown foods, which has expanded to include the local hospital and the county's three other universities.

Alfred State students have built and sold about $200,000 worth of homes and reinvested the proceeds locally in each of the past five years. Business students helped the village secure a $350,000 grant for infrastructure development, while others in the Urban Design Studio help civic leaders visualize proposed improvements to their communities.

Niagara County Community College is developing a new Hospitality and Tourism Center in downtown Niagara Falls, converting a long-vacant shopping mall donated to the college into a 90,000-square-foot academic center for culinary arts, event management, casino gaming and winery operations, as well as restaurant and retail spaces.

SUNY Oneonta's Center for Economic & Community Development is an analysis and problem solving resource for the region addressing topics such as the impacts of city-town consolidation, child care and municipal water quality. The Center's Leadership Otsego program trains employers and nonprofit board members in leadership theories and skills.

What are SUNY's economic development efforts like in practice? A closer look at some of the specifics offers important insights. The following pages present six examples of how SUNY is "at work" as an economic catalyst for New York State.

SUNY AT WORK

The Broad Economic Reach of the University at Buffalo

When Norma Nowak's husband died at 38, her grief was compounded by a special factor: As a genetics researcher in Buffalo, she was on the front lines of the fight against cancer. She knew that 90 percent of the victims of her husband's cancer, Hodgkin's lymphoma, responded to treatment. Could there be a genetic factor involved with those who, like him, did not?

Norma Nowak, director of science and technology, NYS Center of Excellence in Bioinformatics & Life Sciences

Driven by her loss (and strengthened by the growing expertise she developed as a key player in the national effort to decode the human genome), Nowak focused her lab work on finding genetic "markers" that might help explain the vulnerabilities of individual patients. She developed new techniques for comparing the DNA of a healthy person with that of a person suffering a disease that might have a genetic component (whether inherited, or caused by such factors as diet or exposure to carcinogens).

And then, to make customizable versions of those techniques available to physicians and other researchers, she founded her own small start-up company, Empire Genomics, based at the University at Buffalo's New York State Center of Excellence in Bioinformatics and Life Sciences.

"What I do in the lab is important," Nowak says. "But it wasn't touching anybody. I'm not going to be a success as a scientist unless I can get what I do out to people. This company is how I can make it touch people."

A Center of Excellence

Empire Genomics is just one of many labs and small companies, with more than 250 research scientists, at the Center of Excellence, where Nowak serves as director of science and technology. The briskly modern center shares the 400,000-square-foot Buffalo Life Sciences Complex in downtown Buffalo with Roswell Park Cancer Institute and Hauptman-Woodward Medical Research Institute on the Buffalo Niagara Medical Campus.

The center, one of six Centers of Excellence created by New York State, is a joint effort of research institutions, government, industry and philanthropic

organizations to create a hub of life sciences expertise, drive scientific innovation and enhance economic development. It was established at UB in part because of the region's already well-established role as a center for medical research — and in part because of the university's advanced supercomputing capacity ("bioinformatics" is defined as the application of statistics and computer science to the field of molecular biology). Leveraging that research background and UB's data processing power, its scientists work in four key areas of research — cancer biology, pathogens and biodefense, neurodegenerative disease and cardiovascular disease.

Its purpose, ultimately, is to study the processes involved in human disease in order to develop diagnostic tools, therapies, preventative treatments and other disease management devices — and then to parlay that expertise into the development of new and growing bioscience companies in Western New York. Working with a commercialization partnership network of private-sector and philanthropic organizations, it offers research expertise, laboratory and computing facilities and direct assistance with commercialization.

Also within the Center of Excellence is the Center for Advanced Biomedical and Bioengineering Technology. Like all 15 "CATs" (Centers for Advanced Technology) affiliated with the New York State Foundation for Science, Technology and Innovation (NYSTAR), this center supports university-industry collaboration in research, education and technology transfer, with a focus on helping New York businesses develop a competitive edge. One example is Graphene Devices of Niagara Falls, a company started by UB chemist Sarbajit Banerjee to commercialize a one-atom-thick form of carbon that was discovered by two Russian-born physicists who just last year won a Nobel Prize.

In the most recent fiscal year, UB's CAT distributed more than $440,000 to help 18 companies in Western New York develop promising life sciences technologies, including a therapy for muscular dystrophy, work on computerized speech generation and a device that helps patients with chronic obstructive pulmonary disease dislodge mucus. Each company matches the grant from its own funds.

A wide range of services

The Center of Excellence, in turn, is just one of more than a dozen facilities and initiatives at the University at Buffalo that are aimed at spurring innovation and economic development in New York State — everything from high-tech incubators and labs to consulting services for local manufacturers to a downtown program that trains small business owners. Building on the strengths of its School of Engineering and Applied Sciences, its School of Management, its School of Medicine and Biomedical Sciences and its research labs, UB has a range and breadth of economic development efforts evocative of those undertaken by the renowned "land grant" universities of the Midwest, such as Iowa State or the University of Wisconsin.

UB's offerings are so extensive, in fact, that its latest innovation is the creation of a new clearinghouse to help entrepreneurs, corporations and economic developers figure out how to access all these offerings. This new Office of Economic Engagement is overseen by Marsha Henderson, UB's vice president for external affairs, who has deep connections in the Western New York business community from her years as a Key Bank executive.

"Almost as soon as I arrived at the university," she recounts, "people I knew in business said to me: 'UB probably has what I need. But how do I get in

Marsha Henderson, UB's vice president for external affairs, presenting UB to a business audience in Jamestown.

there?'" The university's various programs report to different schools, departments or units with which they have the closest working relationship — the right fit for each, but making UB hard for businesses to navigate. "Solving the connector piece is to me the most difficult bridge," says Henderson. Rather than putting all its economic development efforts into a single structure (and thereby risking a break in the internal connections that made the programs work), UB simply pulled some existing staff into an Office of Economic Engagement, a gateway to bridge the gap. "It's a permeable membrane between the university and the community," says Al Culliton, chief operating officer of the Erie County Industrial Development Agency.

The university developed a special website (http://www.buffalo.edu/businessengagement/) that is organized not around the university's various programs and offices, but around the kinds of needs that individual businesses might bring to the door — "Leverage UB Expertise," "Recruit Employees and Interns" or "Rent UB Facilities and Equipment." Click on what you need, and the site leads you to information on the office or program that might fit.

UB officials also take the show on the road, meeting with business groups around Western New York. On March 11, 2011, for example, Henderson and a crew of other UB personnel spoke to gatherings of interested business people in Jamestown and Dunkirk, hosted by the County of Chautauqua Industrial Development Agency. "We are out to make it easier for you to access the tremendous higher ed resources in this region," she told the 35 business people who came out in Jamestown.

The University at Buffalo's programs cover both sides of what experts in the field have identified as a university's key potential offerings for business growth:

- Supporting the growth of new start-up companies, often derived from faculty research.
- Helping existing local firms prosper and innovate by providing a skilled workforce, as well as access to faculty research and expertise, labs and other facilities.

In both respects, the university builds on its strengths in engineering, management and bioscience.

Baird Research Park

Incubating and growing new companies

One key offering for the development of new companies is UB's Technology Incubator, located in Baird Research Park adjacent to the main campus in Buffalo's northern suburb of Amherst. It provides office and lab space, administrative support and general business assistance to about a dozen small

businesses at a time. Current tenants include Advanced Cancer Theranostx, Inc., which provides cancer diagnostics and R&D services to the biotech and pharmaceutical industries; GSELearning Software, which develops specialized multimedia online training content; and TREK, INC., which makes high-performance electrostatic measurement instruments.

Since the incubator opened in 1988, it has housed 100 different companies, more than two-thirds of which have graduated, with about 500 employees among them. Now the university is developing a biosciences incubator as part of a new research facility in downtown Buffalo that will also house UB's Clinical and Translational Research Center, and the cardiac, stroke and vascular services of Kaleida Health.

Robert J. Genco, a vice provost who oversees the incubator as well as the rest of UB's tech transfer activities through its Office of Science, Technology Transfer and Economic Outreach (STOR), says the university also wants to build new facilities at the Baird Research Park for firms that are ready to "graduate" from their small spaces in the incubator.

"We emphasize start-ups in the incubator," Genco says. "But UB has a lot of technology and expertise that firms want to be able to access as they grow." On the other hand, start-up firms need not be located in the incubator to receive assistance from UB. Genco notes that the university also operates a Directed Energy Program (supported by the New York State Energy Research and Development Authority) for local clean energy firms, helping them access research and faculty as well as other services.

"...UB has a lot of technology and expertise that firms want to be able to access as they grow."

— Robert J. Genco, vice provost, STOR

Founded at about the same time the incubator opened, the "anchor tenant" in the research park is ONY, Inc., which produces a key therapy for premature babies. The product was developed by Edmund A. Egan, M.D., a professor of pediatrics and physiology at UB who serves as the company's CEO and chief medical officer, and the late Bruce Holm, a professor in the UB School of Medicine (and later executive director of the Center of Excellence in Bioinformatics and Life Sciences). In their labs, the two had crafted a lung surfactant preparation they felt had promising biophysical, biologic and clinical effects, and they co-founded the company to commercialize it as Infasurf. It is used for the prevention of respiratory distress syndrome (RDS) in premature infants, and for the treatment of babies who develop RDS.

"Respiratory issues are a huge share of the problems that premature infants have," Egan says. "There was a real need. But commercialization is hard. Start-ups are usually cash-starved. They need help."

Another promising startup is Kinex Pharmaceuticals, which has entered Phase II clinical trials for a compound intended to treat prostate cancer. Located at the Center of Excellence, the company employs 12 people, developing a portfolio of compounds based on a new method for designing and synthesizing anti-cancer drugs, building from research by David Hangauer, Ph.D., a UB associate professor of medicinal chemistry.

SUNY AT WORK

From lab to the market

In addition to ONY and Kinex, UB's commercialization record includes:

Integument Technologies, Inc., a manufacturer of fluoropolymer coatings.

SmartPill Corp., makers of an ingestible capsule that provides diagnostic information from the GI tract.

Medical Conservation Devices, developing a disposable medical device that makes delivery of inhaled anesthetics practical for the first time for infectious patients and those with severe lung injury.

Scivanta Medical Corp., developing a minimally invasive cardiac monitoring device that provides real-time cardiac performance data to clinicians.

Academic Management Systems, which provides management software for schools and colleges.

Simulated Surgical Systems, makers of the RoSS Robotic Surgical Simulator for training surgeons for robotic surgery. This is an example of a company formed between UB and Roswell Park Cancer Institute.

ATTO Technology, Inc., a leader in storage connectivity and infrastructure for data-intensive computing environments.

"They've been so instrumental in helping us change our culture here, and our organization."

— Ken Snyder, president of Hebeler Corp.

Strengthening the competitiveness of Western New York firms

Given Western New York's mature manufacturing economy and the competitiveness challenges facing local companies, UB puts at least as much emphasis on helping existing firms as it does on assisting start-ups. Some 100 companies have been assisted with technology transfer and other university help, a 2010 report by the University at Buffalo Regional Institute found.[iii]

Consider, for example, the Center for Industrial Effectiveness (TCIE), which works to deliver both management and scientific expertise to employers of all kinds — manufacturing companies, banks, health care, local governments, nonprofits and others — as they seek to improve processes and productivity. The center provides access to laboratories and equipment, product design and testing services and workforce training.

As the Buffalo arm of New York's statewide Strategic Partnership for Industrial Resurgence (SPIR), the center administers an annual program of grants that supply as much as $25,000 to small- and medium-sized companies to help them upgrade products and processes. But firms themselves pay for numerous services from TCIE, such as its training in "Lean Six Sigma," a management methodology that attacks waste and defects through a disciplined approach to problem solving.

Hebeler Corp., a metal fabricator in Tonawanda, credits TCIE with helping it keep and grow its business with one of its major customers, GE. In 1998, Ken Snyder, now the president of Hebeler, visited GE Energy in Schenectady and found that his firm was listed in a sign on the wall as one of 10 poorly performing vendors. "When you were on that list, you were targeted to be removed," he told *The Buffalo News*. But the company worked with TCIE consultants and UB student interns to upgrade its processes along Six Sigma lines. "They've been so instrumental in helping us change our culture here, and our organization," said Snyder. Hebeler has quadrupled its sales since that trip in 1998, to $80 million, and now employs about 150 workers in Tonawanda.[iv]

Luvata, a century-old Buffalo manufacturer of coiled wire, reports that techniques it developed with the help of TCIE enabled it to cut the 15 percent defect rate in one of its most profitable product lines to virtually zero, saving over $1 million a year. "For as long as I've been around people in the mill would say you could never solve this problem," says Michael Silvestri, the company's technical director. But they did. Then, he says, the company "took what we learned and applied it to other alloys, and were able to reduce the same defect in them."

Taylor Devices Inc., a North Tonawanda company that manufactures shock absorption, rate control and energy storage devices for various kinds of vehicles and machinery, went to TCIE for help when it found that its customers were going to start requiring a certification standard called ISO 9000:2000 — with which the company had little familiarity. The company reports that it cut manufacturing costs by as much as 13 percent for some products, while improving quality. That helped it retain and grow its supplier contracts.

Another UB center drawing on the university's engineering expertise is the New York State Center for Engineering Design and Industrial Innovation. Funded in part by grants from the New York State Assembly and NYSTAR, its primary focus is on technology, engineering and design, as opposed to management strategy. It offers access to equipment and labs, including extensive equipment for 3D virtual modeling and prototyping, as well as computer-aided design, technical consulting and other forms of assistance.

But business isn't all about high-tech, and neither is UB's assistance to business.

In downtown Buffalo, its School of Management operates a training program for small to mid-sized businesses. With a 25-year track record of helping regional entrepreneurs build their skills and their businesses, the Center for Entrepreneurial Leadership (CEL) is able to fill its classes mostly by word-of-mouth marketing. Its clients willingly take time away from their businesses every week for 10 months — and then often come back again and again to help mentor other learners or to take more advanced classes.

With its access to the School of Management, the CEL's course work covers the full gamut of skills that small business owners need, from human resource management to finance to sales to purchasing. But the participants also teach each other, says Tom Ulbrich, executive director of the CEL. "Business owners talk to business owners in an atmosphere of confidentiality — it turns into a network, and everyone is invested in everyone else's success."

The university says that the nearly 800 CEL alumni employ more than 22,000 Western New Yorkers.

One successful graduate is Lenny L. Johnson, who started his own plumbing business with $7,500 and one partner. "We didn't know business," he says. "I was a plumber."

"I took this dream and I didn't just dream it, I lived it," he says now. Today U.S. Veterans Construction & Management Corp. is a multi-million dollar construction management enterprise.

"I took this dream and I didn't just dream it, I lived it"

— Lenny L. Johnson,
U.S. Veterans Construction &
Management Corp.

And a plan for more

The University at Buffalo has an aggressive long-range plan focused on doing even more to spur development and growth in the region.

Its UB 2020 plan includes a comprehensive physical master plan; capital projects already under way have generated more than $600 million in public and private investment for new buildings and renovations, including a new engineering building and residence hall complex on the North Campus, and a new home for the pharmacy school on the South Campus.

UB's long-range vision includes a comprehensive Academic Health Center on the downtown Buffalo Niagara Medical Campus. Current university construction and renovation projects include a Downtown Gateway complex, and the public-private partnership with Kaleida Health to jointly construct the new multi-million dollar research and clinical care facility in downtown Buffalo.

A UB shuttle bus that runs between the main campus and downtown carries the overall message in a big poster plastered on its side: "UB believes in Buffalo-Niagara."

Albany Nano: The Story of One Entrepreneurial Physics Professor

In September 1988, a self-confessed "geek" from Lebanon named Alain Kaloyeros joined the University at Albany's Physics Department as an assistant professor. Almost immediately he started building his own lab equipment. And he hasn't stopped building since.

Twenty-three years later, the mammoth Albany NanoTech Complex that Kaloyeros founded and leads is acknowledged as perhaps the single most successful example anywhere of university-led economic development, job growth and high-tech discovery rolled into one.

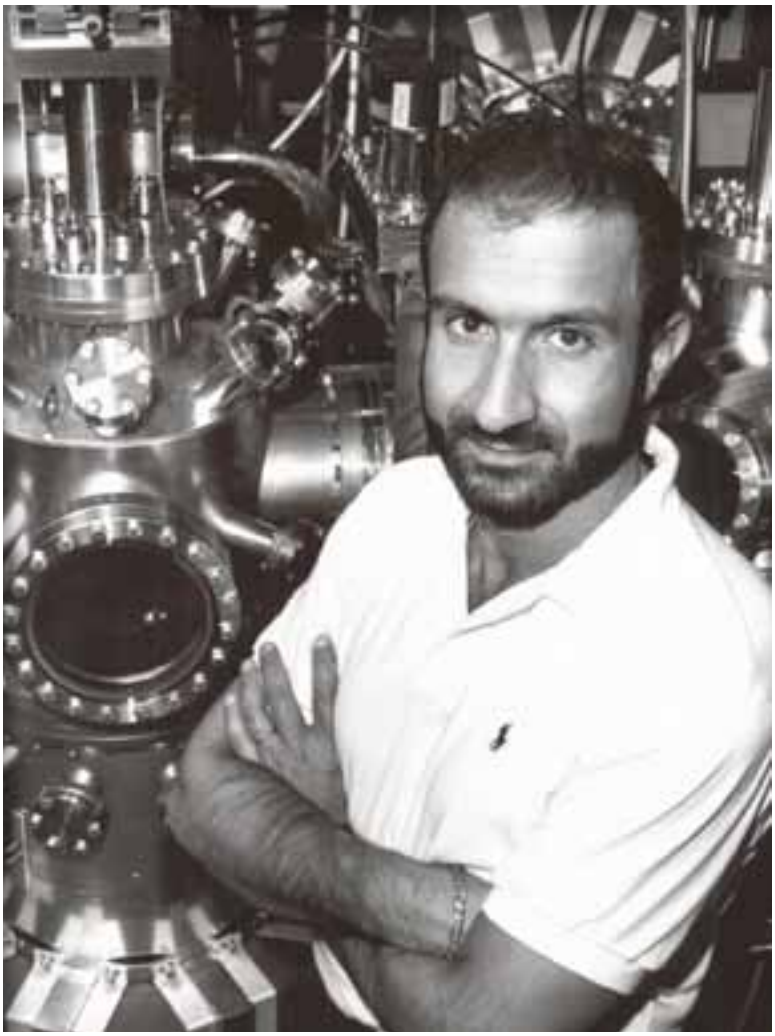


Photo credit: Mark Schmidt, University at Albany

Alain Kaloyeros, senior vice president and chief executive officer of the University at Albany's College of Nanoscale Science and Engineering, in 1990, with the ultra-high-vaccuum device he built to launch his work.

What began with one fledgling professor and some graduate students in basement lab space in the UAlbany physics building has to date attracted some $6 billion in private-sector investment at the campus. It has mushroomed into a sprawling research complex with five gleaming high-tech buildings offering over 800,000 square feet of space — and further expansion is under way. It includes a whole new College of Nanoscale Science and Engineering (CNSE), 80,000 square feet of some of the most advanced clean-room facilities in the world, and scores of corporate research offices, small businesses and incubators.

Between the college and its partners, the complex now hosts some 2,600 scientists, researchers, engineers and technicians — up from only 72 jobs when the first building opened in 2001. Included are personnel from IBM, AMD, Tokyo Electron, SEMATECH and Toshiba, to name a few of the college's 250 partners. More move onto the site almost every month.

CNSE is now moving strongly into alternative energy, developing a major new national center for solar panel research, while it also hosts an incubator for small start-ups and networks a cluster of other off-site businesses in emerging green industries. The college has spurred the development of a research center and curriculum offerings at the SUNY Institute of Technology in Utica, and is collaborating with SUNY Downstate Medical Center on the first-of-its-kind dual degree program in nanomedicine. It has set the stage for new career-building programs at Hudson Valley Community College, Adirondack Community College, Schenectady Community College and Fulton-Montgomery Community College, among others. It has spawned alliances and new jobs as far away as Rochester, Canandaigua, Syracuse and Fishkill — and all those new high-tech jobs produce spending power and tax revenues that help support innumerable other jobs in the regional economy.

The prospect of more growth ahead

There is still more potential on and off the UAlbany site, as the college continues to grow and as the technology developed there is picked up by other employers elsewhere. Kaloyeros, now senior vice president and chief executive officer of CNSE (and also vice president and special advisor to the president for university-wide economic innovation and outreach), thinks 11,000 to 13,000 more jobs could be created by the college itself in the next few years. By the college's calculations, already there are 10,000 other, off-site nanoscience jobs around New York State growing out of its work. And the Nano College is widely considered to have been the linchpin of New York State's successful effort to attract a $4.6 billion GlobalFoundries chip-fab plant, with the potential of another 1,500 jobs or more, to the north in Saratoga County.

"Honestly, my hope is with the right investments in place, you could walk from Fishkill to Albany to Malta to Saratoga on the inside," Kaloyeros told a television interviewer in January 2011. He grinned impishly; that would, after all, mean a building about 130 miles long.[v]

All of this started with that young assistant physics professor and his hankering to acquire a thing called an "ultra-high vacuum material fabrication and characterization system" for use in the UAlbany physics lab.

From diesels to microchips

When Kaloyeros joined the Physics Department in 1988, it was already known for its strengths in materials science. His Ph.D. thesis at the University of Illinois at Urbana-Champaign had focused on titanium carbide, which is used as (among other things) a coating for cylinder walls in diesel engines. But as Kaloyeros began mapping out his research direction at UAlbany, he considered the centrality of materials science to the semiconductor industry. He thought like an entrepreneur — where are the opportunities to put science to work?

Industry wanted microchips packed ever more densely with circuits. Kaloyeros conceived of a device that would enable him and his students to work with and assess alternative chip-making materials in a super-clean, vacuum environment. His lab budget wouldn't cover the cost, so he started working on it himself, using borrowed or donated old parts at the outset and then applying for grants as the project proceeded. In the end he had a device valued at more than half a million dollars. "Sometimes good projects get rejected," he told UAlbany's research magazine in 1990. "But then I just go back and try again and again."[vi]

Soon thereafter he won grants from IBM, SEMATECH, the National Science Foundation and the New York State Energy Research and Development Authority. IBM donated a chemical vapor deposition system to further his work. In 1991, the National Science Foundation named Kaloyeros a Presidential Young Investigator, a designation that carried $100,000 a year in research funding for five years.

In 1993, New York State designated Kaloyeros' lab as a Center for Advanced Thin Film Technology (a "CAT" in official terminology) — promising $2 million a year in state and industry funding. Outside grants pushed the CAT's budget to $12.7 million by 1995-96. Then a complete, $4.5 million pilot semiconductor manufacturing line was installed in the basement of the physics building. Kaloyeros was up-front about the importance of doing research that was of direct value and interest to industry. "Our goal is to provide next-generation products to the semiconductor industry on a timely and cost-competitive basis," he said in 1997. By then he had 23 graduate students working in the Center —

What is Nanotechnology?

"Nanotechnology is the cross-disciplinary science and engineering knowledge for how to control and manage the essential building blocks of matter, atoms and molecules, to form real-life systems with extremely precise functions and highly controlled properties."

— Alain Kaloyeros

more than half of them, he likes to point out, UAlbany grads who had elected to stay for graduate work in his labs.[vii]

In 1997, the university opened a modernistic new building across the road from its main campus. Initially the facility was intended primarily as a co-location for the university's Atmospheric Sciences Research Center and for the Albany forecast center of the National Weather Service; accordingly it was named the Center for Environmental Sciences and Technology Management (CESTM). Kaloyeros managed to slip his growing CAT into the new building, too — though the CAT's presence only got third billing in the university's official announcements.

Part of the NanoTech Complex

When nano became nano

But the CAT grew rapidly, and in 2001 UAlbany established a School of Nanoscale Science and Engineering. (This marked the first official use of "nano" as the descriptor of the focus — nano being a concept pointed more clearly at the future than were the legacy terms of "materials science" and "thin film.") Kaloyeros trekked between corporate research leaders and government officials to get support for more growth. That paid off in April 2001, when Governor George Pataki, legislative leaders and executives from IBM came to CESTM to announce a new Center of Excellence in Nanoelectronics and Nanotechnology. It was to be funded with $50 million in state money (part of a $250 million allocation shared with four other Centers of Excellence). Even more telling in terms of the center's future prospects, IBM announced simultaneously that it would make an additional $100 million investment in Albany Nano to advance the development of the next generation of computer chips.

To permit the co-location of corporate research labs with university labs on campus property, the Legislature adopted special "ground-lease" legislation to get around New York's restrictive laws on public-private partnerships at universities. The SUNY Research Foundation, a chartered, private nonprofit, was permitted to lease the land to a special Fuller Road Management Corporation, also a private nonprofit, which in turn would operate the site and rent the space to university and corporate tenants alike.

From the outset, Kaloyeros' strategy was to develop research facilities more extensive than any one company or university would be likely to build just for itself, thereby luring multiple corporate research operations to the site — creating an environment of cross-pollination and synergies that would drive discoveries both by the college and by its partners. "The infrastructure we're building transcends any one company," Kaloyeros told The Associated Press in 2002. "It's to create basically the hub, to generate the critical mass."

He and his colleagues began brainstorming about other companies around the world who might be lured to the site — most famously in Saturday morning group sessions at a local Starbucks. Staff fanned out to Massachusetts, Texas, California, Japan, Germany, Singapore and many other places, recruiting partners who would fund and share in research projects or locate labs and offices at Albany Nano.

"You can't do this with just university labs and start-ups," Kaloyeros says. "It's kind of like building a mall. You need the anchor tenants. Then the smaller tenants want in, too."

One big breakthrough came in April 2002, when International SEMATECH, one of the crown jewels of Austin, Texas, announced a $405 million North

Center for research at Albany Nano. (Five years later, International SEMATECH announced it was moving its headquarters to Albany, too.) Then in November 2002, Tokyo Electron announced a new $300 million technology center at Albany Nano. After that:

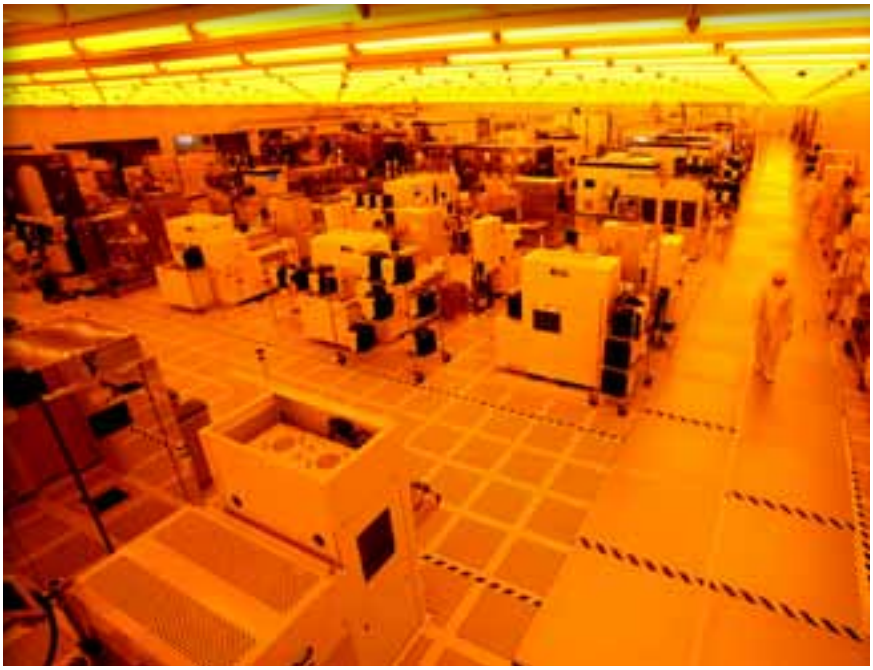
- The school was converted to a College of Nanoscale Science and Engineering in January of 2004, and its first Ph.D. degrees in nanoscience were awarded that December.
- In 2005, ASML announced that it was locating a $400 million R&D center at the campus; a Center for Semiconductor Research was announced. Another $300 million lab, the Applied Materials (AMAT) research center, was established.
- In January 2006, state officials announced plans for a major building project to house a $435 million Institute for Nanoelectronics Discovery and Exploration. In June, Advanced Micro Devices (AMD) announced plans to build a chip fabrication plant in Saratoga County (now under construction as the GlobalFoundries chip-fab). In August, Albany Nano revealed that it had reached a total of 1,350 scientists and engineers working at the complex. In October, Vistec Lithography Inc., announced it would move its global headquarters, R&D, manufacturing and business operations from Cambridge in the United Kingdom to the Arsenal Campus in Watervliet, while establishing joint R&D operations at CNSE in a new Center for Nanolithography.
- In 2008, the Semiconductor Research Corporation announced that CNSE would serve as headquarters for a comprehensive research effort aimed at the development of smaller, faster and cheaper computer nanochips. The International Renewable Energy Technology Institute announced that CNSE would be part of a global consortium designed to accelerate renewable energy technologies. IBM announced it would expand its operations at Albany Nano with an additional 350 jobs, and fund an advanced semiconductor packaging research and development center off-site to be established, managed and owned by CNSE.
- In 2009, UAlbany's NanoCollege launched the world's first comprehensive undergraduate degree program in nanoscale science.
- In 2010, the New York State Energy Research and Development Authority awarded CNSE $1.5 million to establish a clean energy business incubator program. And CG Power and CNSE announced a $20 million Center for Intelligent Power at the NanoCollege. The state's Center of Excellence in Infotonics Technology in Canandaigua announced it would be merging with the Nanoscale Center of Excellence.
- In March 2011, CNSE licensed 28-nanometer technology from IBM that will enable the college to provide pre-manufacturing prototyping for the next generation of chips. And Group4 Labs Inc., a Silicon Valley firm that develops semiconductor wafers, announced it will open manufacturing facilities at CNSE as well as in Syracuse, with about 140 jobs between them.
- In April 2011, U.S. Sen. Charles Schumer announced a federal grant of $57.5 million to CNSE for a joint project with SEMATECH and the University of Central Florida focused on the development of photovoltaic cells. Kaloyeros said this would lead to total investment of about $400 million in the college's growing research on solar power.

"The infrastructure we're building transcends any one company."

— Alain Kaloyeros, 2002

These developments were funded largely by monies raised from private corporations and other partners, and by the federal government — but there was a substantial New York State investment as well. An audit by the Office of the New York State Comptroller in April 2010 found that from 2000 through 2009, the state had funded the operating costs of four research projects and had contributed a share of nine capital projects, for a total authorization of $876 million (of which $672 million had been spent as of August 2009). Comptroller Thomas DiNapoli said that "funding went where it was supposed to go," and noted that meanwhile the center had attracted private investment of $5.5 billion. [viii] (Both public and private investments in the center have continued since then, to a current total of about $7 billion.)

CNSE's recent moves into alternative energy programs are a logical outgrowth of nano research (because many of the most promising advanced technologies in energy rely on nano materials). But in another sense they represent a new direction. Albany Nano is actively working to develop and nurture a regional community of businesses connected to alternative energy — a "cluster," as economic developers call such agglomerations — well beyond the small incubator it operates on the campus itself. One afternoon in February 2011, for example, it brought together more than 125 entrepreneurs, investors, business owners and others for a briefing on storage technologies (batteries, capacitors, pumped-storage and so on) that can maximize the utility of alternative energy sources like wind and solar. Included in the audience were not only those interested in direct involvement in the energy business, but also firms that serve such firms. "I'm here because some of my clients are here and I need to understand their business," said one insurance broker in attendance. That is a classic illustration of "cluster strategy," providing a way to link diverse businesses that share a connection to a new industry.



A 30,000-square-foot clean room at Albany Nano

Albany Nano also seeks regular contact with the Albany community. All told, it hosted about 3,750 students last year (including some who took part in a formal "NanoHigh" program operated jointly with the Albany City School District). Some 38,000 visitors came to the campus during 2010, including more than 1,000 people at a "community day" in November 2010. It hosted a summer NanoCamp as part of a local "Girls in Science and Technology" program in July 2010, brought more than 300 local elementary and secondary school students on campus for a NanoCareer Day in November 2010, and hosted 200 Girl Scouts for a "NanoExplorations" program in November 2009. In 2007, the center even donated 300,000 pounds of sand for restoration projects in the Albany Pine Bush Preserve, adjacent to its campus.

Credit to go around

In the early days there were skeptics who feared that Albany Nano would turn out to be an expensive boondoggle. By now few argue with its success. There are differing views, however, on why it was successful — and, therefore, on what New York State, SUNY and universities generally might do to have more successes like it.

Some attribute the rise of Albany Nano to the perfect selection of the perfect technology focus at the perfect time. And there's some truth in that. Kaloyeros calls nano "the next industrial revolution," and "the 'moon shot' of the 21st Century."[ix] UAlbany got into nano just at the time when high-tech industry first began to confront the fact that previous generations of "micro" technology weren't micro enough for the next big advances needed in computer chips, medicine, materials and a host of other applications.

Then there are those who attribute the whole success simply to wise investments by New York State government. There's some truth in that, too. The $900 million that New York State has put into Albany Nano since 2000, mostly for buildings and equipment, represents a substantial taxpayer investment. But it has averaged only about $80 million a year — less than what the state spends every year just on its "community projects fund" for miscellaneous grants. The amount of private investment at Albany Nano outstrips the state's spending there by almost seven to one. Meanwhile the state has invested billions in other economic-development efforts that have yielded nothing comparable to Albany Nano.

The amount of private investment at Albany Nano outstrips the state's spending there by almost seven to one.

For his part, Kaloyeros consistently gives all the credit he can to elected officials who provided the seed money (and authorization) for the growth of the complex. CNSE's archives of news releases, public statements, legislative testimony and many other documents are replete with praise for Governor Andrew Cuomo, former Governor George Pataki, former Governor David Paterson, former Senate Majority Leader Joseph Bruno, Assembly Majority Leader Ron Canestrari, and many other elected officials for their roles. Often at the top of the list is Assembly Speaker Sheldon Silver, Albany Nano's first and longest-standing, prominent supporter.

But Speaker Silver pushes the credit in the other direction. He says he only approved the first $5 million because of "the vision and a pitch from Dr. Alain Kaloyeros."

"Dr. Kaloyeros is the 'Johnny Appleseed' of nanotechnology," the Speaker said when Albany Nano's alliance with SUNY IT was announced in Utica on Aug. 19, 2010. "Wherever he takes his model, nanotech-related companies and nanotech-related jobs spring up."

That seems, in the end, to be the one key factor that made Albany Nano a success story far outstripping so many other tech ideas, so many other "centers" and "investments" in New York and elsewhere. It all comes back to one assistant physics professor who turned out to be — or who made himself into — a brilliantly effective entrepreneur. People who've worked with Kaloyeros over the years recount virtually a textbook case of entrepreneurship: the vision to see the potential in his field; the discipline to develop a plan for acting on that vision; the salesmanship to get the support the plan needed; and the tenacity to overcome every obstacle, whether technical or bureaucratic.

Not that Kaloyeros ever says anything like that about himself. "I'm under no illusions that the sun revolves around me," he told the *Albany Times Union* in September 2010. "I know where I fit in the food chain."[x]

Downstate Medical Center: A Future in BioTech Grows in Brooklyn

Because they're big and expensive, electroencephalographic (EEG) devices are usually limited to trauma centers, where they help doctors determine the severity of a patient's stroke or the extent of brain injury resulting from a catastrophic accident. But soon, the latest-generation EEG — portable as a cell phone — is expected to be in the hands of emergency medical technicians and army medics, linking them wirelessly to the best neurologists worldwide, helping to save lives by speeding diagnosis and treatment. That's new biotechnology arising from research at SUNY Downstate Medical Center, and developed and commercialized by a university-affiliated start-up — Bio-Signal Group — in space created to help such businesses form and stay in New York City.

Eva Cramer, vice president of biotechnology and scientific affairs, Downstate Medical Center

New York City is known more for Wall Street than for biotech. But the city is rich in scientific and biomedical talent; its nine top academic medical research institutions outnumber those in any other city. Still, the region has long lagged behind places like the Bay Area and Boston in attracting and retaining small and mid-sized biotechnology companies. The primary reason has been a lack of affordable lab space, according to Eva Cramer, vice president of biotechnology and scientific affairs and a distinguished service professor of cell biology at Downstate Medical Center.

In 2000, Cramer and colleagues hatched a plan to create a facility providing lab and office space at reasonable prices. "We started with no real estate, no money, just the idea that we could capitalize on the synergy between companies and our faculty and students," Cramer recalled.[xi] Eleven years later, Downstate has developed an advanced incubator to foster new biotech start-ups, a synthetic chemistry facility, vast swing space on the Brooklyn waterfront to allow maturing firms all the room and resources they need to flourish, and an educational program to train and place college science majors in internships and jobs in the burgeoning biotech industry.

Birthing an incubator

Planners of the Downstate incubator took inspiration from the example of Ulster Community College, which provided university space to help former employees of IBM create new firms in the aftermath of widespread layoffs in the region during the 1990s. They also received valuable guidance from founders of the successful incubator at SUNY Stony Brook, who had much to share about practices to emulate or avoid, based on their experiences. The arrival of new leadership at Downstate Medical Center coincided with new overtures from Brooklyn members of the New York State Legislature concerning a developing initiative in biotechnology. " Downstate President John LaRosa put together a committee comprised of all the key people who would be needed to say yes," Cramer recounted, "which made it possible for decisions to be made and implemented quickly, and which proved instrumental to successes enjoyed by the project in dealing with private businesses."

This early-stage planning led to the formation in October 2000 of Downstate Technology Center Inc. (DTC Inc.), a private nonprofit corporation affiliated with the Research Foundation of SUNY and the Health Science Center at Brooklyn Foundation, Inc. (HSCB Foundation). DTC Inc., was given responsibility, and flexibility, to fund, construct and operate a research park (on land acquired by HSCB Foundation) next to the Medical Center, with

an incubator offering affordable labs and office space, as well as access to specialists and facilities of the university. DTC Inc., received an initial grant of $500,000 from the New York City Council. That funding was then matched by an equivalent grant from the New York State Foundation for Science, Technology and Innovation (NYSTAR), and fueled architectural design and a business plan. Discussions began with potential tenants for a new incubator facility.

In a major coup, ImClone, a subsidiary of Lilly and one of the largest technology firms in the state, agreed to lease 6,000 square feet of already available space owned by HSCB, and then to build at its own expense a new $4.5 million, 13,000-square-foot laboratory facility within the Downstate Research Park — space to house a new Small Molecule Drug Discovery Division working on innovative treatments for cancer. ImClone began construction in May 2001, opened the facility in March 2002, and operated there until financial troubles with the parent firm caused it to leave in September 2005. But it left behind a state-of-the-art commercial synthetic chemistry facility turned over to Downstate, and had enormous value as an anchor that provided cachet and credibility for DTC Inc., in its efforts to attract capital and tenants.

"This place has been a godsend for us. We are fortunate enough to have now attracted the attention of NIH [National Institutes of Health] and others through some grants for research. But we wouldn't have been able to run this operation without the help we received from the incubator. Having the support and having the closeness of resources at the hospital has just been phenomenal."

— Anderson Micu,
chief operations officer,
Bio-Signal Group

With this early momentum, construction of Downstate's Advanced Biotechnology Incubator proceeded apace, based on a design plan for space to be added as fast as funding — which came from New York State, New York City and the federal government — and demand would permit. "We built as quickly as we could and only what resources would allow," Cramer explains. "This permitted us to have something concrete to show for our efforts as we continued to fundraise, to demonstrate success and a flow of return from tenants, and to not over-extend by taking on debt, which helped us to keep rental rates modest."

A groundbreaking ceremony brought a flock of elected officials, academic, business, civic leaders and other well-wishers to Parkside Avenue on September 5, 2002, for the beginning of Phase I: 11,000 square feet of modular lab and office space, completed in May 2004. Phase II, which was designed even as Phase I was under way, provided an additional 13,000 square feet, completed in December 2006. An independent panel of architects and economic development experts honored the effort with a "Building Brooklyn Award" that year from the Brooklyn Chamber of Commerce.

SUNY AT WORK

Downstate Advanced BioTech Incubator

Home to:

Bio-Signal, which commercializes neuroscience discoveries for research and clinical markets.

Aggamin, founded in 2010 to develop biologic therapies to treat high-risk and underserved disease areas.

Anzenna, Inc, a start-up company developing point-of-care molecular diagnostic devices.

Apath, a business involved in state-of-the-art molecular virology and viral genetics for the treatment of infections.

BioCangen, a company developing and commercializing technologies for early cancer detection and prediction of cancer chemosensitivity.

Biomedica, which works with teams of scientists and health care service providers on inflammation, coagulation and tissue regeneration.

BioMolecular, Inc. a company producing a variety of biological research reagents widely used in molecular biological research, drug discovery and clinical diagnosis.

International AIDS Vaccine Initiative (IAVI), lab space for the leading global effort to find a vaccine for AIDS.

The incubator, now full, offers start-ups and early-stage biotech companies wet/dry lab and office space ranging from 400 to 3,000 square feet, designed to allow companies to add space as they grow. Because the research park is located in an Empire Zone — an area designated by the state for economic revitalization — biotechnology firms choosing to lease in Downstate's incubator are eligible for financial incentives for development and growth.

Photo credit: Ryan Brenizer Photography, courtesy of IAVI

The old Brooklyn Army Terminal, reborn

Tenants have access to university scientists, students, research facilities and specialized equipment, while faculty, medical and graduate students at Downstate benefit from opportunities to work actively on entrepreneurial projects next door to the school. The grand plan envisioned for a 50,000-square-foot facility is expected to be finished in June 2012, with the addition of another 26,000 square feet of laboratory and office space, including rooms and satellite communications technology designed to facilitate interactions between inventors, technology companies and venture capital firms elsewhere in New York and around the globe.

Giving maturing biotech firms room to grow

Downstate's initial interest centered on providing affordable space for start-ups that could, particularly, involve faculty. But as the process matured, it became clear to project leadership that there was a much greater need at play. "When we started, I would meet for breakfast every six weeks or so with the director of Audubon, the incubator at Columbia," recalled Cramer. "And it was apparent from our discussions that firms as they outgrew their space in the incubator went to New Jersey. It was clear that we needed a space where biotech firms could go to when they grow so that as they get successful, they don't move out to someone else's tax base."

With the incubator full and room for expansion there too limited, Downstate officials began to look around for larger space that could accommodate growing firms as they transitioned toward manufacturing. To facilitate this effort the Brooklyn Biotechnology Consortium was formed, joining Downstate with the Brooklyn Economic Development Corp., Brooklyn Borough President's Office, Brooklyn Chamber of Commerce, Brooklyn Empire Zones, New York City Economic Development Corp., Empire State Development Corp., New York Biotechnology Association, Pfizer, Con Edison and KeySpan. The group considered a number of possible Empire Zone sites, until a vast, architectural marvel emerged as the strong favorite for an expanded biotech facility: the Brooklyn Army Terminal.

The Brooklyn Army Terminal (BAT) is a 97-acre, Cass Gilbert-designed facility on the Brooklyn waterfront, which served as the country's largest military

supply base through World War II. It holds some four million square feet of commercial space very adaptable for biotech needs, within a secure complex accessible by public and private transportation to all New York City medical and research institutions.

In June 2006, working with the New York City Economic Development Corporation and the SUNY Research Foundation, Downstate incorporated an additional nonprofit organization for the purpose of developing space at the Brooklyn Army Terminal for incubator graduates from Downstate and elsewhere, as well as more mature biotech companies. BioBAT, Inc., also headed by Cramer, secured a 76-year lease on building space from the city and has since raised $2.5 million from the federal Economic Development Administration, $12.5 million from New York City and more than $42 million from New York State to develop the project.

Photo credit: Luz Barbosa, IAVI

Downstate's IAVI Vaccine Design and Development Lab

As an initial phase, the International AIDS Vaccine Initiative (IAVI), an effort of the Bill and Melinda Gates Foundation and other funders, became the first biotechnology tenant to expand from the Downstate incubator, where it still retains space, to the Brooklyn Army Terminal, where it occupies 38,000 square feet. The IAVI Vaccine Design and Development Lab — the only facility of its kind in the world — is staffed with scientists from top-rung academic programs and leading vaccine and biotechnology companies, and designed to bridge the gap between laboratory research and product development by conceiving, comparing, prioritizing and advancing promising AIDS-vaccine strategies. "Having IAVI in BioBAT has been like having a model home in a new development," Cramer described. "It's the example that really shows the idea of what can be done." IAVI has also provided important work opportunities for students from Downstate; four Ph.D. and M.D./Ph.D. students have been engaged in this work.

HOK, a global architectural firm with expertise in bioscience, is designing the expansion of BioBAT, which is proceeding in stages toward a total of some 486,000 square feet. Phase II, involving some 85,000 square feet, is under way and expected to be completed later in 2011. Spaces from 5,000 square feet to more than 100,000 square feet will eventually be available for lease to accommodate a range of tenant needs. "BioBAT was the next logical step," said President LaRosa at a recent event to mark progress at the complex. "Downstate's Advanced Biotechnology Incubator, which provides space for start-up companies, has already added over 100 high-paying jobs to the New York economy. BioBAT's laboratory, office, and manufacturing space on the Brooklyn waterfront is designed for larger companies and offers affordable rents, convenient transportation and access to all the leading academic research centers in the city. We are projecting that BioBAT will create an additional 1,000 jobs."[xii]

"With the incubator, they created something really special out of nothing; it was a barren wasteland. Already, they have brought all kinds of people to Brooklyn who never would have come otherwise, and they have made a point in hiring and contracting locally. The really significant impacts will happen as these high-tech firms are able to grow and to stay in New York because of BioBAT, breathing life in an area largely empty for more than 20 years. What SUNY Downstate's been doing for the city economy — especially as a public university — has just been amazing. And not recognized enough."

— Joan Bartolomeo, president, Brooklyn Economic Development Corporation

Developing a biotech workforce

Leaders of the biotech initiative at Downstate became increasingly aware that, for the effort to work longer-term, firms would require access to a

better-trained workforce along with affordable space in which to form and grow. Cramer of Downstate together with Professor Patricia Rockwell of Hunter College of CUNY developed a biotechnology laboratory technician training program which, with support and guidance from Julian Alssid at the Workforce Strategy Center, received important seed funding from the New York City Sectors Initiative, and has continued with ongoing support from private and public funders. Students participating in The New York Bioscience & Biotechnology Technician Program may come from any biology department in the City University of New York (CUNY), and receive expert training involving state-of-the-art techniques currently in demand in today's biotech market. The program incorporates the use of a specialized curriculum (designed from years of industry experience and with direct input from industry professionals) in a four-week, four-credit workshop that prepares up to 72 students per year for the job market. Students who complete the workshop with a grade of B or better are placed into three-month, paid internships with industry-leading employers and researchers. Over 260 students have successfully completed the program, leading to more than 115 job placements as of March 2011.

An aerial view of Downstate's BioBAT, Inc.

Workforce development programs that prepare college and graduate students to work in the biotech industry are essential to develop academic and industry partnerships since they align graduate training with industry needs, encourage entrepreneurship and help prepare future leaders of the industry. "Having the prepared workforce is not only super-important for the firms," Cramer adds. "The workforce component is a terrific way to link this initiative back to the benefit of the taxpayers, who provide some of the seed money to help these firms to grow in the first place. It provides the workforce for the future, and also ties the benefits back to the community."

Does the biotech future belong to nano?

Noting that nanotechnology is leading to rapidly developing medicines and radical changes across the medical field, and with the U.S. market for nanotechnology medical products projected to reach $53 billion this year and to double over the next five years, Downstate Medical Center and the College of Nanoscale Science and Engineering (CNSE) of the University at Albany recently joined to announce the establishment of a dual degree program in both medicine and nanoscale science and engineering, to foster innovations designed to transform and enhance the prevention, diagnosis, and treatment of disease.

The principal thrust of the initiative is in the development of a joint M.D./Ph.D. program to educate research physicians capable of driving nanotechnology applications in medicine and redefining the standards of health care, as President LaRosa described. But the initiative has economic development implications as well. Alain E. Kaloyeros, senior vice president and chief executive officer of CNSE, says that "this first-of-its-kind program will have

significant implications for addressing one of the nation's most critical 21st Century challenges by catalyzing the development of game-changing medical technologies at a reduced cost, while concurrently building the highly-skilled workforce and robust technological capabilities necessary for New York to capitalize on the fast-growing nanomedicine sector."[xiii] The joint-degree program in nanomedicine may well hold important implications for the development of new firms and technologies in spaces being developed at the Downstate Advanced Biotechnology Incubator and perhaps especially at BioBAT.

Downstate's incubator building

Looking back, looking ahead

New York City is a notably difficult environment in which to operate, and the body of failed economic development efforts involving tech firms is legion. What's enabled the Brooklyn BioTech initiative at Downstate Medical Center to succeed, and to sustain that success across the diverse platforms of the incubator, large-scale development at BioBAT, the growing program in workforce development for graduate and undergraduate students in the biological sciences, and to the new frontiers of nanomedicine?

Some of the accomplishment is attributable to the combination of topic and timing. The Biotech Initiative addresses compelling needs; demand for affordable space for biotech start-ups and maturing firms is established, growing, and not met by the market. There are compelling public benefits generated by retaining early-stage bioscience companies associated with New York's top academic medical and research institutions, attracting companies from elsewhere and providing educational programs to service this growing industry. The efforts were also well-timed in getting underway as the biotech sector blossoms and are expected to contribute even more significantly to economic growth in the years ahead.

The fundamental approach taken to the various initiatives — one might call it "innovative incrementalism" — surely seems to have been smart. The strategic decision to move forward in stages, as quickly as funding and demand allowed, permitted the projects to have demonstrable evidence of progress to show funders and clients, and enabled them to avoid the trap of over-extension and debt that can kill such efforts before they have a chance to become viable.

But the vital ingredients to Downstate's accomplishments come down to the particular combination of people and culture. A nucleus of committed, persistent people stood at the core of Downstate's efforts, and they worked within an organizational culture that encouraged and valued entrepreneurship — not just in the private firms they hoped to form or attract to their newly developed lab space, but among the project staff as well.

"I had no knowledge of the government funding process. That was completely new to me," Cramer recalls. "Here at Downstate, if you have a goal, can get others on board, and are willing to do the work to get there, it is welcomed. No one is going to say, 'sorry, not your job. Don't do that work.' We had an idea. There were clear needs. And we were extremely fortunate to find support among elected officials — we weren't even in their districts — who had and could share a vision, a sense of value and purpose in this work, and who helped to build awareness and provide support."

There was, looking back on it, a "fair amount of upstream swimming," in Cramer's words. East Flatbush and the Brooklyn waterfront may not necessarily be everyone's first idea of the most likely location for cutting-edge biotech. But instead of predetermining outcomes, "the process was one of allowing excellence to grow up from anywhere," Cramer said. And that's a lesson and legacy that could benefit generations of New Yorkers to come.

Stony Brook's Innovation Footprint: From X-Rays to Supercomputing

Formerly one of the nation's most defense-dependent regions, Long Island is in transition to a diversified high-tech economy of companies large and small, led by information technology and biotech, with cleantech an emerging promise, and still supported by a reduced but vibrant national security sector.

As the Island's only major research university, Stony Brook has a breadth of economic development and innovation programs to match — what it says is "one of the nation's most comprehensive suites of economic development programs." The offerings range from R&D collaborations and fast-turnaround technology assistance to incubation and enterprise development assistance to management and workforce development.

John Griffin/Stony Brook University Office of Communications

Stony Brook University's Center of Excellence in Wireless and Information Technology

Stony Brook Vice President for Economic Development Yacov Shamash, who is also dean of the College of Engineering and Applied Sciences, says the objective is to offer support to businesses not only of any size, but at any stage of their development.

The university itself calls this a "cradle-to-Fortune 500" approach. Its Economic Development Council is formalizing the coordination of its various access points for businesses and entrepreneurs, to make it possible for them to take advantage of the full range of the university's expertise.

The university's standing as a science and research powerhouse provides the critical foundation for these programs. Businesses can partner with faculty and researchers who rank second nationally in per-capita research productivity and who can boast of more than 600 patents and 535 executed licenses derived from more than 1,500 invention disclosures, as well as three Nobel Prizes, the National Medal of Science and the National Medal of Technology.

Stony Brook's resources include more than 100 specialized research facilities; two New York State Centers for Advanced Technology; three incubators (four, with the imminent completion of the Advanced Energy Research and Technology Center); and research centers targeted to energy, wireless and information technology and biomedical sciences. The Brookhaven National Lab (which Stony Brook co-manages on behalf of the U.S. Department of Energy) features uniquely powerful user facilities for nanoscience and technology, supercomputing and x-ray, infrared and u-v facilitated research.

A communications revolution

The crown jewel, perhaps, is Stony Brook's Center of Excellence in Wireless and Information Technology, initiated by New York State six years ago to take advantage of Long Island's leadership role in the surging communications industry. In March 2009, the center (also known as CEWIT) moved into a new, next-generation research facility, which has 100,000 square feet of lab space.

With more than 70 associated faculty members and almost 400 graduate students, the center's vision is to become recognized as a world leader in wireless and IT, conduct first-class interdisciplinary research in the still-emerging, technologies of the information age, address the shortage of skilled technology workers, and foster new enterprises.

The center has developed partnerships with IBM and Motorola and CA Technologies, among others. Ongoing research projects and commercialization efforts include such fields as distributed robotics, expressive and hybrid networks, mobile computing, wireless networks, cyber security, computer vision and image processing, radio frequency systems, microwave sensors, wireless sensor networks, computational genetics and protein docking, computational neurobiology, virtual reality, effective bandwidth utilization, wireless protocols, wireless ad hoc networks and wireless gateways. The key industries CEWIT has targeted for commercialization efforts are health care, energy, national security, transportation and e-commerce.

A platform for starting new businesses

Three formal incubators at Stony Brook provide fledgling businesses with space and support as they transition from idea to mature companies able to stand on their own.

The Long Island High Technology Incubator (LIHTI), an incubator at CEWIT and The Incubator at Calverton together encompass more than 90,000 square feet between them, and serve more than 35 tenant companies employing nearly 200 individuals.

Since its opening in 1992, the LIHTI has helped more than 70 businesses get started. Forty-four companies have graduated successfully from the LIHTI program, creating over 500 jobs between them, Stony Brook says. In 2003, a study by the National Business Incubation Association ranked LIHTI as the number one mixed-technology incubator in the nation.

Current incubator companies include Cornerstone Pharmaceuticals, which has received FDA approval for fast-track Phases 1 and 2 clinical trials of a novel cancer drug based on a Stony Brook technology. Among the first anchor companies and first graduates were Renaissance Technologies, LLC, manager of the world's most successful hedge fund, and Collaborative Laboratories, a specialty materials formulator and manufacturer owned by BASF. MesoScribe Technologies was founded in 2002 to commercialize the Direct Write manufacturing technology developed at Stony Brook; Mesoscopic has graduated and its corporate office and East Coast development lab are located in Saint James, N.Y. Another recent graduate, XSB, Inc., based upon Stony Brook technology and longstanding collaborations, is a provider of automated data management solutions to very large federal and commercial customers for information retrieval, data classification, master data management and supply chain optimization. XSB is now based in Setauket, N.Y., where it has continued to grow.

Stony Brook's resources include more than 100 specialized research facilities; two New York State Centers for Advanced Technology; three incubators (four, with the imminent completion of the Advanced Energy Research and Technology Center); and research centers targeted to energy, wireless and information technology and biomedical sciences.

Stony Brook University's Advanced Energy Research & Technology Center (AERTC)

Stony Brook's newest incubator will be part of the Advanced Energy Research & Technology Center (AERTC) opening this year. The new AERTC will focus on innovative ways to produce clean energy, enhance energy production from renewable sources and find more efficient ways to distribute and store energy.

In addition to these formal, "brick and mortar" incubators, Stony Brook also has an "incubator without walls" program and enables businesses and entrepreneurs to rent space on campus.

Shamash views this suite of various incubators as an essential part of Stony Brook's research and economic development missions. "Every one of these is an opportunity to develop new partnerships between the universities, industries and government," he says.

Student entrepreneurship

Stony Brook pursues other efforts to encourage entrepreneurship. Its DARE Student Entrepreneurship Competition annually awards $50,000 in prize funds to fledgling student-run businesses. Of the 11 winners thus far, nine are still in business in New York. One raised a low seven-figure private placement investment in 2010 for an effort to link the Internet to the cellphone network's world of text messaging. Another provides SaaS (Software as a Service) scheduling solutions for 24/7/365 health care settings. New York State Small Business Development Center advisers provide business coaching for the students, and volunteer investment and business professionals and entrepreneurs judge the final presentations.

"Every one of these is an opportunity to develop new partnerships between the universities, industries and government."

— Yacov Shamash, vice president for economic development, Stony Brook University

Since its inception in 2008, Stony Brook's annual Innovation Boot Camp has analyzed 17 inventions with the help of 106 volunteer community professionals, facilitating the formation of four new start-up companies. The Boot Camp helps inventors on the faculty and at other Long Island research institutions answer two basic questions: Can this technology become commercially viable, and am I the entrepreneur who can bring it to market?

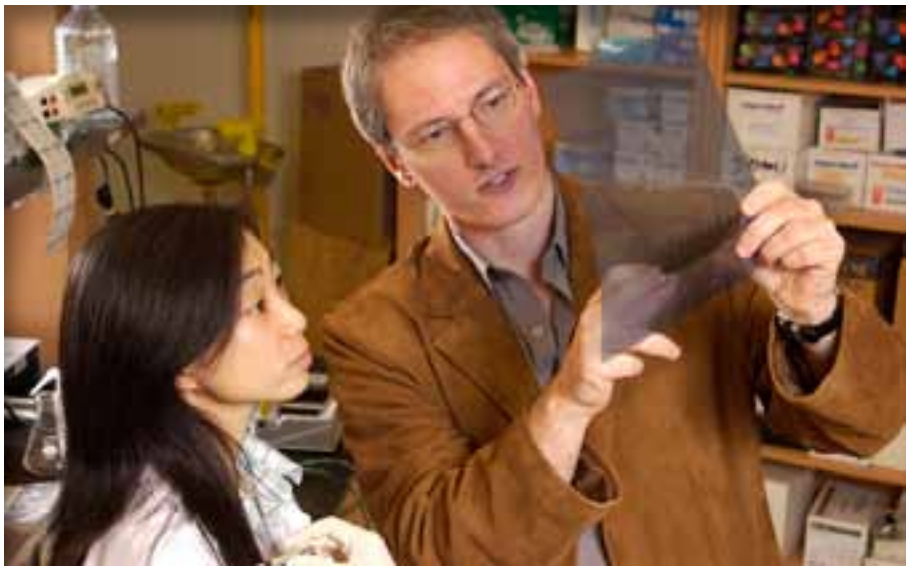
Stony Brook's Small Business Development Center (SBDC) provides in-house expertise and consulting at no cost, as well as links to other resources and funding. For example, the SBDC works with small firms and entrepreneurs to access outside funding such as investment from the Long Island Angel Network and venture capital firms. The SBDC's counselors work with entrepreneurs to refine business plans, prepare and improve financial statements and polish presentations ("pitches") to secure funds from angel investors or conventional lenders. The office says it has worked with more than 11,000 clients and helped them access $250 million in outside financing.

Advanced technology assistance

Stony Brook also hosts the SPIR program (Strategic Partnership for Industrial Resurgence), a SUNY initiative that provides advanced technology assistance to New York's engineering and computing industries.

By linking university engineers not only at Stony Brook but also at the schools of engineering at Binghamton University and the University at Buffalo with high-tech employers, SPIR is intended to help existing firms as well as start-ups remain competitive and expand their markets. SPIR projects range from R&D and prototype development to testing and evaluation, failure analysis and manufacturing improvement in industry sectors from electronics, computer hardware and software to energy, biotechnology and parts suppliers.

One representative SPIR project helped a small-business partner deal with the threatened loss of business from one of its largest customers. The job involved on-site testing and sample collection by materials engineers, and analysis of the samples in campus labs and at the National Synchrotron Light Source at Brookhaven National Laboratory. After reviewing the resulting report, a large supplier to the smaller SPIR partner business acknowledged that it had been providing inadequate materials and corrected the flaws. All told, SPIR at Stony Brook says it has assisted more than 400 New York companies.



John Griffin/Stony Brook University Office of Communications

Research at Stony Brook University

Professional workforce development is advanced through programs of the Corporate Education and Training (CET) office of the Stony Brook University Center for Emerging Technologies. CET partners with business to provide targeted training in many areas, including LEED, project management, marketing and leadership. The center offers programs ranging from certificates to an M.S. in Technology Management.

To build on this record of accomplishment, Stony Brook is working to formalize and strengthen linkages among these programs, and with both internal and external partners, to create a systematic, programmatic process for continuing regional innovation and economic sustainability.

Stony Brook University's Center for Bioengineering

Binghamton University: Strengthening the Southern Tier's High-Tech Industries

IBM was founded in Binghamton by Thomas J. Watson, Sr., who grew up near Elmira and got his start selling pianos in the Southern Tier. The company no longer counts Binghamton as its home base, but its legacy is one reason a broad and diverse array of electronics and high-tech manufacturers has taken root in the region. Today Binghamton University is working to support that sector, with extensive labs, services and training programs that are intended to help its corporate partners drive innovation and growth.

Within a new Innovative Technologies Complex on the eastern edge of the campus, for example, Binghamton operates the Small Scale Systems Integration and Packaging Center (S^3IP), which comprises four programs that are focused on electronics research with major commercial potential.

One key asset of the center is an Analytical and Diagnostics Laboratory (ADL) with $21 million worth of electron microscopes and other high-end equipment that is available to researchers from more than a dozen industry partners, as well as to Binghamton faculty and students.

"A key advantage is that all this is under one roof," says Mary Beth Curtin, associate director of S^3IP. "Companies can share the use of equipment rather than being limited to what they own themselves."

Industry researchers and Binghamton students and faculty work with equipment at the ITC.

Tools for testing and design

The ADL has, among other things, two high-vacuum scanning electron microscopes, a field-emission transmission electron microscope, thermal analysis equipment that incorporates a mass spectrometer, an atomic force microscope, an X-ray imaging system with CT scanner for non-destructive imaging, two laser scanning confocal microscopes, and a selection of other equipment with even more exotic names. "A lot of these are one-of-a-kind prototyping tools," says Curtin.

Some of the equipment is so complicated that it takes the Ph.D. scientists on the staff to operate it for the academic and industrial users. And some of the work is so vital that certain labs are equipped with curtains, so researchers can work outside the view of potentially competing companies using the facilities.

Cindy Gretzinger of Lockheed Martin relies on the Analytical and Diagnostics Laboratory as a resource for failure analysis troubleshooting and for material characterization studies. "The personnel in the lab are super to work with and are extremely knowledgeable in their areas of expertise," she said. "Having a lab resource with the range of capabilities and breadth of technical talent that the ADL brings is great to have when you really need to solve difficult problems."

Ron Davis, a senior research scientist at Corning Inc., noted that scientists there have used equipment, such as a dual-beam focused ion beam and a high-resolution transmission electron microsope, that the company doesn't have on site. "The quality and availability of these instruments have allowed us to have a positive impact on several of our primary research interests, including photovoltaics, semiconductor materials and optoelectronic devices," he said. "Without these tools we would not have been able to advance our materials understanding at the rate required to stay competitive in the current business environment."

"A key advantage is that all this is under one roof. Companies can share the use of equipment rather than being limited to what they own themselves."

— Mary Beth Curtin, associate director of S^3IP

Anju Sharma, a senior scientist on the lab's staff, says the attraction to researchers in industry and at the university is not simply the individual pieces of equipment, but the fact that they can be used sequentially to pursue multi-stage design and diagnostic tests. For example, a researcher can use one machine to examine a cross-section of the interior of a block of material to identify strata for testing, then use another device to mill out a slice for closer examination, then examine the surface of that sample at the atomic level using a third device — all within a few steps of each other.

The programs under the umbrella of the Center of Excellence include the Integrated Electronics Engineering Center (IEEC), a Center for Advanced Microelectronics Manufacturing, the Center for Energy Efficient Electronic Systems, and the Center for Autonomous Solar Power (CASP).

The IEEC puts a special emphasis on helping companies analyze the packaging of electronic devices — "packaging" not in the sense of cardboard shipping boxes, but in terms of addressing the connections and arrangement of the many small electronic components that go into the making of a single device. Devices have to be analyzed as a "package" in the design stage — and then prototypes have to be assessed that way, too.

Another area of expertise is electronic devices that are flexible — something for which the commercial demand is expected to be enormous in the years ahead. The military, for example, would like to be able to incorporate communications gear and other electronic circuits in combat uniforms. Auto designers would like solar panels which, instead of being flat and rigid, could be molded to match the aerodynamic curves of a car's roof. Binghamton is facilitating ideas like that through both the IEEC and the CASS.

Industry partners at S^3IP include Endicott Interconnect Technologies, Corning, BAE Systems, General Electric, IBM, Lockheed Martin, Xerox, ASE, AMD, Universal Instruments, Analog Devices and the FlexTech Alliance.

"The companies are helping us build a technology road map," says Curtin. "They will help us decide: How should we be building the center to be of use?" This fall Binghamton will open a new academic building for its engineering school on the east side of the complex, which will enhance opportunities for students and faculty to interact with industry researchers on the site. And the university hopes soon to go ahead with an expansion of the S^3IP on the west side. "We would like to have our company collaborators be as close as possible," says Curtin, with office space in that new building — though she notes that unless changed, current New York State law limiting public-private partnerships on campus will make that difficult.

"The companies are helping us build a technology road map."

— Mary Beth Curtin

A helping hand for faculty start-ups

Binghamton is ahead of the curve in another respect: helping faculty and students discover their inner entrepreneur. SUNY's new Strategic Plan looks to an "Entrepreneurial Century," recognizing that economic growth requires an entrepreneurial mindset on campus and beyond.

Within its Innovative Technologies Complex, Binghamton has opened a "Start-up Suite" — literally, a suite of small offices near labs and common space — that it has positioned as a kind of "pre-incubator" for aspiring and start-up companies with roots in faculty research. There are currently spaces for eight companies, but the university plans to make about a dozen more slots available when a new engineering building adjacent to the ITC is opened this fall.

The initial building in Binghamton's Innovative Technologies Complex

One of the first occupants was NSC Technologies, which is based on research by C.J. Zhong, a professor of chemistry, and is headed by Zhong's former post-doctoral student, Jin Luo. It is working to develop materials for chemical and biological sensors and fuel-cell catalysts.

Eugene B. Krentsel, Binghamton's assistant vice president for entrepreneurship and innovation partnerships, says the start-up suite is important not just for the potential of the new companies themselves, but also as a tool for recruiting faculty and students.

"Some researchers want not only to make an impact within academia, but also hope to change the world far beyond the bounds of the campus by seeing their work translated into the creation of new, marketable products, technologies or services — or by positioning their graduate students to do so," Krentsel says. "This is a terrific opportunity for those faculty."

Injecting entrepreneurship into the curriculum

Business guru Peter Drucker has said that entrepreneurship is not necessarily an innate or inborn trait. It can be learned. That, in turn, means it can be taught.

So to help teach it, Binghamton has launched a program called Entrepreneurship Across the Curriculum, offering small stipends to help faculty members who want to fold an entrepreneurship component into their existing classes. In some universities with such programs, the initiative is confined to a business or engineering school. But at Binghamton it's available across the board, and has led to modified courses on civic entrepreneurship, modeling and design for a sustainable planet, nonprofit management, and developing innovative health care provider roles, among others. David Campbell, an assistant professor of public administration, has developed a course on "social entrepreneurship," recognizing the value of entrepreneurial thinking to students who'd like to apply it to volunteer service work, or to careers in nonprofits or government.

"An entrepreneurial approach can be beneficial for those in theater, social work, philosophy— practically every field imaginable," says Krentsel. "It doesn't necessarily mean starting a company. You can be entrepreneurial within any profession."

The stipend, Krentsel adds, isn't the reason faculty participate — it functions more nearly as a prompt. "The faculty who do this told us they had wanted to do something like this for years," he says. "What the program does is it gets them doing it this year."

Krishnaswami Srihari, dean of the Thomas J. Watson School of Engineering and Applied Science at Binghamton, has developed a use for the program that could be regarded as particularly, well, entrepreneurial. He's often called upon to teach a class session for a faculty member who's away at, say, an academic conference. So he's developed modules on entreprenership that he can simply use whenever one of those substitute sessions arises.

Student interest is high, says Krentsel. "We now get a steady flow of students coming to my office to talk about entrepreneurship."

Keyed to the Potential of Minority-Owned Businesses

SUNY AT WORK

Given New York State's increasingly diverse demographics, minority-owned small businesses are the way of the future. SUNY's Small Business Development Center (SBDC) reports that minority-owned businesses are now about 35 percent of all its clients — and women-owned businesses are about half the total.

The SBDC, an office that coordinates 24 individual centers across the state, most of them at SUNY campuses and all of them largely funded through the federal Small Business Administration, says its services are available to all citizens, but that given New York's diverse population, it makes a special effort to respond to the gender and the ethnic background of clients who come to it for help.

One example of that customized approach is the SBDC's Olé program focusing on Latino entrepreneurs. Olé (Organización de Latino Entrepreneurs) is based at the Brooklyn SBDC Regional Center but operates statewide.

Promoted through annual fairs that are conducted in Spanish by urban SBDCs across the state, the program provides traditional management and technical assistance on everything from personnel to accounting to access to capital. It focuses on helping Latino entrepreneurs gain access to government contracting opportunities, particularly federal and state procurement programs for minority- and women-owned businesses.

For example, SBDC staffs help women and minority business owners achieve Minority and Women Owned Business Enterprise (MWBE) certification from New York State, qualifying them for state procurement opportunities. Once certified, they also gain access to the SBDC's Procurement Assistance Center, which serves as a kind of gateway to help small businesses find procurement opportunities that fit their products and services.

Another SBDC program helps small and minority-owned businesses become bonded — often a requirement for government and other purchasing and construction contracts — or to increase their levels of bonding so they have access to larger contracts and projects.

SBDC says that in the last two years, minority clients of its programs have invested nearly $82 million in their businesses and created or sustained more than 2,500 jobs. Women-owned businesses served by SBDC have reported investing more than $155 million, with 5,000 jobs created or sustained.

CASE IN POINT

Ulster Community College

Ulster Small Business Development Center

Commercial painting contractor Patti Heins was already certified as a woman and minority-owned business when she arrived at the SUNY Ulster Small Business Development Center in 2008, seeking help in expanding her business and navigating the government procurement process.

Working with her SBDC counselor, she secured a line-of-credit to bring enough employees on board to handle major contracts, and continued to work with the center to define and implement a business strategy. By the end of 2010, Heins' firm, Pefezione Painting, Inc., had created 12 new jobs and secured contracts in excess of $1.5 million, while Heins was recognized as New York State's Woman Entrepreneur of the Year. Heins is just one of the 15,600 clients the Ulster SBDC has aided to date.

SUNY &

Small Business Development Centers

Brockport College
Has worked directly with 16,443 businesses, helping them to invest $140 million in the area economy and create or save over 5,700 jobs since 1987.

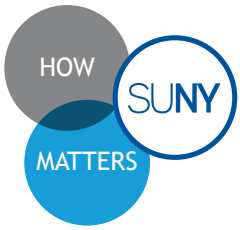
Buffalo State College
Has helped more than 14,000 businesses invest more than $131 million in the local economy, creating or saving approximately 8,000 jobs.

Corning Community College
Has provided 568 training events since 1987, helping 9,621 employers create or retain over 3,270 jobs.

SUNY Geneseo
137 active clients with related investments totaling nearly $2.5 million. Assisted 20 new start-up businesses and helped create or retain some 66 jobs in the past year. Provides entrepreneurial training to high school students in nearby communities.

SUNY Oswego
Provides training in business and financial planning, marketing research and microenterprise development through workshops and one-on-one counseling.

Rockland Community College
Has partnered with industry from the region to develop customized training that helps businesses operate more efficiently; training services are provided by Rockland's Center for Personal & Professional Development.



An Economic Force in its Own Right

With 64 institutions, 463,800 students, 83,800 faculty and staff, and a budget of over $11 billion, SUNY is an economic force in its own right. But its role in the knowledge economy extends well beyond dollars and cents. As it implements its core mission in education, research and service, as well as diverse programs and initiatives in economic development, SUNY seeds an innovation economy with new discoveries and research and prepares the knowledge workforce of tomorrow. SUNY also vitalizes communities across New York State by supporting businesses and organizations, fostering a diverse, educated population, and contributing to physically and economically vibrant places.

SUNY's economic impact

Jumpstarting this powerful process of knowledge exchange and economic growth are the dollars universities attract to fund research, offer high-quality academic programs, pay wages and benefits to faculty and staff, and build and maintain core capital assets: classrooms, laboratories, high-tech equipment, athletic and cultural facilities, research parks and business incubators. SUNY's revenues, including tuition, research grants and government funding, nurture and support the creation and transfer of knowledge. They are also directly injected into the economy as institutions purchase goods and services, faculty and staff spend their wages on living expenses, students live in the community and campus visitors lodge, dine and enjoy related attractions. These dollars then circulate through a robust cycle of economic activity, supporting related businesses — from utilities and suppliers to grocery stores and restaurants — to generate additional economic output and employment.

As of the baseline year of 2008-09, the 64 institutions of SUNY together support an annual $19.8 billion economic impact on the New York State economy, reflecting the operation of this vast system as well as dollars pumped into the economy by the roughly 84,000 faculty and staff, 464,000 students and 790,000 overnight visitors to SUNY campuses. This economic activity supports 91,000 jobs across the state, over and above SUNY's own

direct employment, and produces $460 million in state and local property, income and sales taxes.

Fueling these impacts are over $10 billion in revenues SUNY attracts from tuition, grants and contracts, private gifts, state funding and auxiliary services such as student housing and food service. As a major state institution, SUNY has as its largest single source of revenues state funding, including appropriations, grants and contracts, which totaled $3.9 billion in 2008-09. Yet the state is making a lucrative investment in SUNY: based on its $19.8 billion economic impact, SUNY generates over $5 in economic output for every dollar of state support. SUNY also draws in a substantial amount of revenue from out-of-state sources, such as federal grants and out-of-state student tuition, accounting for an estimated 16 percent of total SUNY revenues.

SUNY's direct spending on goods and services needed to operate and run 64 institutions, as well as wages and benefits to 83,800 faculty and staff, totaled $11.2 billion in 2008-09. Labor costs, at $6.8 billion, accounted for 60 percent of SUNY's direct spending, primarily funding instruction, academic and institutional support and auxiliary enterprises. Of the $11.2 billion in spending associated with SUNY, about 88 percent stayed in New York State, paying employees who live here as well as in-state vendors and suppliers.

SUNY's nearly 464,000 students contribute significantly to SUNY's $19.8 billion economic impact, spending off campus more than $2.3 billion annually as they live and work in the community. On average, each

HOW SUNY MATTERS TO THE ECONOMY

SUNY Generates a Minimum Annual $19.8 Billion Economic Impact in New York State

Here's how it happens...

SUNY attracts revenues from a range of public and private sources...

$10.3 billion in revenues

$1.5 B in tuition & fees
$2.6 B in auxiliary service sales
$3.9 B in NYS appropriations, grants & contracts
$1.1 B in federal appropriations, grants & contracts
$1.2 B from other sources

8% Sponsored research dollars
16% Estimated out-of-state revenues

SUNY campuses, employees, students and visitors purchase goods and services...

$13.6 billion in spending

$6.8 B by SUNY on employee wages & benefits
$4.4 B by SUNY on other institutional purchases
$2.3 B by students
$126 M by overnight visitors
(5.3 M visitors, 15% overnight)

88% Estimated spending in NYS
76% Estimated spending in region

Those dollars circulate through the state and regional economy, stimulating additional economic activity and greater total impacts...

Economic Output
$19.8 billion in NYS

Employment Impact
173,000 jobs across NYS
SUNY employment: 83,800
Jobs indirectly supported: 89,200

Taxes Generated
$460 million in taxes generated for NYS and local government
$162 M in income taxes
$153 M in sales taxes
$145 M in property taxes

**Sum total may differ slightly due to rounding*

$19.8 B / $3.9 B

*Represents a **$5.10** return on investment for every dollar of state funding*

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides revenues, spending and employment counts. A campus survey provided data on out-of-state revenue and spending. Impacts have been calculated using IMPLAN. Tax impacts are based on data from NYS Dept. of Taxation and Finance and NYS Office of Real Property Tax Services. See "Economic Impact," "Employment by SUNY," "Revenues and Spending of SUNY Institutions," "Student Spending," "Survey of SUNY Campuses," "Tax Impacts" and "Visitor Spending" in Data Notes for more information.

student spends $5,100 per year on off-campus housing, food, transportation, books, personal services and entertainment. SUNY campuses drew more than 5 million visitors in 2008-09 for cultural offerings, special events, athletics, conferences and as guests of faculty and students. Contributing most directly to economic impacts are overnight visitors, with roughly 790,000 such visitors disbursing an estimated $126 million on off-campus lodging, dining and transportation in 2008-09.

SUNY as a research enterprise

SUNY makes one of its most important economic impacts as a research enterprise. Every year, SUNY's top researchers attract hundreds of millions of dollars in research funding to explore the latest ideas, applications and technologies in their fields. In 2008-09, SUNY institutions received approximately $1.3 billion in federal, state, local and private grants and contracts to support research projects and programs — that's 13 percent of SUNY's total revenue picture. More than $664 million of this came from federal sources, representing new dollars flowing into and through the state economy to support economic activity and employment oriented around knowledge and innovation. SUNY's four university centers — the University at Buffalo, University at Albany, Stony Brook University and Binghamton University — generated half of total research dollars, or over $600 million altogether.

SUNY & the Innovation Economy

In the best of the last three years, SUNY generated....

- 360 invention disclosures
- 225 patent applications
- 79 patents
- 22 spin-offs
- 25 start-ups
- 60 licenses

$23 million in license income

Source: Interview and survey data from SUNY institutions

Such investments are paying off for the state and its regions in the form of new businesses and jobs and profitable commercial applications. In one year, SUNY's university centers and colleges generated 360 invention disclosures, 225 patent applications, 79 patents, 22 spin-offs and 25 start-up businesses. The 60 licenses secured by these institutions collectively turned over more than $23 million in income.

But the impact of SUNY research is perhaps best appreciated from a longer-term perspective. Much of what is being researched won't turn into a product or application for years. But when the next source of renewable energy, treatment for cancer or cyber security tool emerges, it will change the way society functions. As SUNY invests in research faculty and staff, builds laboratories, research parks and business incubators, transfers knowledge to commercial applications, and assists businesses, it builds a foundation of human capital and infrastructure for success in the 21st Century economy.

Preparing the knowledge workforce

SUNY is a dominant force in the preparation and training of the New York State workforce. Every year, it turns out more than 78,800 graduates holding associate's- to doctoral-level degrees across 7,500 academic programs. Armed with the latest skills and knowledge, these graduates provide the human capital employers need to grow in this knowledge economy. While SUNY primarily educates state residents, it is also a powerful magnet for talent from beyond the state's borders, with approximately 35,000 of 463,800 SUNY

students coming from across the nation and globe. The nearly 1.6 million SUNY alumni in New York State represent a labor pool with vast potential to fill jobs across the state's largest and fastest growing industries. Relative to all degree-granting institutions in New York State, SUNY grooms one in three graduates overall, and more than half at the level of associate's degree.

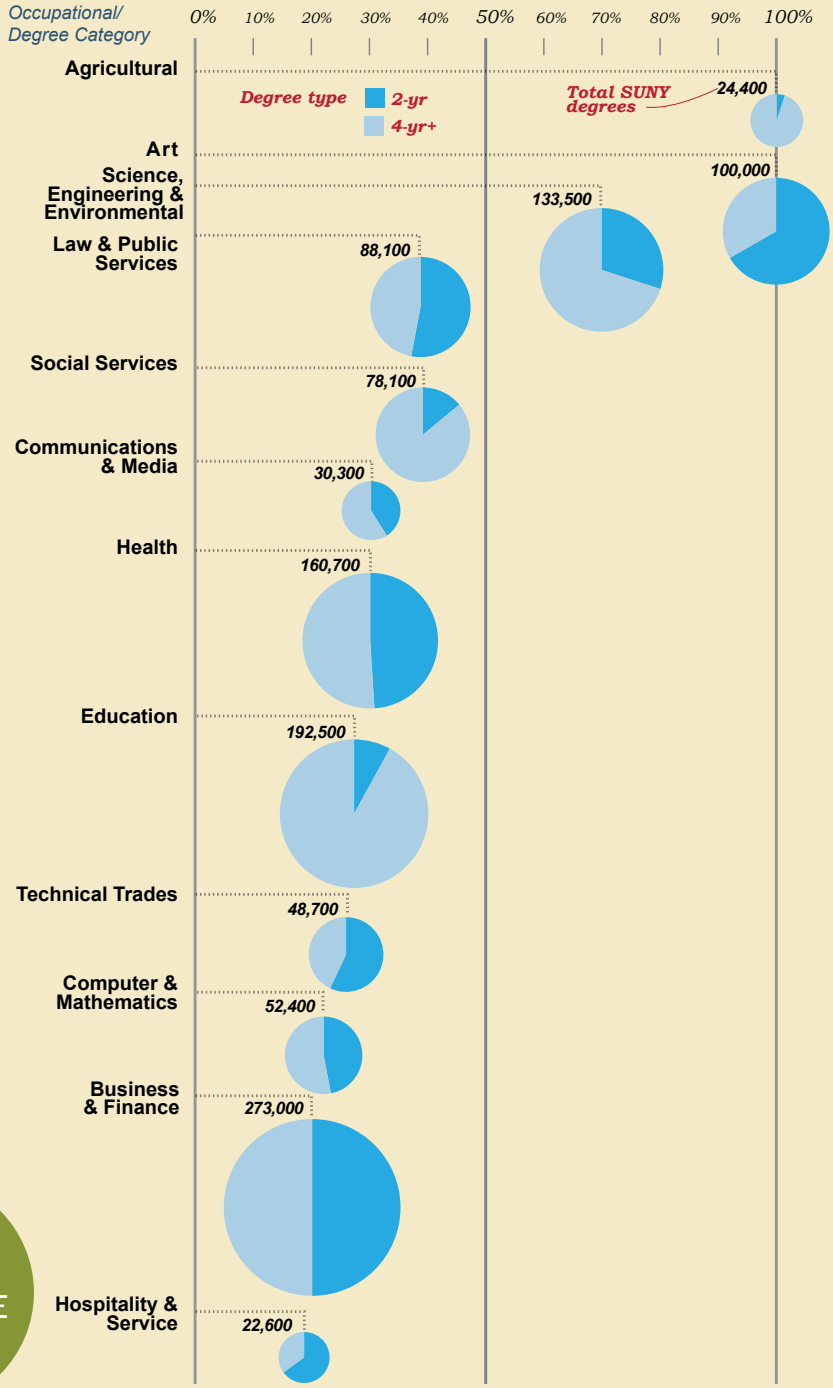
SUNY's university centers and colleges, community colleges and technology colleges play unique but complementary roles in workforce development. While doctoral programs at university centers and colleges prepare the next generation of scholars, researchers, scientists and specialists at the leading edge of their fields, community and technical colleges provide diverse options for vocationally-oriented degrees and certificates. The result is a diversely trained core of SUNY graduates that can push the boundaries of industry with advanced knowledge, fill gaps in workforce capacity and meet the needs of emerging industries.

The cumulative capacity of SUNY graduates to fill jobs across diverse industries in the state suggests the breadth and depth of SUNY's role in workforce preparation. Overall, SUNY's 1.6 million alumni constitute a labor pool sufficiently trained to fill four in 10 jobs in the state requiring an advanced skill or college degree.

A closer look at SUNY alumni by the specific degrees they hold reveals significant workforce capacities for a diverse range of industries, from law and the arts to health and sciences. For instance, SUNY's 133,500 alumni holding science,

SUNY alumni represent a key labor supply for New York State, holding the degrees required by jobs across a range of industries.

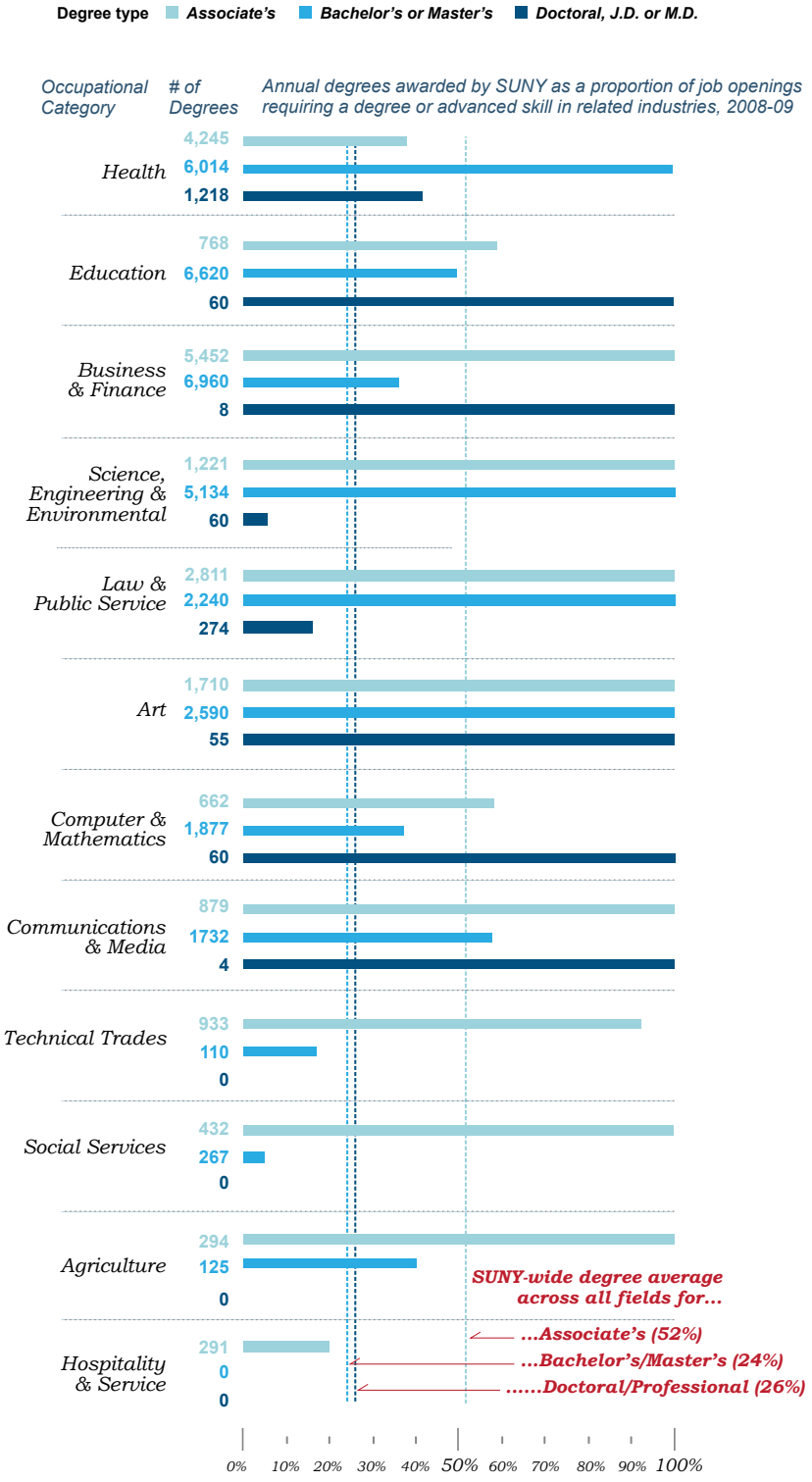
Degrees held by SUNY alumni as a proportion of jobs requiring a degree or advanced skill in related industries



While bringing important capacities to the workforce, liberal arts degrees are too broad to be matched to a specific occupational field and were thus excluded from this analysis.

Source: SUNY institutions provided alumni ZIP codes and field of study; occupational data are from NYS Dept. of Labor. See "Alumni Data" in Data Notes for more information.

In 2008-09, SUNY produced 78,800 graduates holding the degrees needed to fill job openings across the state, helping to fuel industry growth in the knowledge economy.



engineering & environmental degrees represent a supply sufficient to fill more than 70 percent of all related degree- or skill-requiring jobs across the state. In the growing fields of education and health, SUNY alumni number enough to fill almost one-third of jobs demanding their educational qualifications. More than one-quarter of technical trades jobs could be filled by SUNY alumni holding the required degrees or skills. Proportionally fewer SUNY alumni hold the degrees needed for jobs in computer & mathematics, business & finance and hospitality, the latter of which relies heavily on graduates with two-year degrees.

SUNY supports continued economic growth by annually releasing a cadre of graduates prepared to fill job openings in emerging and high-growth industries — particularly in knowledge-based fields. In 2008-09, SUNY's 78,800 graduates included over 35,000 bachelor's degrees, 30,000 associate's degrees, 10,000 master's degrees and 2,500 doctoral or first-professional degrees. Relative to all college graduates in the state, SUNY generates more than half at the associate's level, and about one-quarter at the bachelor's/master's and doctoral/professional levels. Additionally, SUNY issued nearly 2,800 certificates at the vocational and post-baccalaureate levels in 2008-09, most commonly in the fields of education and health.

An examination of SUNY's supply of graduates relative to annual job openings shows SUNY is meeting workforce needs in most industries, according to a benchmark of SUNY's share of overall college graduates in the state. For instance, SUNY generates at least its share of graduates for job openings in computer & mathematics, business & finance, communications & media, and education, from the associate's to doctoral level. Among the areas where SUNY can bolster enrollment are at the associate's level for hospitality and

While bringing important capacities to the workforce, liberal arts degrees are too broad to be matched with a specific occupational field and were thus excluded from this analysis.

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides degrees awarded by field of study and level. Job openings are from NYS Dept. of Labor. See "Occupational Openings in New York State" in Data Notes for more information.

health, and at the bachelor's level for technical trades and social services, especially as many of these industries are projected to grow in coming years. SUNY also generates fewer graduates relative to job demand at the doctoral level for the fields of law as well as science, engineering & environmental.

SUNY supports several strategic "clusters" of industries that cut across traditional occupational categories and are linked by similar needs for talent, technology and infrastructure. New York State leaders have targeted these 16 clusters due to their total employment, growth potential and above-average wages, among other factors. In 2008-09, SUNY awarded over 47,200 SUNY degrees in fields related to one or more of New York State's 16 cluster industries — that's nearly two-thirds of total SUNY degrees. Relative to the total state supply of college graduates trained in these areas, SUNY plays a dominant role. In one year, SUNY produces from one-third to two-thirds of degrees in the state that prepare graduates for jobs in the manufacturing, fashion and biomedical clusters. Of all SUNY's cluster-related degrees, about half supported at least one of three clusters — front office & producer services, financial services and back office.

SUNY is also seizing the opportunity to fuel growth in innovation-based industries through its Centers of Excellence at university centers across the state. In addition to robust research environments, these Centers of Excellence provide career pathways development and specialized training in industries ranging from alternative energy and nanoscience to wireless technologies and the life sciences.

SUNY AT WORK

Looking forward, an ample supply of graduates will be critical to propel high-growth and innovation-based industries in need of experts, researchers, technicians and related staff. As SUNY continues to invest in academic programs, research and innovation and workforce training, it has the opportunity to play an even greater role in advancing the state's knowledge economy. Boding well for the state's workforce in coming years is the strong tendency of SUNY graduates to stay in New York State to live and work, with historic patterns showing nearly three in four alumni choose to settle here.

SUNY generates degrees needed for jobs within industry "clusters" targeted for development by the state.

In 2008-09,

47,200

– 60 percent of all SUNY degrees awarded that year – were in fields of study related to these 16 clusters.

Clusters are groups of related industries linked by similar needs for talent, technology and infrastructure. Cluster industries are targeted for growth due to their contributions to total employment in the state, projected growth, export potential, above-average wages and concentrated presence in one or more regions of the state.

Source: U.S. Dept. of Education, IPEDS, 2008-09, reports degrees by field of study and level. NYS Empire State Development and NYS Dept. of Labor provides cluster industry information. See "Cluster Industries in New York State" in Data Notes for more information.

Measuring SUNY's Impact on Communities

SUNY shapes the communities of New York State, contributing to racial and ethnic diversity, a more highly educated population and greater economic vibrancy. To isolate and measure SUNY's community impacts, nine "SUNY Impact Communities" were identified based on the following criteria:

No Private Colleges or Universities Within the Community
Many SUNY institutions operate near private colleges and universities. These host communities benefit from an agglomerated higher education impact; while SUNY contributes to these impacts, it is not the sole factor.

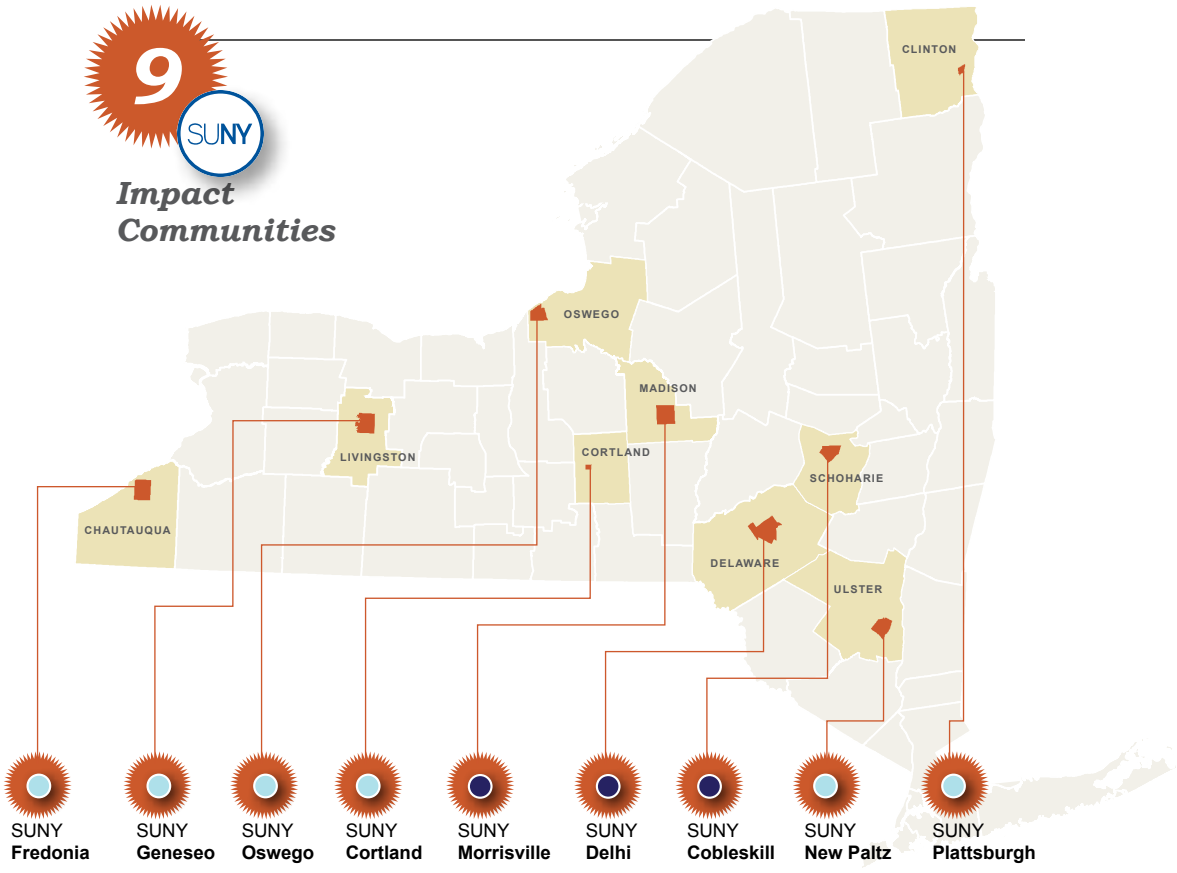
No Community Colleges Within the Community
Community colleges primarily serve commuting county residents. Thus, SUNY's demographic impacts are dispersed across the county and not necessarily concentrated in the host community.

SUNY's community impacts extend across municipal boundaries, but are concentrated within host communities. To isolate these impacts, the nine "SUNY impact communities" were compared to their surrounding county.

Catalyzing community vitality

Beyond its direct economic impacts, SUNY is a major, vital member of New York State and its diverse communities, enriching people and supporting vibrant places as it educates, engages and serves. SUNY's more than 2 million students, faculty, staff and alumni — some drawn to the state because of SUNY — have distinct, positive impacts on the demographic, economic and social vitality of their communities as they support businesses, fill jobs, raise families and engage in civic debate. In fact, about one in 10 of this state's nearly 20 million residents is tied to SUNY as a student, employee or alumnus. The sheer scale of the SUNY footprint spanning 64 campuses in more than 60 towns, villages and cities suggests the system's impact on the physical character of the state's communities. Committed to public service, SUNY also shares expertise and resources with community groups, nonprofits and government to support problem solving and decision making from the organizational to regional scale on issues as diverse as leadership development and public health. SUNY creates a brand of "place" for its host communities, standing as a landmark and source of pride, providing cultural and recreational resources, and serving as a crossroads for all members of the community.

SUNY makes its greatest mark on communities through its mission to provide broadly accessible higher education to the people of New York State. For individuals, an education means intellectual fulfillment and greater economic opportunities over the course of a lifetime. The stakes are equally high at the community scale — an educated populace is a prerequisite for success in today's knowledge-based economy. SUNY plays a significant role in educating and elevating the people and communities of New York State, enrolling 40 percent of



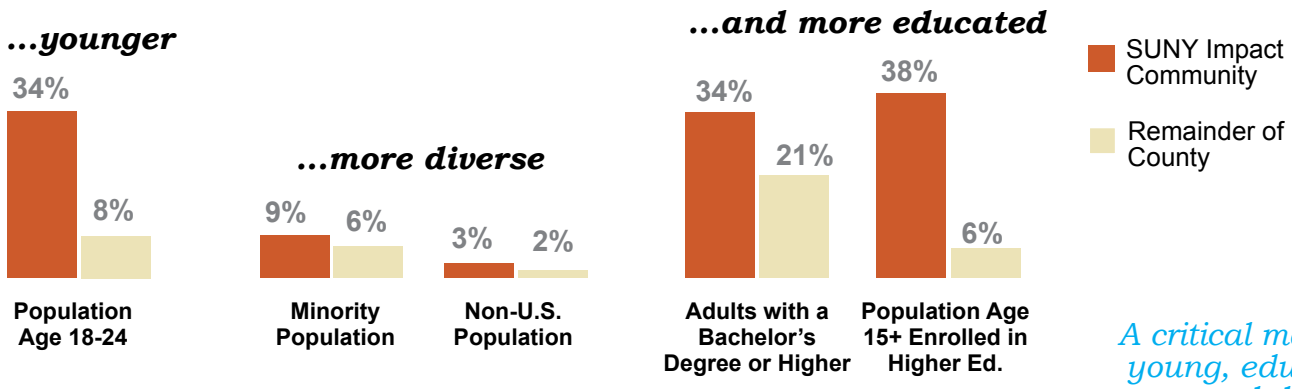
the state's high school graduates.[i] Nearly 430,000 SUNY students, or 92 percent of total enrollment, are state residents.

SUNY extends educational opportunities to a diverse population, including those historically left out. More than one in four students is a racial or ethnic minority, while 25 percent are from a low-income community. Nearly one in five SUNY students is non-traditional — age 30 or older — suggesting SUNY provides both valuable opportunities for continuing education and flexible learning environments for those balancing school with family or work.[ii] In addition to SUNY's relatively low tuition costs overall, its community colleges feature open enrollment and even more affordable tuition, while special workforce development and educational programs reach out to academically and economically underserved residents.

In the most direct terms, educating a diverse population, including the economically disadvantaged, breaks the cycle of poverty and leverages returns to the community over generations. At the same time, SUNY's diversity introduces different perspectives to the community and, as students graduate to the workforce, to employers and industries at the forefront of economic growth. Furthering the SUNY impact on population diversity and cultural vibrancy are 17,000 international students (as of 2008-09), bringing top-tier talent to the state and enriching communities with varied traditions, backgrounds and ideas.

For SUNY's host communities, this critical mass of young, educated and diverse students translates into discrete, concentrated demographic impacts. Compared with their surrounding county, SUNY host communities are younger, more diverse and more highly educated. A comparison of nine "SUNY impact communities" with the rest of their county shows impact communities have

SUNY impact communities are...



SUNY impact communities have four times as many 18-24 year-olds compared with the rest of their county.

Racial and ethnic minority populations are greater in SUNY impact communities relative to the rest of their county.

The population of non-U.S. citizens in SUNY impact communities is higher than the rest of their county.

In SUNY impact communities, one in three adults holds a bachelor's degree or higher compared with one in five adults in the rest of their county. Additionally, more than six times as many are pursuing a college degree.

A critical mass of young, educated and diverse students attending SUNY institutions translates into discrete, concentrated demographic impacts on SUNY's host communities.

Source: 2005-09 American Community Survey. See "Demographic & Housing Data" in Data Notes for more information.

four times as many 18-24 year-olds, proportionally more racial and ethnic minorities (9 percent vs. 6 percent) and non-U.S. citizens (3 percent vs. 2 percent), and a higher proportion of adults with a bachelor's degree or higher (34 percent vs. 21 percent).

As SUNY institutions, faculty, students and alumni engage with and serve their host communities, they contribute to economic and cultural vitality and create more vibrant places.

SUNY institutions also play an important role in building economically and culturally vibrant communities, and defining a distinct sense of place. SUNY's 64 campuses sit within a diverse range of communities, from the state's largest cities to its most remote towns and rural areas. The campuses themselves are full of energy, as classrooms and quads bustle with activity and debate, buildings and landmarks are constructed or revitalized and community members visit the campus to attend lectures, cultural performances and athletic events. This vibrancy spills over the campus boundaries as SUNYs dynamically engage with their communities. SUNYs create spaces and resources to share, from libraries to green space to restaurants. They play lead roles on community issues

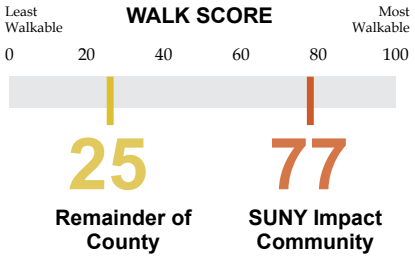
9 SUNY Impact Communities

SUNY impact communities have...

SUNY Impact Community

Remainder of County

...greater "walk-ability"

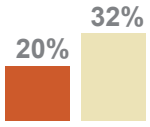


SUNY impact communities are more "walk-able," with core amenities such as coffee shops, bookstores, groceries and theaters within walking distance of where people live. On a scale of 0-100, the average "walk" score for SUNY impact communities is 77 ("Very walkable," with most daily destinations within walking distance) while the surrounding counties average only 25 ("Car-dependent," with some amenities reachable by foot).

Source: WalkScore.com. See "Walk Scores" in Data Notes for more information.

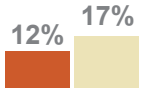
...fewer residents leaving the county for work

Likely due to greater employment opportunities in the community, a greater proportion of residents of SUNY impact communities are able to work within the same county compared with those in the rest of the county.



...and lower housing vacancy rates

SUNY "lives" in the community, and helps draw others there to live and work, contributing to lower housing vacancy rates relative to the surrounding county.



Source: 2005-09 American Community Survey. See "Demographic & Housing Data" in Data Notes for more information.

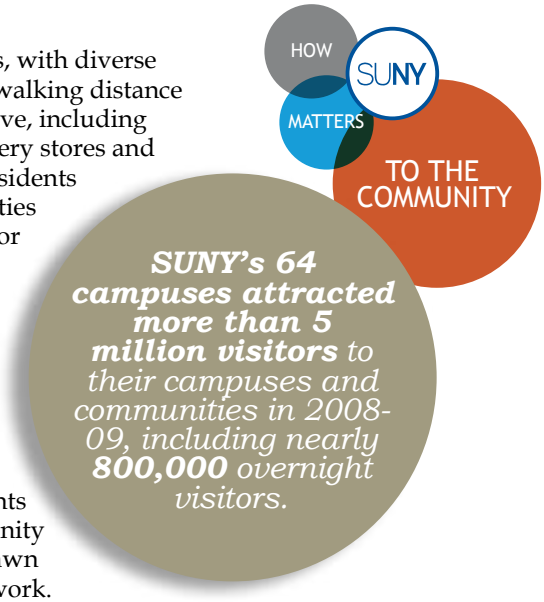
Related Finding

One in five businesses in NYS is within a mile radius of a SUNY.

Source: U.S. Census Bureau On the Map, 2008. See "Employment Locations in New York State" in Data Notes for more information.

and inform public policy. Using their communities as laboratories, students and faculty supply new understanding and knowledge through applied research. SUNY students, faculty and staff live in the community and surrounding region. Businesses catering to SUNY students, faculty, staff and visitors — from cultural centers to coffee shops — are drawn to the area, creating a critical mass of jobs, services and amenities for the population.

These impacts are clearly evident within the nine SUNY impact communities, across several measures of economic vibrancy and community vitality. These communities are more pedestrian-friendly than are surrounding areas, with diverse amenities within walking distance of where people live, including coffee shops, grocery stores and theaters. Fewer residents in these communities leave the county for work compared with residents of the rest of the county. Even housing vacancy rates are lower in SUNY impact communities as faculty and students live in the community and others are drawn there to live and work.



SUNY & Community Vitality

SUNY Cortland's Main Street outreach facility houses civic engagement activities and economic development programming provided by the City of Cortland's Downtown Partnership Alliance, including space for college/community networking, an art gallery, classrooms, and programs sponsored by the Cortland Center for Economic Education and others. SUNY Cortland also has long been engaged in a community-wide leadership task force system that sets priorities for addressing community needs.

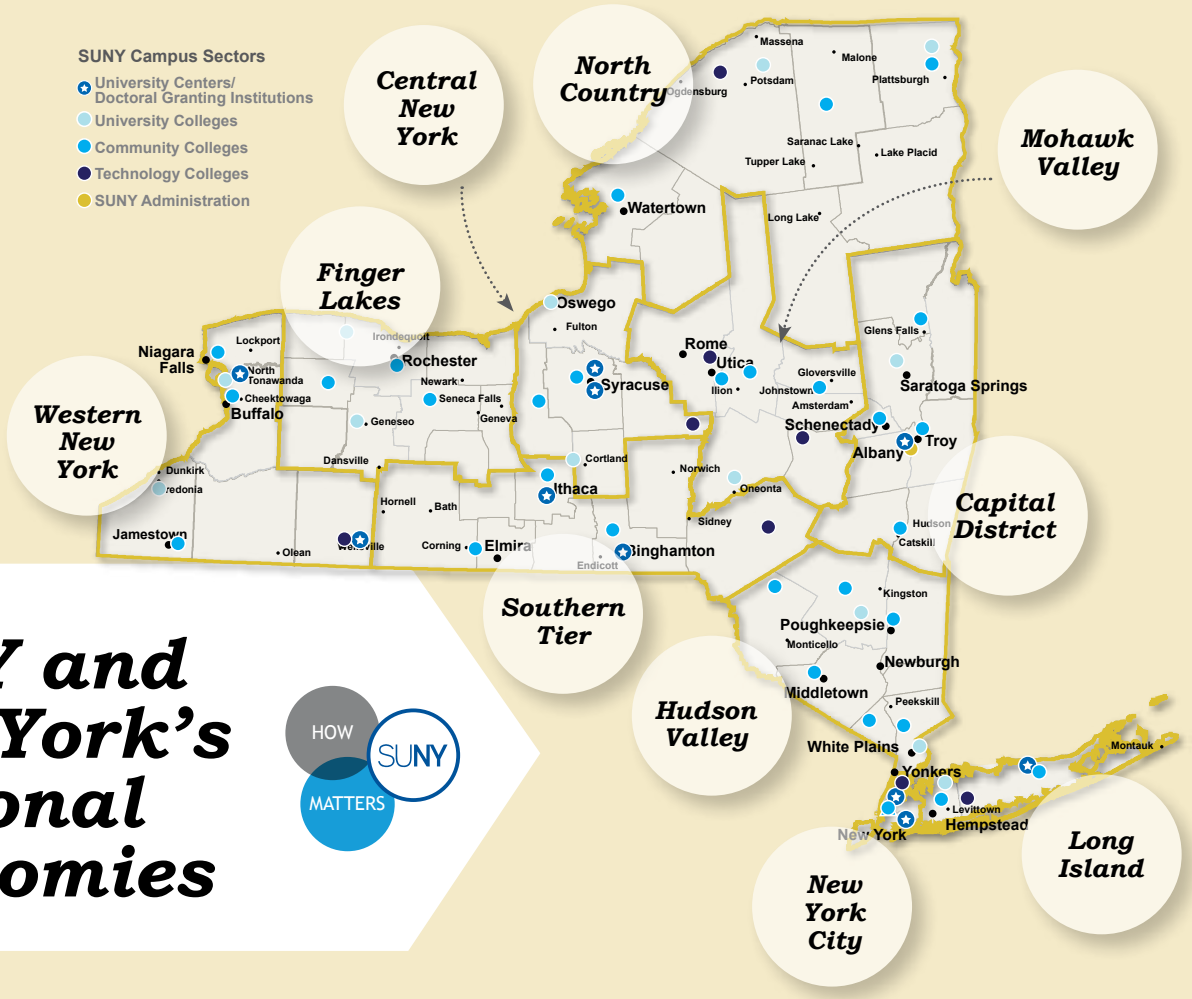
SUNY Delhi's O'Connor Center for Community Engagement devotes some 20,000 hours of service from students, faculty and staff to a wide array of civic groups every year. The school has been named to the President's Higher Education Community Service Honor Roll for a fourth consecutive year.

SUNY Geneseo operates a thriving destination restaurant, inn and banquet/wedding/meeting facility that draws from four counties, provides employment opportunities and anchors the Geneseo business district.

SUNY Morrisville students and faculty are at the center of the Keys to Work Initiative, a collaboration between Morrisville and the Madison County Community Action Partnership. The school provides the facility, technology and student labor to repair vehicles that the Madison County CAP helps community members obtain for transportation to work. Students gain valued learning experience while offering direct assistance to community members in need.

The Center for Research, Regional Education and Outreach at **SUNY New Paltz** provides multiple research activities concerning public policy issues of regional and statewide significance in areas such as regional well-being, intergovernmental collaboration and efficiency, and water quality. CRREO research provides numerous opportunities for student participation in these projects.

SUNY Plattsburgh's Technical Assistance Center helps public agencies, nonprofits, businesses and industries in northern New York achieve their planning and development goals by providing applied research, economic analysis and project implementation and management. Drawing from Plattsburgh faculty, the center provides the community with substantial expertise in economic and community development, planning, demographics, economic impact analysis, workforce development, tourism, marketing research and rural broadband.



SUNY and New York's Regional Economies

SUNY has a presence in every corner of New York State, with 64 institutions serving communities of every type, from the small village of Alfred in Western New York to the rural town of Clinton in North Country to densely populated Nassau County on Long Island. Yet across the 10 regions of New York State, the SUNY presence varies in its mix of institutions, programs and services, both to fit the unique economic, workforce and community needs of its host region, and to support a comprehensive SUNY system of higher education.

The colleges and universities of SUNY are in many ways reflections of the communities they serve. Residents, industries and businesses shape academic programs, enrich the exchange of ideas and knowledge and lend a distinct sense of place and cultural flavor. In turn, SUNY institutions leverage wide-ranging impacts, driving regional economies with new dollars, businesses and jobs, providing a skilled workforce and supporting a robust process of knowledge transfer. SUNY also supports vibrant communities across the state through physical development, a diverse population and cultural enrichment. At the same time, the academic specializations and innovative programs of each region complement one another to build a stronger New York State economy, a better prepared state workforce and higher quality of life for the entire state population.

SUNY's Impacts Across Regions At-a-Glance for 2008-09

	SUNY AFFILIATES: STUDENTS	EMPLOYEES	ALUMNI	SUNY affiliates as a % of the region's population	Total degrees from region's SUNYs (2008-09)	Economic impact of region's SUNYs on NYS economy
Capital District *p. 50*	44,200	8,800	166,000	*21% of 1.1 million population*	*7,300 (36% of total grads in region)*	*$2.1 billion*
Central New York *p. 56*	40,600	8,300	107,000	*22% of 713,000 population*	*6,500 (47% of total grads in region)*	*$2.1 billion*
Finger Lakes *p. 62*	48,300	5,600	188,000	*20% of 1.2 million population*	*7,600 (43% of total grads in region)*	*$1.1 billion*
Hudson Valley *p. 68*	57,300	7,400	181,000	*11% of 2.3 million population*	*7,300 (32% of total grads in region)*	*$1.3 billion*
Long Island *p. 74*	85,000	16,000	325,000	*15% of 2.9 million population*	*13,100 (45% of total grads in region)*	*$3.9 billion*
Mohawk Valley *p. 80*	25,200	3,700	75,000	*19% of 550,000 population*	*4,200 (73% of total grads in region)*	*$683 million*
New York City *p. 86*	17,800	4,700	150,000	*2% of 8.5 million population*	*4,800 (4% of total grads in region)*	*$1.9 billion*
North Country *p. 92*	22,300	3,500	61,000	*37% of 236,000 population*	*4,200 (73% of total grads in region)*	*$604 million*
Southern Tier *p. 98*	44,700	9,400	97,000	*23% of 646,000 population*	*8,700 (58% of total grads in region)*	*$2.0 billion*
Western New York *p. 104*	48,400	16,400	235,000	*24% of 1.4 million population*	*15,100 (64% of total grads in region)*	*$3.7 billion*

The sum of regional economic impacts is slightly less than total statewide economic impacts due to rounding within the separate impact models.

The following pages frame the SUNY economic footprint — its institutions, students, faculty and staff and alumni — in the context of these 10 regions, each uniquely defined by its economic structure, industrial foundation and population makeup. The associated impacts are explored with key facts, figures and analysis:

Driving the Economy: The economic impact of each region's SUNY institutions and their contributions to the innovation economy.

Preparing the Knowledge Workforce: Skills and capacities provided by SUNY alumni living in the region and graduates of the region's SUNY institutions.

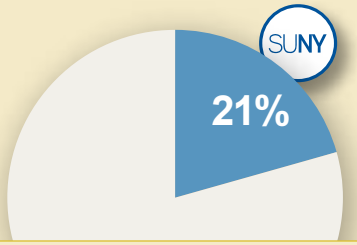
Cases in Point: Select programs of SUNY institutions profiled for innovative approaches to economic development.

SUNY in the Capital District

The Capital District of New York State is home to six SUNY institutions, including the University at Albany, the system's third largest research university, four community colleges, one technology college and SUNY Administration. The region's more than 44,000 SUNY students hail predominantly from within the eight-county region, with levels of international and out-of-state enrollment in line with the SUNY average. More than 166,000 SUNY alumni live in the region, the fifth largest cluster of SUNY grads in the state. Together these SUNY students, alumni and faculty and staff comprise about 21 percent of the Capital District's total population.

The Capital District Economy

Billed as the "Tech Valley" of New York State, the Capital District has emerged as the state's hotbed of innovation and invention, and SUNY is at the forefront, providing the education, training and business support to foster entrepreneurship, new technology development and direct economic growth. Generating a $2.1 billion economic impact, this region's SUNY institutions also prepare graduates for strategic industry clusters in electronics and imaging. Among SUNY's leading economic development efforts in the region are the University at Albany's College of Nanoscale Science and Engineering, a nexus for research, tech transfer and new business creation. Hudson Valley Community College's TEC-SMART center trains businesses in the renewable technologies industry, and Schenectady Community College is ramping up the health care workforce by building skills among low-income individuals.



In '08-'09, SUNY students, employees and alumni accounted for ***21% of the Capital District's population.***

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment and employee counts. Current alumni counts are from SUNY campuses. Population data are from 2009 American Community Survey. See "Alumni Data" and "Demographic & Housing Data" in Data Notes for more information.

STUDENTS

44,200 students attended a Capital District SUNY school.

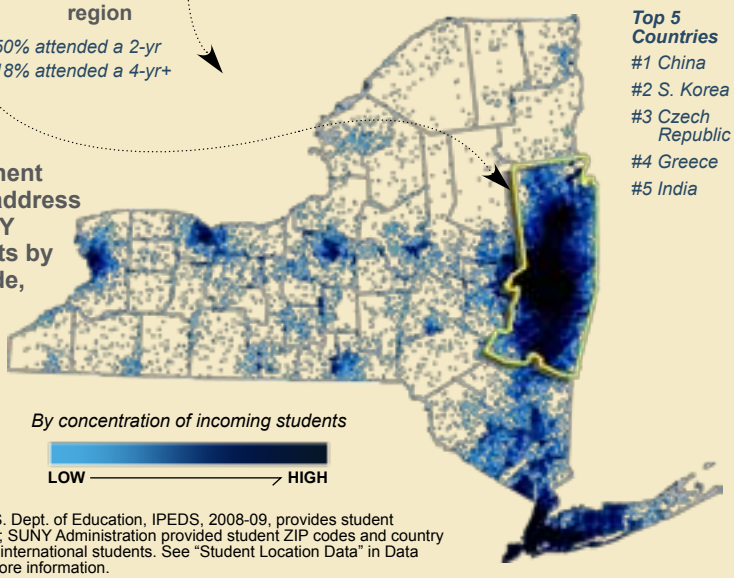
Where these students originated...

- **68%** from within this region
  - *50% attended a 2-yr*
  - *18% attended a 4-yr+*
- **26%** from elsewhere in NYS
- **2%** from elsewhere in U.S.
- **4%** from elsewhere in world

Top 5 Countries

#1 China
#2 S. Korea
#3 Czech Republic
#4 Greece
#5 India

Permanent home address of SUNY students by ZIP code, 2010



By concentration of incoming students

LOW → HIGH

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollments; SUNY Administration provided student ZIP codes and country of origin for international students. See "Student Location Data" in Data Notes for more information.

EMPLOYEES

8,800

SUNY faculty and staff employed in the Capital District.

Source: U.S. Dept. of Education, IPEDS, 2008-09, and SUNY Research Foundation. See "Employment by SUNY" in Data Notes for more information.

ALUMNI

166,000

SUNY alumni live in the Capital District.

- **103,000** ...graduated from a SUNY in this region and stayed in this region.
- **63,000** ...graduated from a SUNY elsewhere in NYS and now live in this region.

Source: SUNY institutions provided alumni data as of 2010. See "Alumni Data" in Data Notes for more information.

SUNY DIVERSITY

- **24%** Minority students
- **21%** Students from a low-income ZIP code (20%+ children live below poverty line)
- **18%** Non-traditional students (age 30+)

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment by race/ethnicity and age. Students from low-income ZIP codes are from 2010 student ZIP codes from SUNY Administration, and poverty data by ZIP code are from 2005-09 American Community Survey. See "Diversity of SUNY Students" in Data Notes for more information.

Capital District SUNYs Generate a $2.1 Billion Economic Impact

HOW SUNY MATTERS TO THE ECONOMY

Here's how it happens...

SUNY attracts revenues from a range of public and private sources...

$1.1 billion in revenues

$135 M tuition & fees
$74 M auxiliary service sales
$476 M NYS appropriations, grants & contracts
$148 M federal appropriations, grants & contracts
$228 M other sources

28% Sponsored research dollars
17% Estimated out-of-state revenues

SUNY campuses, employees, students and visitors purchase goods and services...

$1.4 billion in spending

$576 M by SUNY on employee wages & benefits
$601 M by SUNY on other institutional purchases
$210 M by students
$10 M by overnight visitors
(427,500 visitors, 17% overnight)

88% Estimated spending in NYS
65% Estimated spending in region

Those dollars circulate through the state and regional economy, stimulating additional economic activity and greater total impacts...

Economic Output

$2.1 billion in NYS, and 62%, or $1.3 billion, in the Capital District

Employment Impact

17,600 jobs

SUNY employment: 8,800
Jobs indirectly supported: 8,800

Taxes Generated

$36 M in total taxes generated for NYS and the Capital District

$11 M income taxes
$11 M sales taxes
$14 M property taxes

**Sum total may differ slightly due to rounding*

$2.1 B / $476 M

Represents a ***$4.40*** *return on investment for every dollar of state funding*

Driving the Economy

The $2.1 billion economic impact of SUNY in the Capital District supports nearly 8,800 jobs in related businesses on top of 8,800 faculty and staff. About two in three dollars of this output stays in the Capital District economy. Annual tax impacts from these SUNY institutions as well as SUNY Administration approach $36 million.

A major factor in SUNY's impact in the Capital District, the University at Albany is distinguished not only by its size, but also in its attraction of the most sponsored research dollars of any SUNY institution. Overall, sponsored research dollars represent 28 percent of revenues for this region's SUNYs compared to an 8 percent average statewide. Behind this impact is the University at Albany's NanoTech Complex, a network of high-tech research buildings housing the school's College of Nanoscale Science and Engineering and more than 2,500 scientists, researchers and technicians

SUNY & the Innovation Economy

In the best of the last three years, Capital District SUNYs generated....

- 27 invention disclosures
- 19 patent applications
- 5 patents
- 2 spin-offs
- 2 start-ups
- 6 licenses

Source: Interview and survey data from SUNY institutions.

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides revenues, spending and employment counts. SUNY campuses provided data on out-of-state revenue and spending. Impacts have been calculated using IMPLAN. Note that these data do not include the impact of spending by businesses allied with or served by SUNYs – such as the very large corporate presence at Albany Nano. Tax impacts are based on data from NYS Dept. of Taxation and Finance and NYS Office of Real Property Tax Services. See "Economic Impact," "Employment by SUNY," "Revenues and Spending of SUNY Institutions," "Student Spending," "Survey of SUNY Campuses," "Tax Impacts" and "Visitor Spending" in Data Notes for more information.

collaborating on innovative new technologies and discoveries.

Such SUNY-led economic development happens in many other ways, large and small, in this region. For instance, Columbia-Greene Community College's Professional Academic Center provides equipment, training resources and meeting spaces for businesses, while Hudson Valley Community College offers an alternative energy training center at the Saratoga Technology and Energy Park.

SUNY also makes important contributions to community vitality through its programs. As one example, the region's SUNY campuses lured nearly 430,000 visitors in 2008-09 through cultural assets, special events and activities, supporting local businesses from hotels to restaurants.

SUNY Administration, located in Albany, is also an important part of the SUNY economic impact in this region. Employing more than 500 and with a budget of roughly $250 million, this office contributes from 10 percent to 20 percent of the region's total SUNY economic impact. This office's spending and revenue picture also accounts for the region's slightly higher reliance on New York State appropriations, grants and contracts relative to other regions of the state.

See also SUNY at Work: Albany Nano: The Story of One Entrepreneurial Physics Professor (p. 18).

CASE IN POINT

Hudson Valley Community College

Hudson Valley Community College Gears Up to Fill High-Tech Needs

When GlobalFoundries announced it would build a $4.6 billion chip-fab plant in Saratoga County, it was both a challenge and an opportunity for workforce development in the Capital District. The challenge was that the region's leaders knew they did not, yet, have enough workers trained to meet the needs of the promised new facility. The opportunity was this need to train those workers could thrust the region's workforce development programs to a whole new level.

One key response came quickly from Hudson Valley Community College, which launched what became known as TEC-SMART, a whole new facility which it opened in January 2010. The facility (the full name is Training and Education Center for Semiconductor Manufacturing and Alternative and Renewable Technologies), is a joint initiative between the college and the New York State Energy Research and Development Authority. It is located at the Saratoga Technology and Energy Park, which is next to the Luther Forest Technology Campus, where the GlobalFoundries plant is under construction.

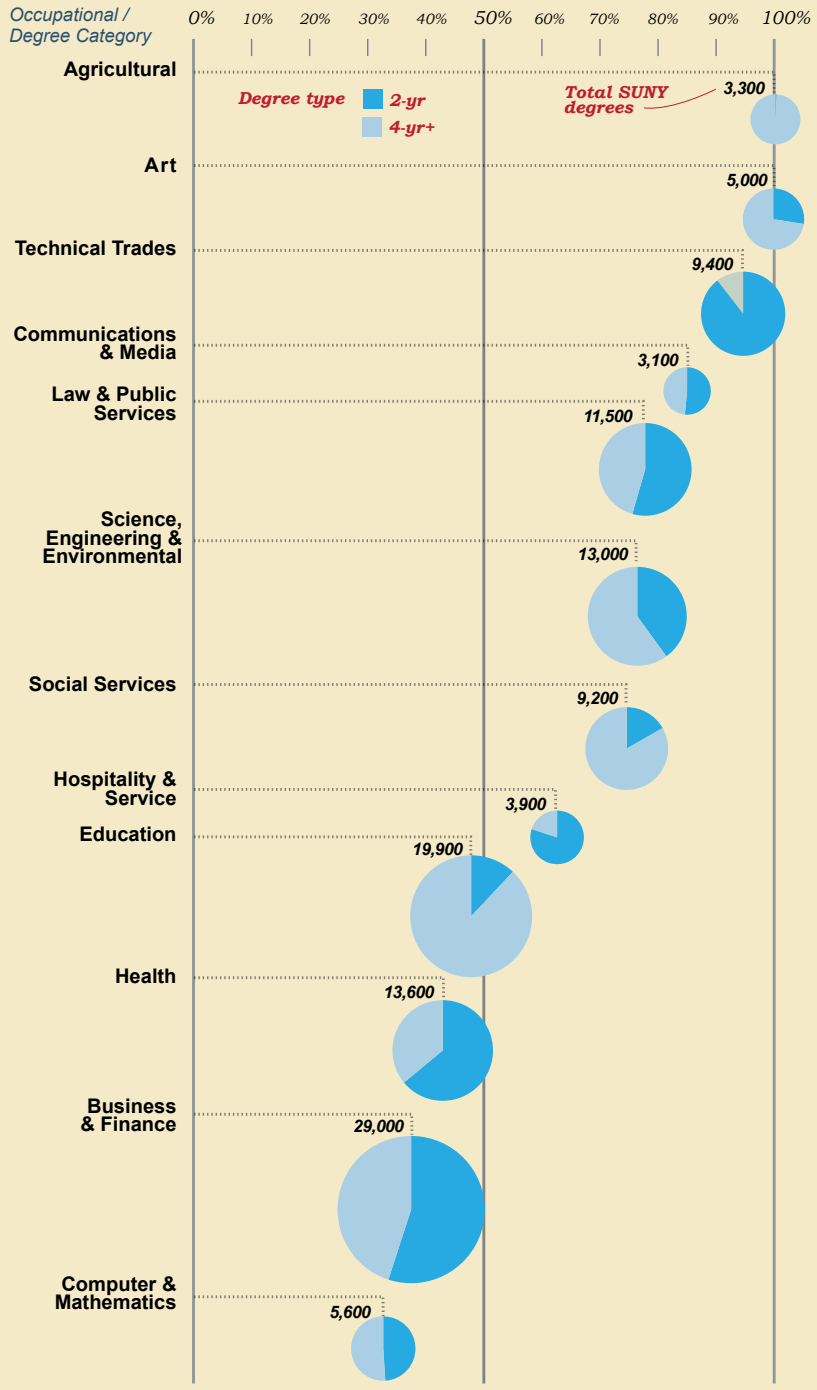
But its mission is not limited to training workers just for that chip-fab plant. Instead, the college has taken the opportunity posed by that immediate training need to craft a longer-term strategy for a center that will also train skilled technicians for the growing renewable energies field, helping to accelerate the regional growth of that industry, as well.

TEC-SMART features more than a dozen state-of-the-art classrooms and laboratories that will be used to train the workforce in semiconductor manufacturing, green technologies, including photovoltaic and in-home energy efficiency, geothermal, alternative fuels and wind energy. It has two 120-foot-high wind turbines that will be used for training and that will also generate nearly 2,500 kilowatt hours of energy to help power the campus.

In addition, the college says the facility will offer courses in business and in the liberal arts and sciences area, including English, psychology and math, making it easier for students who go there with a vocation in mind to take the broader curriculum that will qualify them for full associate's degrees.

How SUNY graduates match up with workforce needs across the range of industries in the Capital District

Degrees held by SUNY alumni as a proportion of jobs requiring a degree or advanced skill in related industries



While bringing important capacities to the workforce, liberal arts degrees are too broad to be matched to a specific occupational field and were thus excluded from this analysis.

Source: SUNY institutions provided alumni ZIP codes and field of study; occupational data are from NYS Dept. of Labor. See "Alumni Data" in Data Notes for more information.

Preparing the Workforce

The Capital District's more than 166,000 SUNY alumni are a critical source of labor for the region's explosive innovation- and technology-based economy. With a significant two-year college presence, as well as one of the state's largest university centers, the Capital District is bolstered by a diverse SUNY-trained workforce.

The 13,000 SUNY alumni holding degrees in science, engineering & environmental fields can fill more than three-quarters of related degree-requiring jobs in the region. Most of these degrees are related to engineering and biomedicine, reflecting the region's growing nanotech industry.

Representative of the governmental functions of the Capital District, large numbers of alumni with law and public service degrees reside in the region. These include alumni of the University at Albany's political science and public administration programs as well as graduates of the University at Buffalo Law School. From the region's community colleges come many alumni with degrees related to criminal justice and paralegal services.

Extensive vocational programs in the trades and hospitality in the region contribute to an alumni pool with the potential to fill six in 10 and nine in 10 degree-requiring jobs in these fields, respectively.

Granting 7,300 degrees every year, SUNY accounts for about one in three college graduates in the Capital District. Historic alumni patterns show just over one-third stay in the Capital District to live and work, and nearly three in four stay in the state, suggesting the major role these SUNYs play in supplying knowledge workers statewide.

Albany's College of Nanoscale Science and Engineering generates graduates primed for work in the Capital District's nanotechnology industry, including the region's proportionally high number of degrees related to electronics & imaging, a strategic state cluster industry.

Through an array of coordinated training and skills-building programs for emerging industries and, most immediately, the expansion of GlobalFoundries in Malta, N.Y., SUNY has taken on the lead role in workforce preparation in the Capital District. For instance, SUNY Adirondack's Tech Valley Track emphasizes engineering, science, technology and mathematics, as well as "must-have" complementary skills in problem solving, proactive decision making, opportunistic collaboration, interpersonal accountability, business ethics and a global outlook in the workplace. Hudson Valley Community College has developed TEC-SMART to train skilled technicians for GlobalFoundries. Meanwhile, other programs address workforce shortages in core industries, such as Schenectady County Community College's efforts to train health care workers.

Capital District SUNYs Generate a Large Share of Degrees for NYS Cluster Industries

Electronics & Imaging; Information Technology; Back Office

SUNY prepares the state's workforce for strategic cluster industries by granting degrees required by jobs in those industries. A "large share" of cluster-related degrees indicates this region's SUNYs contribute proportionally more to SUNY's total degrees for one or more clusters than they do to SUNY degrees overall.

CASE IN POINT

Photo courtesy of Ellis Medicine

Health care employers have a hard time finding trained workers — and welfare recipients need jobs. This project puts the two together.

Schenectady County Community College

Schenectady County Community College Launching New Program to Fill Health Care Needs

Schenectady County Community College has obtained a major grant from the federal Department of Health and Human Services to train health care workers. Totaling $11.2 million, the grant is the largest such grant in New York State and is designed to train Temporary Assistance to Needy Families (TANF) recipients and low-income individuals for professional jobs in the health care field. These include Certified Nursing Assistant (CNA), Licensed Practical Nurse (LPN), Registered Nurse (RN) and Emergency Medical Technician (EMT). Schenectady will also develop a Health Information Technology (HIT) training program. The Center for Workforce Health Studies documented the high demand for trained employees in these occupations in the Capital District. Schenectady will partner with community agencies on the project, named Health Care Opportunities. During its five-year life, the effort will train some 600 individuals annually. The project includes outreach efforts, skills assessment, ongoing case management support, transportation, dependent care and temporary housing so students can maintain employment and pursue career advancement. Job retention and career advancement outcomes will also be tracked.

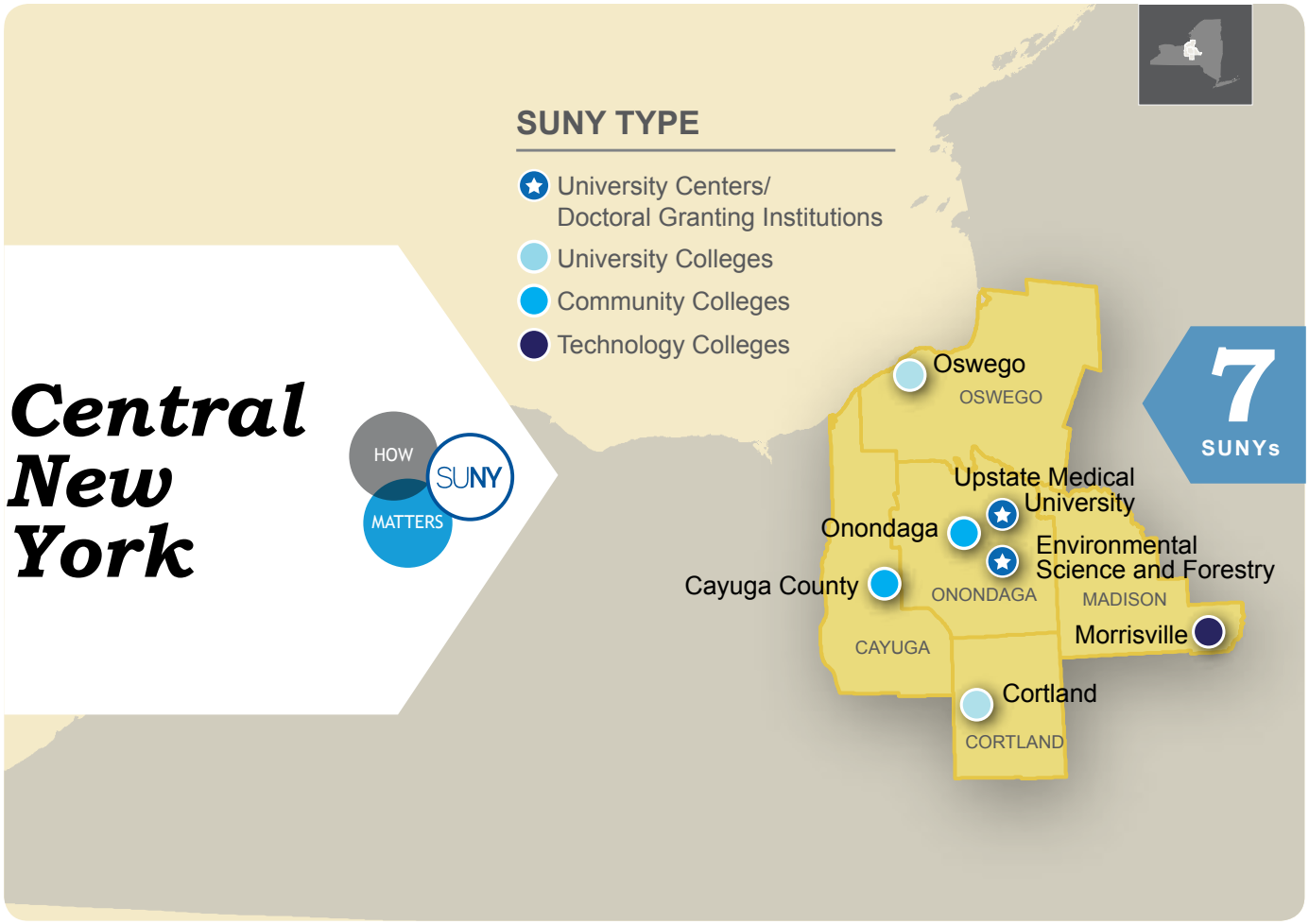
BY THE NUMBERS

SUNY alumni living in region as % of region's total labor supply **29%**

Total degrees from region's SUNYs (2008-09) **7,300**

SUNY grads as a % of total grads in this region **36%**

Source: SUNY institutions provided current alumni data; labor supply is from NYS Dept. of Labor. Degrees awarded are from U.S. Dept. of Education, IPEDS, 2008-09. See "Alumni Data" and "Student Location Data" in Data Notes for more information.

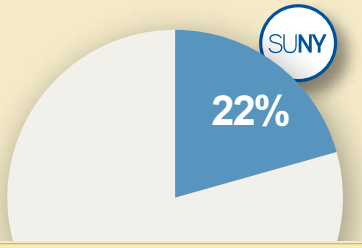


SUNY in Central New York

Central New York's seven SUNY institutions offer a diverse range of educational opportunities, including two university centers with academic specialties in medicine and the environmental sciences. With student enrollment just over 40,000, Central New York has a mid-sized SUNY presence, with a dense network of connections to the economy and people of the region. About half of the 107,000 SUNY alumni living in Central New York are products of one of these seven institutions. Overall, SUNY students, alumni and faculty and staff comprise one-fifth of the region's population.

The Central New York Economy

SUNY is a big part of the region's transition to a knowledge-based economy, fostering growth in such industries as health care and medical devices, bioprocessing, electronics and clean energy technologies. Among its economic development support programs are Cayuga Community College's entrepreneurial training and a major SUNY partnership with private universities to build a biotechnology incubator. At the same time, SUNY supports advances in the region's manufacturing base through vocational degree programs that retool the skilled workforce. As to the bottom line: these institutions pump $2.1 billion into the state and regional economies on an annual basis.



In '08-'09, SUNY students, employees and alumni accounted for ***22% of Central New York's population.***

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment and employee counts. Current alumni counts are from SUNY campuses. Population data are from 2009 American Community Survey. See "Alumni Data" and "Demographic & Housing Data" in Data Notes for more information.

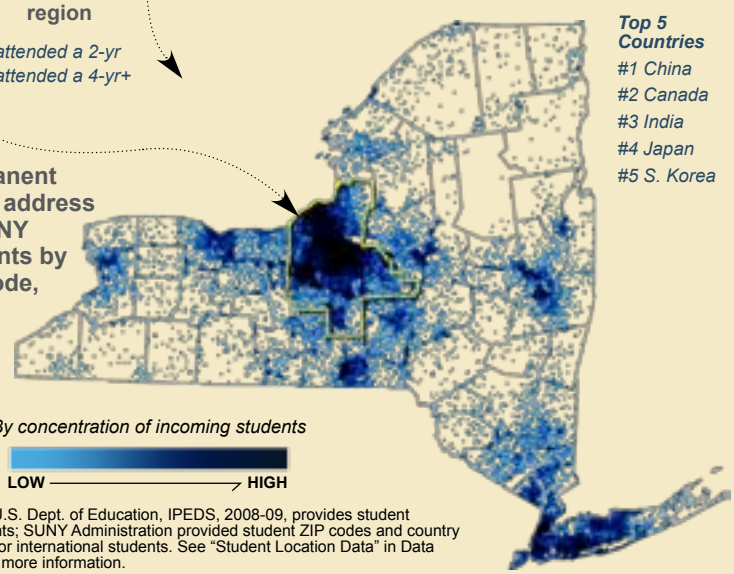
STUDENTS

40,600 students attended a Central New York SUNY school.

Where these students originated...

- **63%** from within this region
  - *43% attended a 2-yr*
  - *20% attended a 4-yr+*
- **31%** from elsewhere in NYS
- **3%** from elsewhere in U.S.
- **4%** from elsewhere in world
  - ***Top 5 Countries***
  - *#1 China*
  - *#2 Canada*
  - *#3 India*
  - *#4 Japan*
  - *#5 S. Korea*

Permanent home address of SUNY students by ZIP code, 2010



Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollments; SUNY Administration provided student ZIP codes and country of origin for international students. See "Student Location Data" in Data Notes for more information.

EMPLOYEES

8,300

SUNY faculty and staff employed in Central New York.

Source: U.S. Dept. of Education, IPEDS, 2008-09, and SUNY Research Foundation. See "Employment by SUNY" in Data Notes for more information.

ALUMNI

107,000

SUNY alumni live in Central New York.

- **57,000** ...graduated from a SUNY in this region and stayed in this region.
- **50,000** ...graduated from a SUNY elsewhere in NYS and now live in this region.

Source: SUNY institutions provided alumni data as of 2010. See "Alumni Data" in Data Notes for more information.

SUNY DIVERSITY

- **14%** Minority students
- **24%** Students from a low-income ZIP code (20%+ children live below poverty line)
- **16%** Non-traditional students (age 30+)

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment by race/ethnicity and age. Students from low-income ZIP codes are from 2010 student ZIP codes from SUNY Administration, and poverty data by ZIP code are from 2005-09 American Community Survey. See "Diversity of SUNY Students" in Data Notes for more information.

Central New York SUNYs Generate a $2.1 Billion Economic Impact

HOW SUNY MATTERS TO THE ECONOMY

Here's how it happens...

SUNY attracts revenues from a range of public and private sources...

$1.3 billion in revenues

$123 M tuition & fees
$552 M auxiliary service sales
$445 M NYS appropriations, grants & contracts
$87 M federal appropriations, grants & contracts
$78 M other sources

4% Sponsored research dollars
9% Estimated out-of-state revenues

SUNY campuses, employees, students and visitors purchase goods and services...

$1.6 billion in spending

$799 M by SUNY on employee wages & benefits
$595 M by SUNY on other institutional purchases
$199 M by Students
$9 M by overnight visitors
(766,400 visitors, 9% overnight)

84% Estimated spending in NYS
68% Estimated spending in region

Those dollars circulate through the state and regional economy, stimulating additional economic activity and greater total impacts...

Economic Output

$2.1 billion in NYS, and 71%, or $1.5 billion, in Central New York

Employment Impact

17,600 jobs

SUNY employment: 8,300
Jobs indirectly supported: 9,300

Taxes Generated

$48 M in total taxes generated for NYS and Central New York

$23 M income taxes
$15 M sales taxes
$10 M property taxes

**Sum total may differ slightly due to rounding*

$2.1 B / $445 M

Represents a ***$4.70*** *return on investment for every dollar of state funding*

Driving the Economy

Central New York SUNYs' $2.1 billion economic impact includes a $1.5 billion impact on the regional economy. In 2008-09, this economic activity supported more than 9,300 jobs in related industries across the state, in addition to 8,300 faculty and staff employed by SUNY in this region. Taxes generated for local and state government totaled $48 million.

The primary driver of the $2.1 billion Central New York SUNY impact is the Upstate Medical University, which enrolls just over 2,000 students and includes a major university hospital. The university accounts for more than half of SUNY's economic impact in this region, derived primarily from revenues for hospital services.

The region's university centers are prolific generators of research and innovation, with 32 invention disclosures, seven patents and one spin-off in one year. Additionally, Upstate Medical and the College of Environmental Science and Forestry

SUNY & the Innovation Economy

In the best of the last three years, Central New York SUNYs generated....

- 32 invention disclosures
- 13 patent applications
- 7 patents
- 1 spin-off
- 3 licenses

Source: Interview and survey data from SUNY institutions.

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides revenues, spending and employment counts. SUNY campuses provided data on out-of-state revenue and spending. Impacts have been calculated using IMPLAN. Tax impacts are based on data from NYS Dept. of Taxation and Finance and NYS Office of Real Property Tax Services. See "Economic Impact," "Employment by SUNY," "Revenues and Spending of SUNY Institutions," "Student Spending," "Survey of SUNY Campuses," "Tax Impacts" and "Visitor Spending" in Data Notes for more information.

are partnering with Syracuse University and several other private colleges in the region to develop a Biotechnology Research Center to nurture start-up ventures.

SUNY supports community vitality in Central New York through an array of special programs and services. For instance, SUNYs in this region are frequent and committed partners on community development initiatives. Morrisville State College operates a food processing facility for local farmers and producers, and SUNY Cortland's Main Street outreach facility offers civic engagement opportunities, cultural spaces and economic development programs. The five SUNY institutions of Central New York combined to draw over 766,000 visitors to their campuses in 2008-09, with more than 68,000 overnight visitors spending $9 million at local hotels, restaurants and attractions.

CASE IN POINT

SUNY's Upstate Medical University and the College of Environmental Science and Forestry

SUNY Institutions In Syracuse Pool Efforts To Build Biotechnology

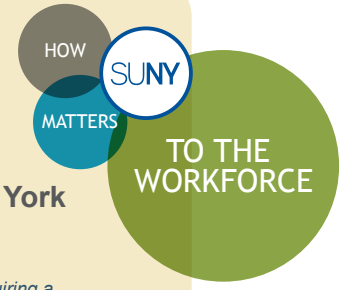
Bringing advances in biotechnology to the commercial marketplace is the goal of the Central New York Biotechnology Research Center (BRC).

Led by SUNY's Upstate Medical University and the College of Environmental Science and Forestry (ESF), the BRC also includes Syracuse University, LeMoyne College and private interests. Construction of the BRC was funded by the State University Construction Fund and other state monies.

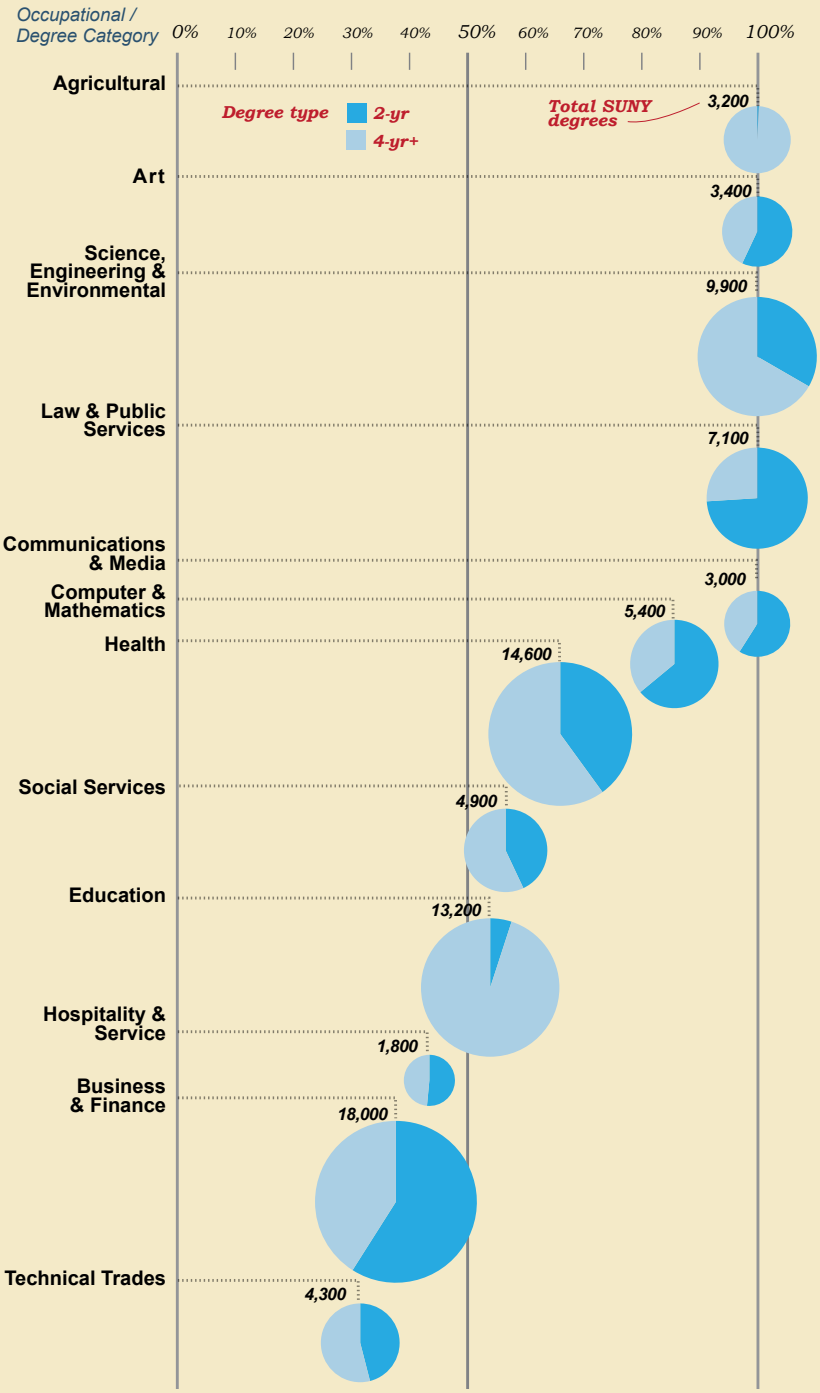
The $20 million building will house 12 wet lab/office modules with room for up to 100 scientists and entrepreneurs. The 50,000-square-foot facility, expected to open in spring 2012, is located within walking distance of Upstate and ESF as well as a private business incubator and the Syracuse Center of Excellence in Technology in Energy and Environmental Systems.

The BRC is designed to attract spin-off companies from Upstate Medical, ESF and Syracuse University, privately owned start-up ventures and laboratories of established companies seeking to locate near a growing science, research and entrepreneurial cluster. To continue building interest in this new incubator, the BRC will convene its third annual Biotechnology Symposium in June 2011. The two main program tracks – Uses of Biotechnology to Improve Health Care and Environmental Biotechnology Applications – are built around the synergy between Upstate Medical and ESF.

How SUNY graduates match up with workforce needs across the range of industries in Central New York



Degrees held by SUNY alumni as a proportion of jobs requiring a degree or advanced skill in related industries



While bringing important capacities to the workforce, liberal arts degrees are too broad to be matched to a specific occupational field and were thus excluded from this analysis.

Source: SUNY institutions provided alumni ZIP codes and field of study; occupational data are from NYS Dept. of Labor. See "Alumni Data" in Data Notes for more information.

Preparing the Workforce

Numbering over 107,000, SUNY alumni in Central New York represent one in four members of the region's skilled labor supply. In fact, SUNY alumni alone could fill every degree-requiring job in the region in fields as diverse as art and engineering. Computer & mathematics, a typically labor-strapped field, benefits from a pool of 5,400 SUNY alumni with related degrees and enough capacity to fill four out of five jobs in this industry.

The region's specialized university centers play an important role in this abundant supply of highly trained workers. For instance, nearly 4,400 graduates from SUNY Upstate Medical University are still in the region, holding degrees in medicine, medical technologies or therapies and nursing. These health graduates, along with alumni from other SUNYs, combine to 14,600 alumni with the capacity to fill more than two out of three health degree-requiring jobs.

With 9,000 alumni in Central New York, SUNY Cortland is the greatest source of SUNY bachelor's degrees in this region. Over two-thirds of these alumni hold degrees in education, contributing significantly to the region's ample supply of teachers and education experts.

Notably, SUNY alumni in Central New York have less capacity for filling jobs in the hospitality & service and technical trades industries, both of which depend fairly heavily on those holding two-year degrees.

While the region's seven SUNY institutions mint more than 6,500 graduates every year, most of these, about two in three, will leave the region for work, likely a factor of this upstate region's economic challenges. However, SUNY institutions are working aggressively to propel industry growth through strategic

workforce development. For instance, Upstate Medical is expanding access to its programs through branch campuses across upstate New York, and SUNY Oswego counsels community members on small business start-ups. Onondaga Community College's Small Business Development Center has one-to-one counseling and group training ranging from "Fast Track" for start-ups to business skills refinement for contractors. Additionally, Cayuga Community College provides a customized training program in lean manufacturing.

Central New York SUNYs Generate a Large Share of Degrees for NYS Cluster Industries

Communications, Software & Media Services

SUNY prepares the state's workforce for strategic cluster industries by granting degrees required by jobs in those industries. A "large share" of cluster-related degrees indicates this region's SUNYs contribute proportionally more to SUNY's total degrees for one or more clusters than they do to SUNY degrees overall.

CASE IN POINT

Cayuga Community College

Cayuga Community College Lays a Foundation for Entrepreneurship in Auburn

HOW SUNY MATTERS TO THE COMMUNITY

The Stardust Entrepreneurial Institute, a three-story facility in downtown Auburn, houses Cayuga Community College's workforce development program. It also houses five business incubator spaces, a "smart room" for conferences and classes, the county economic development agency and the Cayuga County Chamber of Commerce. This physical proximity and close coordination among the institute's partners — including the Stardust Foundation — enables the organization to offer would-be and new entrepreneurs a "first-stop" set of resources. Cayuga expanded on this approach and used an "infusion model" to embed an entrepreneurial approach throughout its academic curriculum. The college offers not only dedicated entrepreneurial classes but also opportunities to apply entrepreneurial principles in other academic programs including English, telecommunications, criminal justice, early childhood education and art. And specific, contract-based training is provided to local employers through Cayuga's Business and Industry Center.

Can a community college partner creatively with other community organizations to enhance economic and social development opportunities?

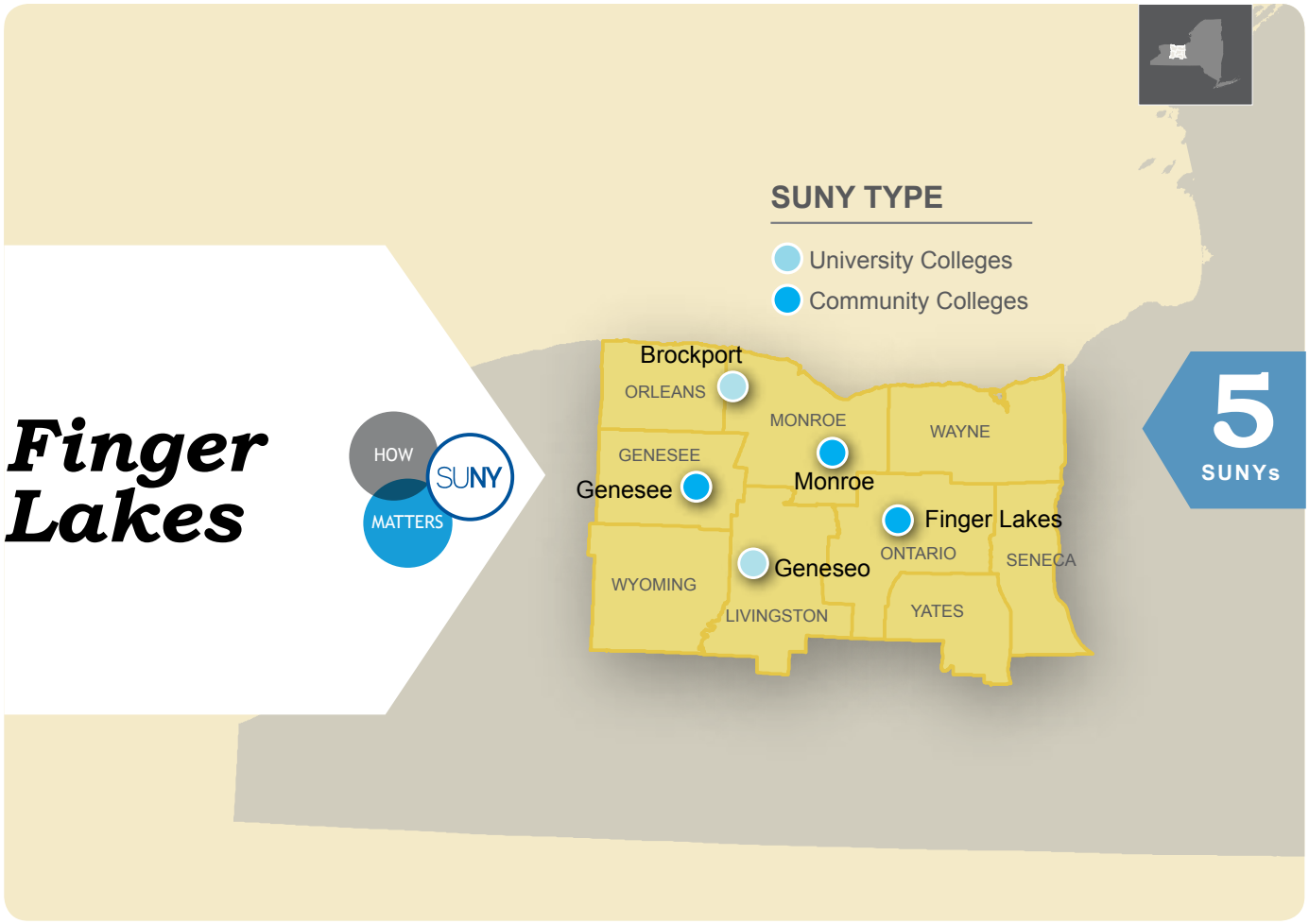
BY THE NUMBERS

SUNY alumni living in region as % of region's total labor supply **27%**

Total degrees from region's SUNYs (2008-09) **6,500**

SUNY grads as a % of total grads in this region **47%**

Source: SUNY institutions provided current alumni data; labor supply is from NYS Dept. of Labor. Degrees awarded are from U.S. Dept. of Education, IPEDS, 2008-09. See "Alumni Data" and "Student Location Data" in Data Notes for more information.

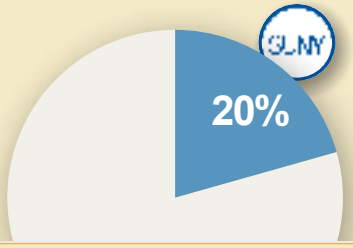


SUNY in the Finger Lakes

With Rochester as its metropolitan core, the Finger Lakes region holds five SUNY institutions, including two university colleges at Brockport and Geneseo. Its student population of over 48,000 makes the Finger Lakes the fourth largest concentration of SUNY students in the state. More than 188,000 SUNY alumni have settled in the region, with almost two in three of these a product of a Finger Lakes SUNY. About one in five of the Finger Lakes population is affiliated with SUNY as a student, employee or alumnus.

The Finger Lakes Economy

The Finger Lakes region is distinguished by its industry base in optics, imaging, high-tech electronics, manufacturing, life sciences, information technology, agriculture and tourism, all of which significantly rely on SUNY for a constant supply of new ideas and knowledge workers. While this region has a sizeable presence of private higher education, its SUNYs provide core economic development support. From a small business development center at SUNY Brockport to Monroe Community College's partnership with local hospitals to boost enrollment in its nursing program, Finger Lakes SUNYs are pursuing a diverse range of programs and policies that tap emerging economic opportunity while addressing critical gaps in talent and resources. Additionally, these schools serve as an economic engine generating over a billion dollars annually.



In '08-'09, SUNY students, employees and alumni accounted for ***20% of the Finger Lakes population.***

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment and employee counts. Current alumni counts are from SUNY campuses. Population data are from 2009 American Community Survey. See "Alumni Data" and "Demographic & Housing Data" in Data Notes for more information.

STUDENTS

48,300 students attended a Finger Lakes SUNY.

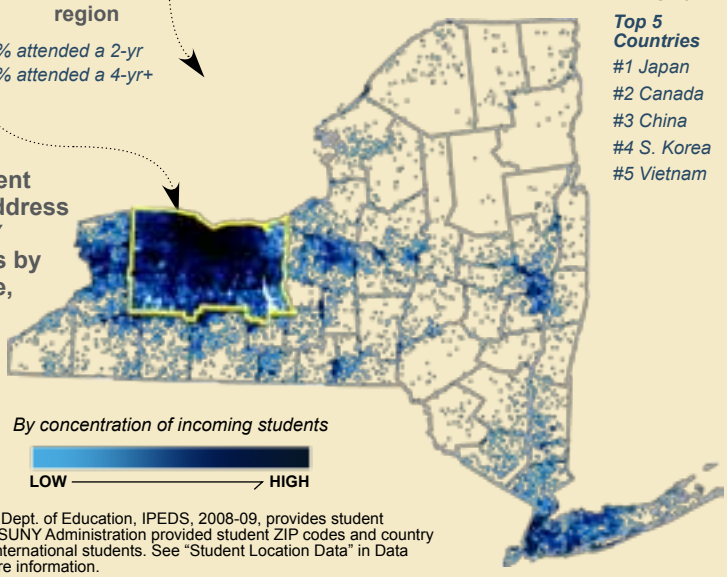
Where these students originated...

- **80%** from within this region
  - *65% attended a 2-yr*
  - *15% attended a 4-yr+*
- **18%** from elsewhere in NYS
- **1%** from elsewhere in U.S.
- **1%** from elsewhere in world

Top 5 Countries

#1 Japan
#2 Canada
#3 China
#4 S. Korea
#5 Vietnam

Permanent home address of SUNY students by ZIP code, 2010



By concentration of incoming students

LOW → HIGH

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollments; SUNY Administration provided student ZIP codes and country of origin for international students. See "Student Location Data" in Data Notes for more information.

EMPLOYEES

5,600

SUNY faculty and staff employed in the Finger Lakes.

Source: U.S. Dept. of Education, IPEDS, 2008-09, and SUNY Research Foundation. See "Employment by SUNY" in Data Notes for more information.

ALUMNI

188,000

SUNY alumni live in the Finger Lakes.

- **115,000** ...graduated from a SUNY in this region and stayed in this region.
- **73,000** ...graduated from a SUNY elsewhere in NYS and now live in this region.

Source: SUNY institutions provided current alumni data. See "Alumni Data" in Data Notes for more information.

SUNY DIVERSITY

- **18%** Minority students
- **20%** Students from a low-income ZIP code (20%+ children live below poverty line)
- **17%** Non-traditional students (age 30+)

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment by race/ethnicity and age. Students from low-income ZIP codes are from 2010 student ZIP codes from SUNY Administration, and poverty data by ZIP code are from 2005-09 American Community Survey. See "Diversity of SUNY Students" in Data Notes for more information.

Finger Lakes SUNYs Generate a $1.1 Billion Economic Impact

HOW SUNY MATTERS TO THE ECONOMY

Here's how it happens...

SUNY attracts revenues from a range of public and private sources...

$498 million in revenues

$103 M tuition & fees
$59 M auxiliary service sales
$209 M NYS appropriations, grants & contracts
$61 M federal appropriations, grants & contracts
$67 M other sources

1% Sponsored research dollars
14% Estimated out-of-state revenues

SUNY campuses, employees, students and visitors purchase goods and services...

$706 million in spending

$324 M by SUNY on employee wages & benefits
$181 M by SUNY on other institutional purchases
$198 M by students
$4 M by overnight visitors
(329,600 visitors, 9% overnight)

93% Estimated spending in NYS
79% Estimated spending in region

Those dollars circulate through the state and regional economy, stimulating additional economic activity and greater total impacts...

Economic Output

$1.1 billion in NYS, and 68%, or $750 million, in the Finger Lakes

Employment Impact

11,400 jobs

SUNY employment: 5,600
Jobs indirectly supported: 5,800

Taxes Generated

$21 M in total taxes generated for NYS and the Finger Lakes

$5 M income taxes
$9 M sales taxes
$7 M property taxes

**Sum total may differ slightly due to rounding*

$1.1 B / $209 M

*Represents a **$5.00** return on investment for every dollar of state funding*

Driving the Economy

Finger Lakes SUNYs send $1.1 billion into the state economy annually, with their spending and spinoff economic activity supporting nearly 6,000 jobs above and beyond 5,600 faculty and staff. About $750 million of these impacts, or almost 70 percent of the total impact, stays within the Finger Lakes regional economy. These SUNYs also supported over $21 million in sales, income and property taxes for state and local government in 2008-09.

SUNY & *the Innovation Economy*

In the best of the last three years, Finger Lakes SUNYs generated....

- 3 invention disclosures
- 42 patent applications
- 1 spin-off

Source: Interview and survey data from SUNY institutions.

Finger Lakes SUNYs make important contributions to community vitality in the region. Recreational and cultural amenities and other campus events and attractions helped draw roughly 330,000 visitors in 2008-09. The approximately 30,000 estimated to stay overnight spent $4.3 million on lodging, food and entertainment, primarily benefitting local businesses.

SUNY institutions in the Finger Lakes region also address regional economic challenges by providing businesses and community members with technical assistance and resources. For instance, Monroe Community College partners with a

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides revenues, spending and employment counts. SUNY campuses provided data on out-of-state revenue and spending. Impacts have been calculated using IMPLAN. Tax impacts are based on data from NYS Dept. of Taxation and Finance and NYS Office of Real Property Tax Services. See "Economic Impact," "Employment by SUNY," "Revenues and Spending of SUNY Institutions," "Student Spending," "Survey of SUNY Campuses," "Tax Impacts" and "Visitor Spending" in Data Notes for more information.

nonprofit in the region to sponsor students interested in careers in construction. The college provides a rigorous training program, while the nonprofit follows up with résumé development, interviewing skills and job placement. Genesee Community College's Business and Employee Skills Training Center offers counseling, training and industry research for entrepreneurs and organizations. SUNY Geneseo operates a destination restaurant and inn that draws visitors to the area and serves community members.

CASE IN POINT

Photo courtesy Newdigs.com

SUNY Geneseo

Geneseo Focuses On Entrepreneurship – for Business and for the Community

For more than seven years, SUNY Geneseo and its Small Business Development Center (SBDC) have worked with Rochester's South Wedge Planning Committee (SWPC) to create an economic development model that has delivered superior results in one of Rochester's designated redevelopment areas.

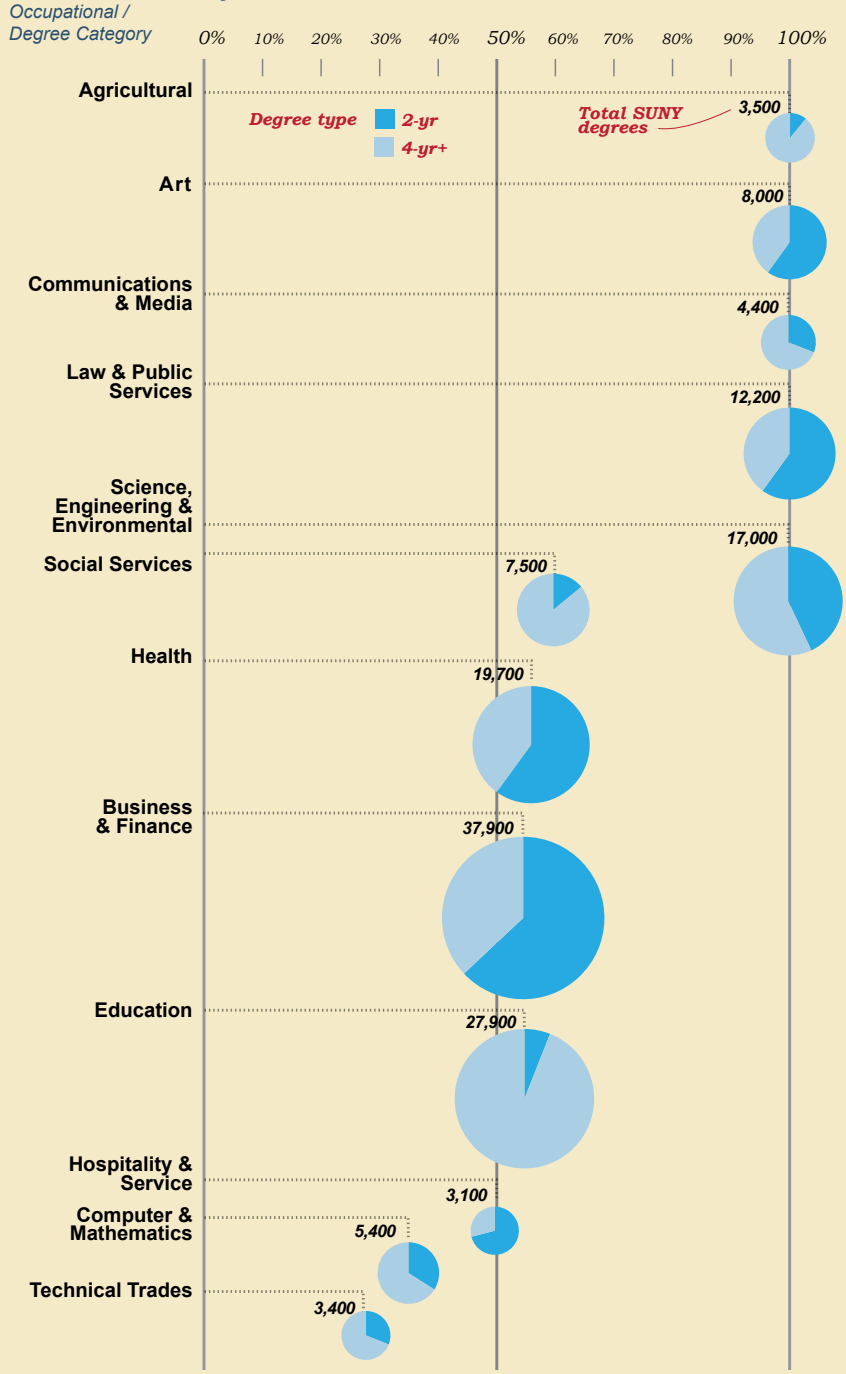
The SBDC encouraged SWPC, a neighborhood preservation committee, to adopt a comprehensive approach to redevelopment that has resulted in the South Wedge area becoming a model for other areas of the city. The South Wedge today is recognized as the "hottest" development area in the city with increased resident satisfaction, rising property values and a 90-percent success rate in new business start-ups after three years.

Geneseo student teams under SBDC direction have been providing business support services to the SWPC and to individual entrepreneurs in the area, strengthening these businesses while engaging in meaningful experiential learning. This support has engaged professors and students in community-wide market research and marketing planning that has identified and prioritized businesses desired by area residents and shoppers from surrounding areas.

The students' research and planning led to the creation and implementation of a very successful marketing campaign entitled "Savor Our Flavor," which has now been adopted by the community to celebrate and promote the area's ethnic and cultural diversity, as well as to promote business.

How SUNY graduates match up with workforce needs across the range of industries in the Finger Lakes

Degrees held by SUNY alumni as a proportion of jobs requiring a degree or advanced skill in related industries



While bringing important capacities to the workforce, liberal arts degrees are too broad to be matched to a specific occupational field and were thus excluded from this analysis.

Source: SUNY institutions provided alumni ZIP codes and field of study; occupational data are from NYS Dept. of Labor. See "Alumni Data" in Data Notes for more information.

Preparing the Workforce

Representing one-third of the Finger Lakes regional labor supply, the 188,000 SUNY alumni living in this region are a major factor in its nascent knowledge economy. For instance, the nearly 17,000 degree-holders in scientific and engineering fields are enough to fill every related job in the region requiring a degree or advanced skill. In fact, the region's SUNY alumni represent a labor pool large enough to fill at least half the jobs across 10 industries. The only fields where they represent a relatively minor share of the region's labor pool are computer & mathematics and technical trades.

The Finger Lakes region mirrors the rest of the state in terms of the distribution of degrees across alumni, with top fields of study including education, business, health, science and law. SUNY Geneseo and Brockport contribute significantly to the region's supply of educators. As the single largest degree-granting institution for SUNY alumni in the region, Monroe Community College plays an important role in workforce training, particularly through its nursing, engineering and business programs. Nearly 1,000 University at Buffalo Law School alumni live in the region, representing half of all lawyer jobs in the Finger Lakes.

These Finger Lakes SUNYs turned out approximately 7,600 new college graduates in 2008-09, about one-third of all new college graduates produced in the region. According to past alumni patterns, about half of SUNY graduates are projected to stay in the region and 80 percent will settle in the state, reflecting a critical mass of workforce assets.

Among the contributions of this region's SUNYs to cluster industries targeted by the state are graduates prepared for work in travel & tourism, a major industry in this region known for its scenic lakes and vineyards. The region's community colleges offer a range of related degree programs and non-credit courses.

Finger Lakes SUNYs Generate a Large Share of Degrees for NYS Cluster Industries

Communications, Software & Media Services

SUNY prepares the state's workforce for strategic cluster industries by granting degrees required by jobs in those industries. A "large share" of cluster-related degrees indicates this region's SUNYs contribute proportionally more to SUNY's total degrees for one or more clusters than they do to SUNY degrees overall.

The Finger Lakes region faces many challenges common to upstate communities, but SUNY is helping to bridge gaps in economic opportunity through several innovative workforce development programs. For instance, SUNY Geneseo's Microenterprise Assistance Program provides low- and moderate-income entrepreneurs with free training and technical assistance to start and maintain businesses. Monroe Community College combines community-building with workforce development by assisting low-income and economically disadvantaged populations, including incarcerated adults and youth, with training in construction and the trades.

CASE IN POINT

Finger Lakes Community College

Finger Lakes Community College Focuses Collaboration to Help Build Skills

Finger Lakes Community College in Canandaigua offers both credit and non-credit courses that yield a more competitive, efficient workforce both by developing new skills and honing current ones. Key to its planning are collaborations with partners such as the Finger Lakes Workforce Investment Board, the Finger Lakes Advanced Manufacturers' Enterprise and individual employers. Two programs illustrate the range of its offerings. The college's Viticulture and Wine Technology degree is the only formal two-year training program for vineyard managers, winemakers and others with the specialized skills necessary to maintain growth in the Finger Lakes wine industry. Students study the science of wine-making, obtain hands-on experience in commercial vineyards, focus on sustainability and learn wine tasting at the nearby New York Wine and Culinary Center in Canandaigua. Meanwhile, the college's new two-year Instrumentation and Control Technologies degree will train students for well-paying jobs in high-technology manufacturing. The program stresses an integrated approach to courses in mathematics, physics, computational skills and subsequent courses in electronics, design, process improvement, data acquisition and automation. Students participate in hands-on problem solving, case studies, job shadowing and required internships.

Finger Lakes Community College works closely with community partners to identify key workforce needs in the region.

HOW SUNY MATTERS TO THE COMMUNITY

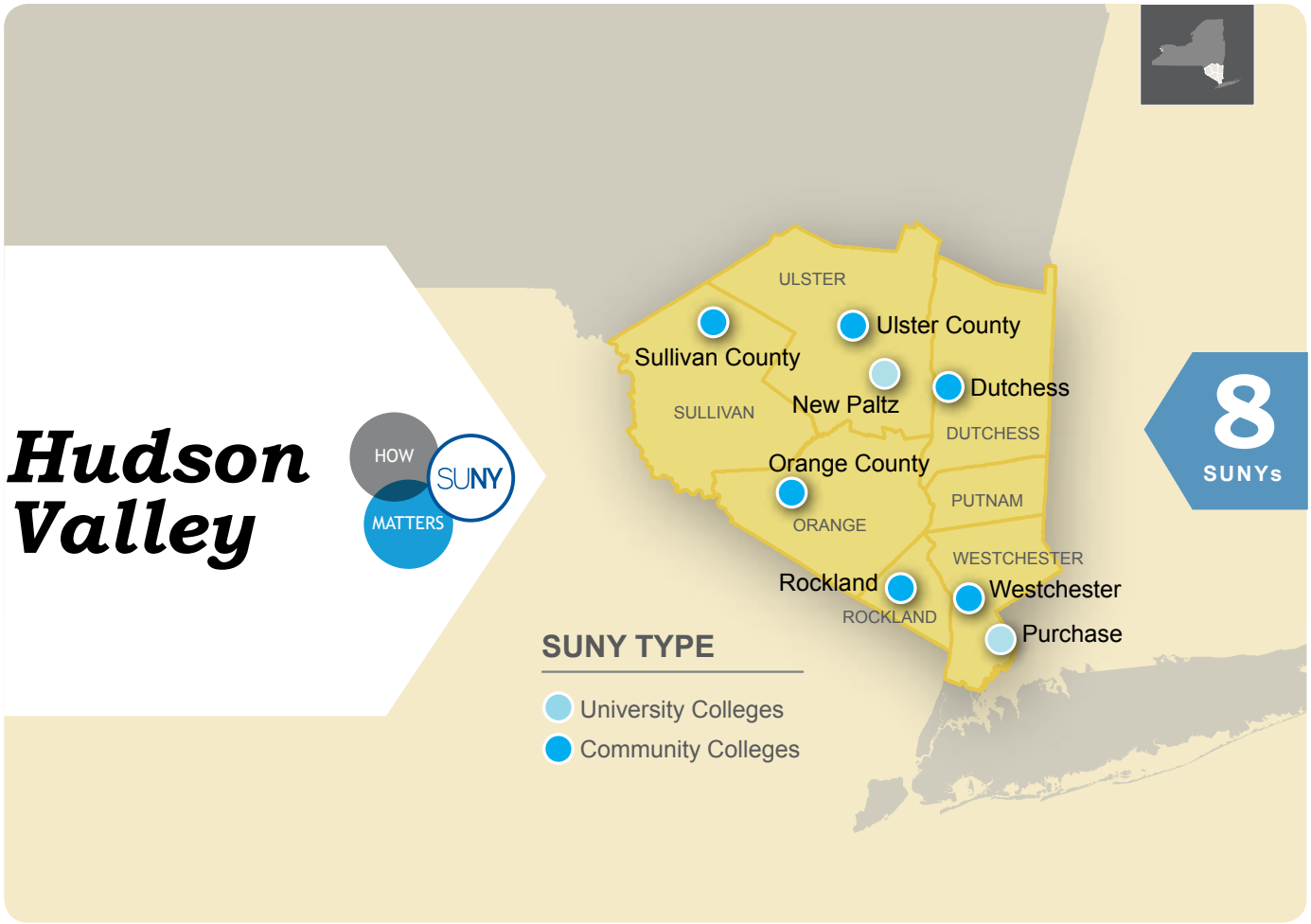
BY THE NUMBERS

SUNY alumni living in region as % of region's total labor supply **30%**

Total degrees from region's SUNYs (2008-09) **7,600**

SUNY grads as a % of total grads in this region **43%**

Source: SUNY institutions provided current alumni data; labor supply is from NYS Dept. of Labor. Degrees awarded are from U.S. Dept. of Education, IPEDS, 2008-09. See "Alumni Data" and "Student Location Data" in Data Notes for more information.

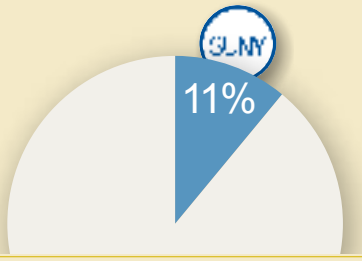


SUNY in the Hudson Valley

Just north of New York City are the eight SUNY institutions of the Hudson Valley region. The SUNY presence here is predominantly at the two-year level — six of the region's eight schools are community colleges, including Westchester Community College, one of the state's largest. As a community college center, an overwhelming majority, or 82 percent, of the region's SUNY students are from within the region. Approximately 181,000 SUNY alumni live and work in the region, with two in three of these graduates of a Hudson Valley SUNY. In this highly populated region, SUNY students, employees and alumni represent about 11 percent of Hudson Valley residents.

The Hudson Valley Economy

The Hudson Valley regional economy is effectively leveraging growth opportunities in strategic industries such as alternative energy and green technology, in addition to an existing industry base in biotechnology and manufacturing. The region's eight SUNYs are proactive partners in economic development, with efforts as diverse as a business support center for the emerging solar energy industry in development at SUNY New Paltz and elder care training at Rockland Community College. These institutions contribute directly to the region's economy, supporting $1.3 billion in economic output and preparing more than 7,300 new graduates for the state and regional workforce every year.



In '08-'09, SUNY students, employees and alumni accounted for ***11% of Hudson Valley's population.***

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment and employee counts. Current alumni counts are from SUNY campuses. Population data are from 2009 American Community Survey. See "Alumni Data" and "Demographic & Housing Data" in Data Notes for more information.

STUDENTS

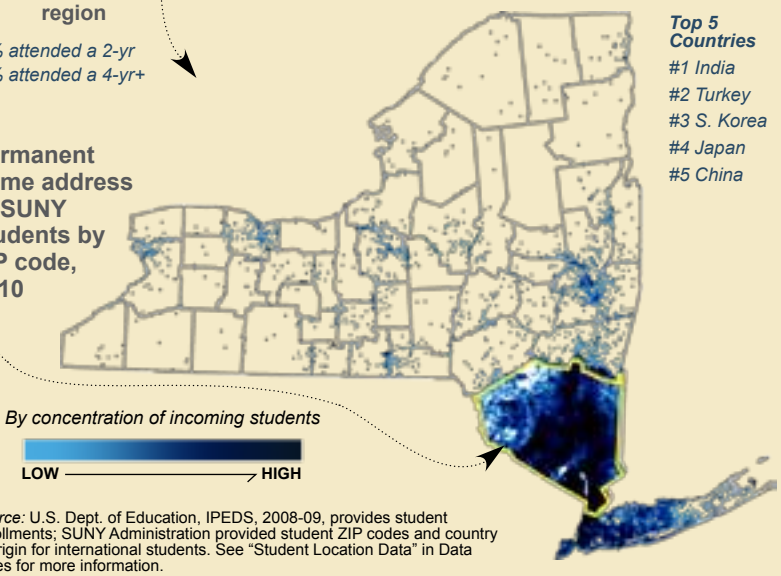
57,300 students attended a Hudson Valley SUNY.

Where these students originated...

- **82%** from within this region
  - *69% attended a 2-yr*
  - *13% attended a 4-yr+*
- **13%** from elsewhere in NYS
- **3%** from elsewhere in U.S.
- **3%** from elsewhere in world

Top 5 Countries
#1 India
#2 Turkey
#3 S. Korea
#4 Japan
#5 China

Permanent home address of SUNY students by ZIP code, 2010



Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollments; SUNY Administration provided student ZIP codes and country of origin for international students. See "Student Location Data" in Data Notes for more information.

EMPLOYEES

7,400

SUNY faculty and staff employed in the Hudson Valley.

Source: U.S. Dept. of Education, IPEDS, 2008-09, and SUNY Research Foundation. See "Employment by SUNY" in Data Notes for more information.

ALUMNI

181,000

SUNY alumni live in the Hudson Valley.

- **95,000** ...graduated from a SUNY in this region and stayed in this region.
- **86,000** ...graduated from a SUNY elsewhere in NYS and now live in this region.

Source: SUNY institutions provided current alumni data. See "Alumni Data" in Data Notes for more information.

SUNY DIVERSITY

- **33%** Minority students
- **25%** Students from a low-income ZIP code (20%+ children live below poverty line)
- **19%** Non-traditional students (age 30+)

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment by race/ethnicity and age. Students from low-income ZIP codes are from 2010 student ZIP codes from SUNY Administration, and poverty data by ZIP code are from 2005-09 American Community Survey. See "Diversity of SUNY Students" in Data Notes for more information.

Hudson Valley SUNYs Generate a $1.3 Billion Economic Impact

HOW SUNY MATTERS TO THE ECONOMY

Here's how it happens...

SUNY attracts revenues from a range of public and private sources...

$653 million in revenues

$154 M tuition & fees
$60 M auxiliary service sales
$238 M NYS appropriations, grants & contracts
$66 M federal appropriations, grants & contracts
$135 M other sources

1% Sponsored research dollars
15% Estimated out-of-state revenues

SUNY campuses, employees, students and visitors purchase goods and services...

$925 million in spending

$443 M by SUNY on employee wages & benefits
$221 M by SUNY on other institutional purchases
$237 M by students
$24 M by overnight visitors
(1.3 M visitors, 13% overnight)

89% Estimated spending in NYS
83% Estimated spending in region

Those dollars circulate through the state and regional economy, stimulating additional economic activity and greater total impacts...

Economic Output

$1.3 billion in NYS, and 77%, or $1.0 billion, in the Hudson Valley

Employment Impact

14,600 jobs

SUNY employment: 7,400
Jobs indirectly supported: 7,200

Taxes Generated

$41 M in total taxes generated for NYS and the Hudson Valley

$8 M income taxes
$14 M sales taxes
$19 M property taxes

**Sum total may differ slightly due to rounding*

$1.3 B / $238 M

*Represents a **$5.40** return on investment for every dollar of state funding*

Driving the Economy

The Hudson Valley SUNYs' $1.3 billion economic impact includes a $1 billion impact on the regional economy. This region's SUNY impact offers the state the second highest return on investment: $5.40 in output for every dollar received in New York State appropriations, grants and contracts. Hudson Valley SUNYs also generated more than $41 million in property, income and sales taxes for state and local government in 2008-09. Economic activity associated with Hudson Valley SUNYs support more than 7,000 jobs across the region and state above and beyond the 7,400 faculty and staff that work for these institutions.

Notably, tuition and fees play a proportionally greater role as a revenue source for Hudson Valley SUNYs, accounting for 25 percent of total revenues compared with 16 percent for SUNY overall. This is a product of Hudson Valley's high enrollment levels (it's third in the state) combined with proportionally

SUNY & the Innovation Economy

In the best of the last three years, Hudson Valley SUNYs generated....

- 27 invention disclosures
- 19 patent applications
- 5 patents
- 2 start-ups
- 6 licenses

Source: Interview and survey data from SUNY institutions.

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides revenues, spending and employment counts. SUNY campuses provided data on out-of-state revenue and spending. Impacts have been calculated using IMPLAN. Tax impacts are based on data from NYS Dept. of Taxation and Finance and NYS Office of Real Property Tax Services. See "Economic Impact," "Employment by SUNY," "Revenues and Spending of SUNY Institutions," "Student Spending," "Survey of SUNY Campuses," "Tax Impacts" and "Visitor Spending" in Data Notes for more information.

fewer research dollars generated by a predominantly community college base. Overall student spending in the region is lower relative to the SUNY average given the predominance of part-time students at the region's six community colleges.

Hudson Valley SUNYs support a vital regional economy primarily through business assistance, workforce training and community engagement. Four of these six institutions have a small business development center, including that of Ulster Community College, which has worked with 15,600 clients since it opened ***(see Case in Point: Ulster Small Business Development Center, p. 37)***. Featuring two professional schools in the fine and performing arts and the Performing Arts Center at SUNY Purchase, Hudson Valley's SUNY institutions offer a rich variety of cultural amenities that helped attract more than 1.3 million visitors to the region in 2008-09, the second highest visitor level of all regions. Moreover, these attractions build on the region's draw as a destination for cultural tourism, furthering a strong and vibrant sense of place in the Hudson Valley region.

CASE IN POINT

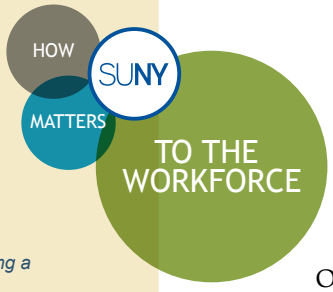
Ulster, Dutchess, Sullivan, Orange, Rockland and Westchester Community Colleges

Training Consortium Helps 'Clean Energy' Businesses Train their Workforce

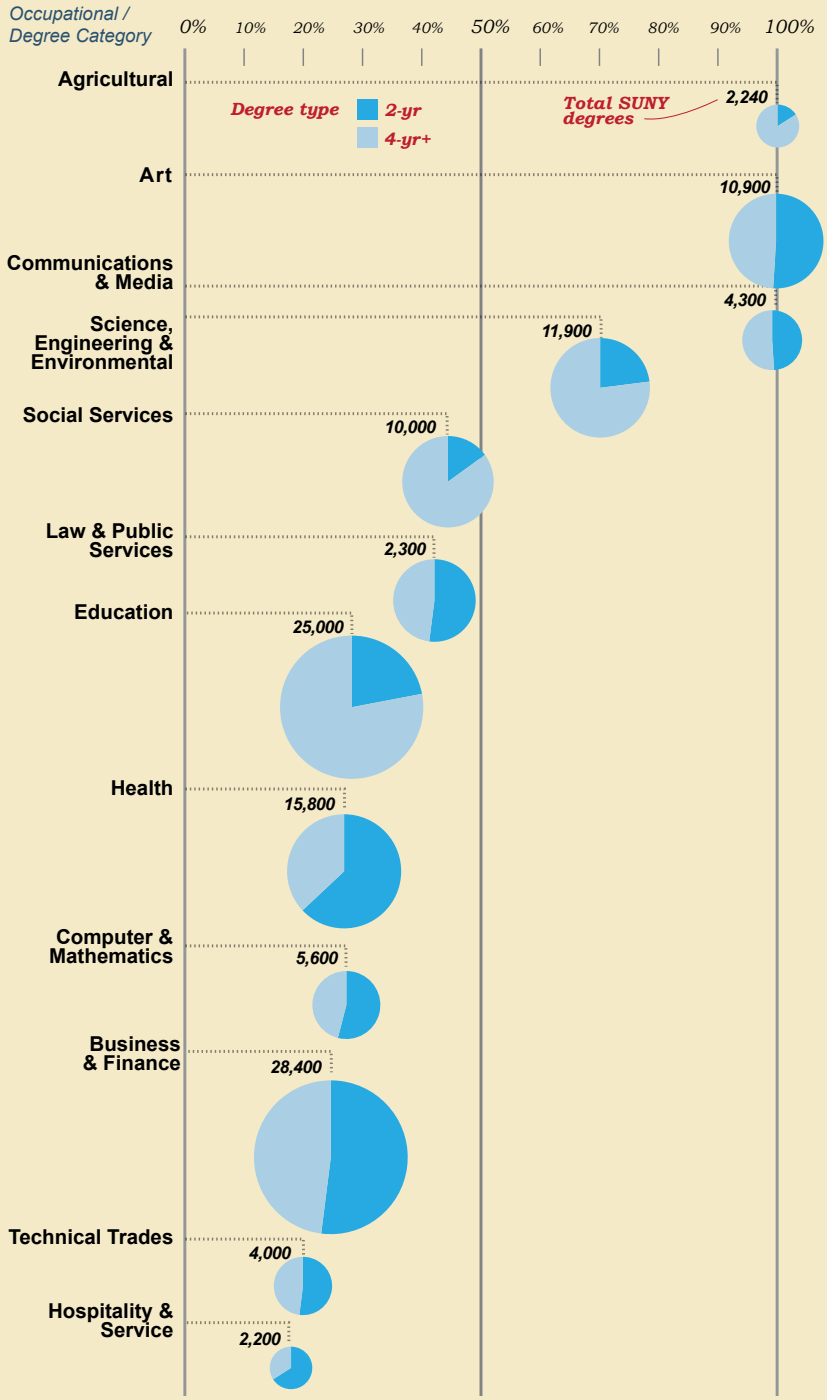
Seeded by a $500,000 grant from the New York State Energy Research and Development Authority, Ulster, Dutchess, Sullivan, Orange, Rockland and Westchester community colleges have formed a Clean Energy Technology Training Consortium, helping emerging clean energy and energy efficiency businesses and service professionals gain the technical and business development skills needed in the rapidly developing market for green industries. More than 1,500 individuals have received training, supporting the development of a clean energy business cluster in the region. The ranks of new entrepreneurs include John Lorino of All Around the House Energy Management, Jon and Mona Reese of Bright Star Solar, and Doug Hertz of Sunrise Solar Solutions, each of whom were able to take the training they received from SUNY and realize their dream of owning a thriving business in the Hudson Valley region.

Workers in the emerging "clean energy" businesses need a whole new set of skills and training. Six community colleges in the Hudson Valley have formed an unprecedented partnership to help provide them.

How SUNY graduates match up with workforce needs across the range of industries in the Hudson Valley



Degrees held by SUNY alumni as a proportion of jobs requiring a degree or advanced skill in related industries



While bringing important capacities to the workforce, liberal arts degrees are too broad to be matched to a specific occupational field and were thus excluded from this analysis.

Source: SUNY institutions provided alumni ZIP codes and field of study; occupational data are from NYS Dept. of Labor. See "Alumni Data" in Data Notes for more information.

Preparing the Workforce

Overall, SUNY plays an important but relatively smaller role in labor supply in the Hudson Valley region given the prevalence of private higher education here. The more than 181,000 SUNY alumni living in the Hudson Valley region account for 16 percent of the region's total labor supply. Nonetheless, a closer look shows SUNY is fundamental to workforce preparation in the Hudson Valley. For instance, the nearly 12,000 SUNY alumni in the Hudson Valley holding science and engineering degrees have the potential to fill two in three jobs in this flourishing sector for the region. These science and engineering alumni are primarily graduates of SUNY university centers outside the region, as well as SUNY New Paltz's School of Science and Engineering.

The region's two-year institutions also play an important role in workforce preparation. Hudson Valley's six community colleges have collectively educated about 68,000, or more than one in three, alumni residing in the region. These alumni are especially critical to the health, hospitality and technical trades industries. Moreover, about one in five SUNY students in Hudson Valley is non-traditional, the highest such enrollment level in the state and indicative of the prominent role community colleges play in equipping the workforce with the latest skills and expertise.

This labor source is supplemented every year by more than 7,300 new graduates emerging from the region's SUNY institutions. With most Hudson Valley students from within the region, and more than half of Hudson Valley SUNY graduates estimated to remain in the region, there is a tremendous opportunity

to nurture cradle-to-career workforce development in support of emerging demand for skills and education.

In terms of preparing graduates for work in the state's targeted cluster industries — groups of related industries that share a need for talent — Hudson Valley SUNYs provide a large share of SUNY graduates holding degrees related to travel & tourism, communications, software & media services, financial services and back office.

Through a variety of programs, SUNY is reaching out to businesses and into the community to build workforce capacity. Among these efforts is Rockland Community College's Literacy Institute providing low-cost training in ESL (English as a Second Language) to the region's immigrant community, mentoring and management training for start-up companies at Sullivan Community College's Hudson Valley Center for Innovation, and green technology training at Dutchess Community College.

Hudson Valley SUNYs Generate a Large Share of Degrees for NYS Cluster Industries

Travel & Tourism, Communications, Software & Media, Financial Services, Back Office

Hudson Valley SUNYs Assisting Businesses

4 of 6 community colleges have an office dedicated to small business assistance

SUNY prepares the state's workforce for strategic cluster industries by granting degrees required by jobs in those industries. A "large share" of cluster-related degrees indicates this region's SUNYs contribute proportionally more to SUNY's total degrees for one or more clusters than they do to SUNY degrees overall.

Orange, Rockland, Sullivan and Ulster Community Colleges

Hudson Valley Education Consortium

Initiated in 2007, the Hudson Valley Education Consortium is designed to leverage academic and professional training programs among Orange, Rockland, Sullivan and Ulster Community Colleges that are leading edge and relevant to businesses throughout the region.

By allowing all four colleges to jointly register programs with one campus designated as lead, this model partnership significantly expands student and employer access to signature programs available throughout the region, leveraging investments made in areas of strength and avoiding the unnecessary costs of program duplication.

Leaders of these colleges chose to forego competition for short-term institutional revenue in favor of the collective interests of Hudson River Valley residents and New York State taxpayers.

CASE IN POINT

CASE IN POINT

SUNY Purchase

Arts at Purchase

The arts have helped shape the Hudson Valley's economy for over 200 years, a heritage given new life through Purchase College. Its Performing Arts Center, a four-theatre complex, is the foremost presenter of performing arts in the region. The center has had a strong influence on the development of the arts as a cornerstone of the region's economy and quality of life. More than 200,000 people attend some 650 performances, benefits and events there each year. The center's Arts-in-Education program presents workshops, in-school programs and special performances for more than 20,000 school children, ages 5-18, from schools in the six-county area each season. Meanwhile, the college's Neuberger Museum of Art offers guided expert tours, programs for school children and community access programs such as "Neu Experiences," a program for people with Alzheimer's. These programs employed over 95 independent artist-educators, musicians, critics, scholars and exhibiting artists, and about 25 local providers for printing/design, carpentry/art installation and event services.

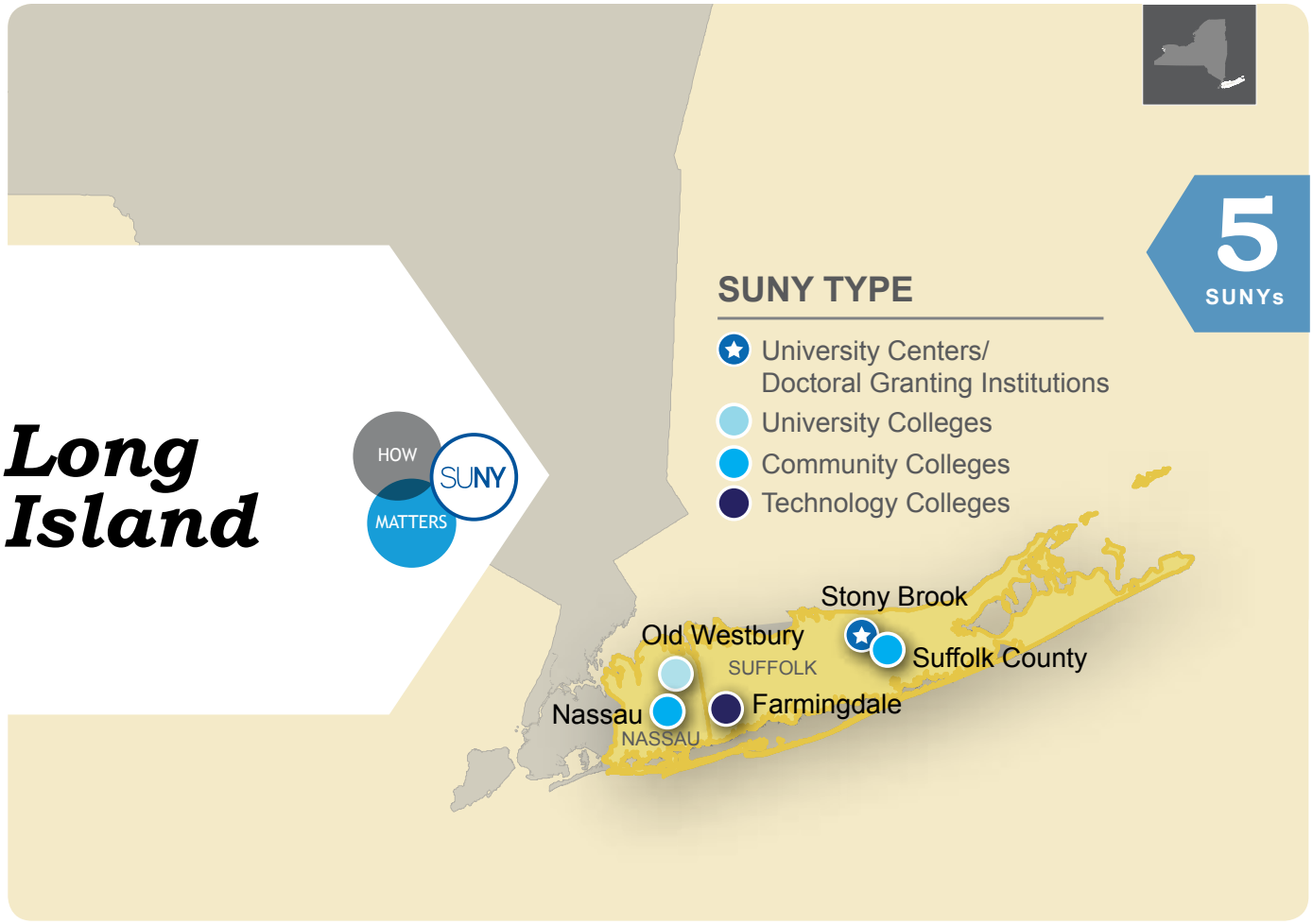
BY THE NUMBERS

SUNY alumni living in region as % of region's total labor supply **16%**

Total degrees from region's SUNYs (2008-09) **7,300**

SUNY grads as a % of total grads in this region **32%**

Source: SUNY institutions provided current alumni data; labor supply is from NYS Dept. of Labor. Degrees awarded are from U.S. Dept. of Education, IPEDS, 2008-09. See "Alumni Data" and "Student Location Data" in Data Notes for more information.

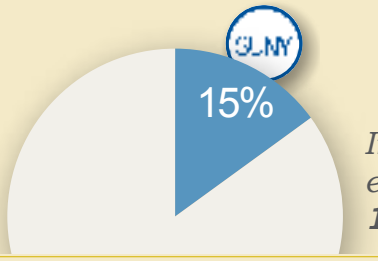


SUNY on Long Island

In no other region is the SUNY presence larger than in Long Island. This region is home to five SUNY institutions, three of which are among the top five in the state for enrollment. Long Island's 85,000 SUNY students constitute nearly 20 percent of overall SUNY enrollment. More than one in three of these students is a racial or ethnic minority, making Long Island the most diverse SUNY region in the state. Over 85 percent of the 325,000 SUNY alumni living on Long Island — the largest concentration of SUNY alumni in the state — graduated from a Long Island SUNY. These 426,000 SUNY affiliates represent 15 percent of Long Island's 2.9 million residents.

The Long Island Economy

Closely tied to the New York City economy, Long Island is also distinguished by an industry mix of aerospace defense, pharmaceutical, financial services, biotech biomedical, agriculture, software and information technology, and travel and hospitality. The five SUNY institutions of Long Island bolster this diverse economy through a wide range of programs, from Suffolk Community College's expanded culinary and nursing programs to meet regional workforce shortages to Farmingdale State College's comprehensive business support services. Long Island's SUNY institutions generate $3.9 billion annually, with 17,500 jobs supported above and beyond SUNY employment. Serving as a ready supply of labor with the latest skills and knowledge are more than 13,000 annual graduates of Long Island SUNYs.



In '08-'09, SUNY students, employees and alumni accounted for ***15% of Long Island's population.***

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment and employee counts. Current alumni counts are from SUNY campuses. Population data are from 2009 American Community Survey. See "Alumni Data" and "Demographic & Housing Data" in Data Notes for more information.

STUDENTS

85,000 students attended a Long Island SUNY.

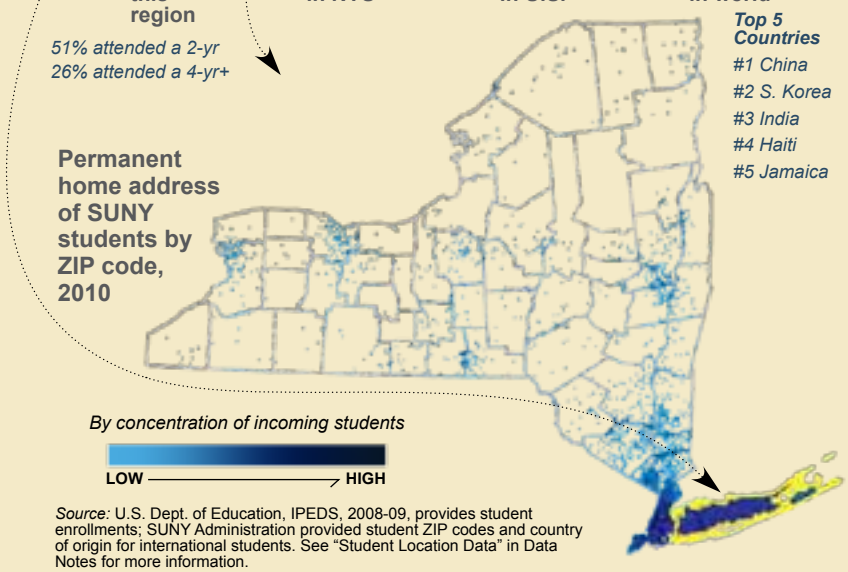
Where these students originated...

- **78%** from within this region
  - *51% attended a 2-yr*
  - *26% attended a 4-yr+*
- **14%** from elsewhere in NYS
- **2%** from elsewhere in U.S.
- **7%** from elsewhere in world

Top 5 Countries

#1 China
#2 S. Korea
#3 India
#4 Haiti
#5 Jamaica

Permanent home address of SUNY students by ZIP code, 2010



By concentration of incoming students

LOW → HIGH

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollments; SUNY Administration provided student ZIP codes and country of origin for international students. See "Student Location Data" in Data Notes for more information.

EMPLOYEES

16,000

SUNY faculty and staff employed on Long Island.

Source: U.S. Dept. of Education, IPEDS, 2008-09, and SUNY Research Foundation. See "Employment by SUNY" in Data Notes for more information.

ALUMNI

325,000

SUNY alumni live on Long Island.

- **229,000** ...graduated from a SUNY in this region and stayed in this region.
- **96,000** ...graduated from a SUNY elsewhere in NYS and now live in this region.

Source: SUNY institutions provided current alumni data. See "Alumni Data" in Data Notes for more information.

SUNY DIVERSITY

- **36%** Minority students
- **9%** Students from a low-income ZIP code (20%+ children live below poverty line)
- **17%** Non-traditional students (age 30+)

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment by race/ethnicity and age. Students from low-income ZIP codes are from 2010 student ZIP codes from SUNY Administration, and poverty data by ZIP code are from 2005-09 American Community Survey. See "Diversity of SUNY Students" in Data Notes for more information.

Long Island SUNYs Generate a $3.9 Billion Economic Impact

HOW SUNY MATTERS TO THE ECONOMY

Here's how it happens...

SUNY attracts revenues from a range of public and private sources...

$2.4 billion in revenues

$275 M tuition & fees
$922 M auxiliary service sales
$749 M NYS appropriations, grants & contracts
$201 M federal appropriations, grants & contracts
$220 M other sources

7% Sponsored research dollars
11% Estimated out-of-state revenues

SUNY campuses, employees, students and visitors purchase goods and services...

$2.9 billion in spending

$1.6 B by SUNY on employee wages & benefits
$877 M by SUNY on other institutional purchases
$474 M by students
$9 M by overnight visitors
(335,400 visitors, 17% overnight)

85% Estimated spending in NYS
78% Estimated spending in region

Those dollars circulate through the state and regional economy, stimulating additional economic activity and greater total impacts...

Economic Output

$3.9 billion in NYS, and 79%, or $3.1 billion, in Long Island

Employment Impact

33,500 jobs

SUNY employment: 16,000
Jobs indirectly supported: 17,500

Taxes Generated

$129 M in total taxes generated for NYS and Long Island

$43 M income taxes
$36 M sales taxes
$50 M property taxes

**Sum total may differ slightly due to rounding*

$3.9 B / $749 M

Represents a ***$5.20*** *return on investment for every dollar of state funding*

Driving the Economy

The five SUNYs of Long Island combine to support the largest absolute and proportional impact of all regions, with $3.9 billion in output accounting for 20 percent of the SUNY total in 2008-09. About 80 percent of this figure — or $3.1 billion — fuels the Long Island economy. Already the biggest SUNY employers, with nearly 16,000 faculty and staff, Long Island SUNYs additionally support over 17,000 jobs in related industries across New York State. The region's SUNYs create a state and local tax impact at $129 million.

Stony Brook University is by far the biggest contributor to this region's SUNY impact, accounting for about 75 percent of revenues generated and dollars spent. Similar to other SUNYs with affiliated hospitals, Stony Brook generates the bulk of its revenues through the Stony Brook University Medical Center. With high levels of research and

SUNY & the Innovation Economy

In the best of the last three years, Long Island SUNYs generated....

120	invention disclosures
101	patent applications
27	patents
5	spin-offs
3	start-ups
22	licenses

Source: Interview and survey data from SUNY institutions.

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides revenues, spending and employment counts. SUNY campuses provided data on out-of-state revenue and spending. Impacts have been calculated using IMPLAN. Tax impacts are based on data from NYS Dept. of Taxation and Finance and NYS Office of Real Property Tax Services. See "Economic Impact," "Employment by SUNY," "Revenues and Spending of SUNY Institutions," "Student Spending," "Survey of SUNY Campuses," "Tax Impacts" and "Visitor Spending" in Data Notes for more information.

auxiliary revenues, Long Island SUNYs are significantly less dependent on state government as a revenue source, with only 32 percent coming from New York State appropriations, grants and contracts compared to a 40 percent SUNY-wide average.

Long Island SUNYs, led by Stony Brook, are the state's most prolific in research commercialization, with 120 invention disclosures, 27 patents and five spin-offs. Collectively, these institutions also secured the most research dollars of all SUNY regions.

On top of its power as an economic engine, Long Island SUNYs regularly work with businesses and community leaders to advance economic development strategies and community vitality. For instance, Old Westbury requires first-year students to provide at least 50 hours of community service in a civic engagement capacity to area nonprofits (over 1,000 students have already provided in excess of 50,000 service hours). Other efforts include Stony Brook's Incubator at Calverton, which specializes in agriculture, aquaculture and environmental technologies, and Farmingdale State College's provision of faculty and student expertise, lab space and equipment to local businesses.

See also SUNY at Work: Stony Brook's Innovation Footprint: From X-Rays to Supercomputing (p. 30).

Photo courtesy of Farmingdale State College

CASE IN POINT

Farmingdale State College

The Long Island Economy is Changing Constantly – and Farmingdale Keeps Up

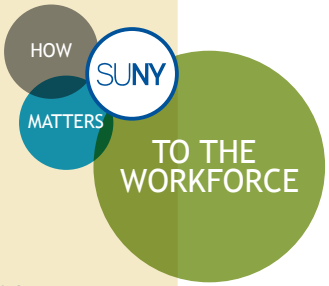
The economic development mission at SUNY's Farmingdale State College has adapted continuously to keep pace with the changing Long Island economy.

As the region evolved from an early focus on agriculture to giant defense firms and more recently to smaller, high-tech companies aimed at civilian markets, Farmingdale, too, has completed a dramatic transformation. Today, through all facets of the institution, Farmingdale works closely with industry by providing corporate training, consulting, technological assistance and internships.

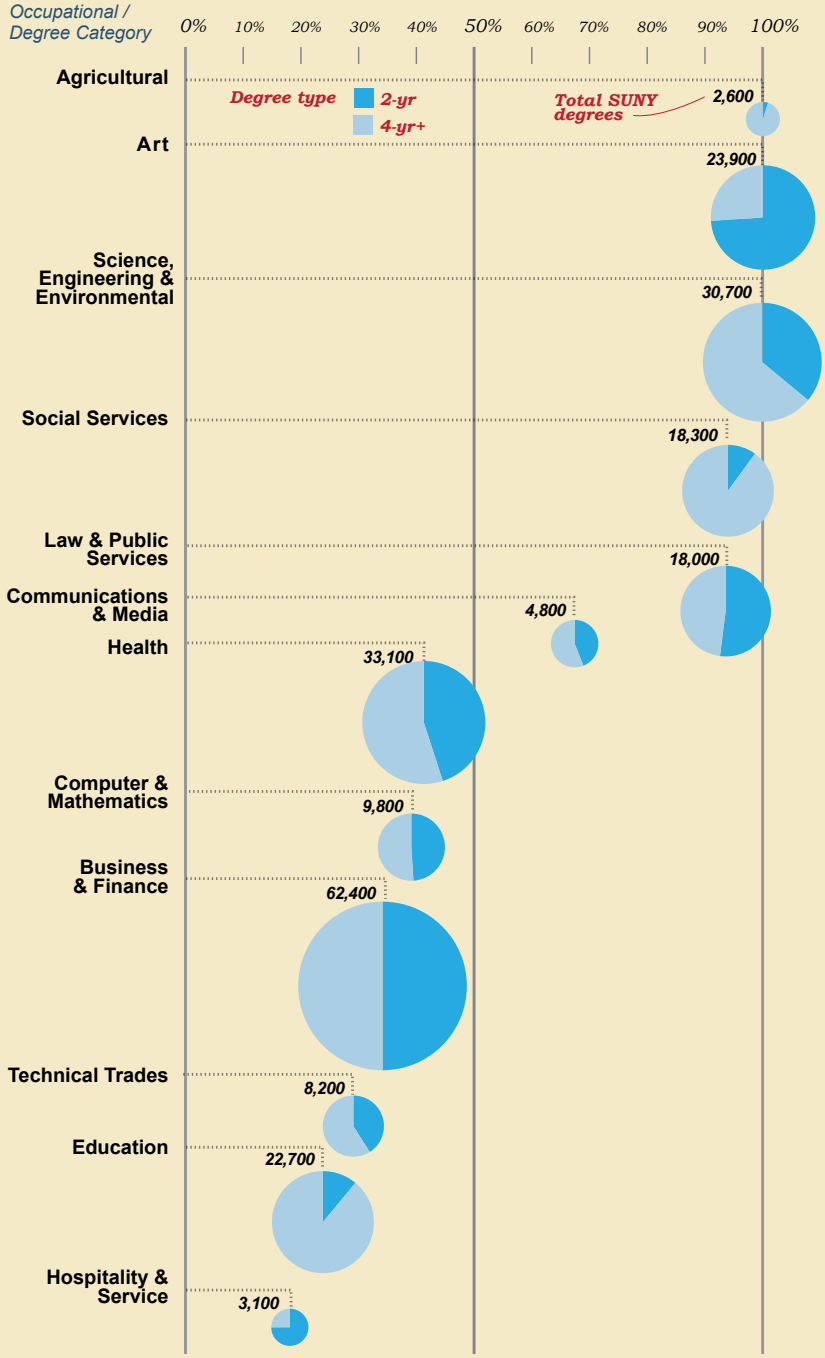
The college provides a range of services to Long Island businesses and has formed strong partnerships with various business organizations. Every academic program has an advisory council that reviews current offerings, curricula and equipment to ensure relevancy and timeliness. Farmingdale hosts several industry forums each year where business leaders discuss trends, forecast workforce needs and identify ways in which Farmingdale can help meet those needs. The Long Island Forum for Technology praises Farmingdale's ability to adapt quickly to emerging industry trends and needs.

The Institute for Research and Technology Transfer (IRTT) affords industry with access to specialized equipment and faculty to improve productivity and conduct applied research. IRTT stresses automated manufacturing and develops and transfers new technology to industry for commercial applications. Students work on real-world industry problems including projects in fuel cell technology, CAD/CAM and robotics.

How SUNY graduates match up with workforce needs across the range of industries on Long Island



Degrees held by SUNY alumni as a proportion of jobs requiring a degree or advanced skill in related industries



While bringing important capacities to the workforce, liberal arts degrees are too broad to be matched to a specific occupational field and were thus excluded from this analysis.

Source: SUNY institutions provided alumni ZIP codes and field of study; occupational data are from NYS Dept. of Labor. See "Alumni Data" in Data Notes for more information.

Preparing the Workforce

SUNY is a core asset in workforce preparation for Long Island, training a large supply of knowledge workers for the region's and state's fastest growing industries. Even in an economy as large as that of Long Island, SUNY alumni represent more than 20 percent of the total labor supply. Given Long Island's proximity to and economic interdependence with New York City, these SUNY alumni are a critical supply of labor for both regions.

With the financial capital of the world next door, Long Island has its greatest alumni concentration in the field of business & finance. More than 62,400, or close to 20 percent of the region's alumni, hold two- or four-year degrees in this field. These alumni number enough to fill approximately one-third of related degree-requiring jobs on Long Island.

Health is Long Island's largest employment sector, with SUNY alumni serving as a deep pool of labor from which to draw. These graduates — enough to fill more than 40 percent of degree-requiring health jobs on Long Island — are largely products of health and medical programs at Stony Brook University and New York City's Downstate Medical Center, as well as nursing programs at Farmingdale State College and Nassau and Suffolk community colleges. Reflecting other dominant industries in the broader New York City region, science and engineering, art, social services and law are also among the most frequent degrees held by Long Island SUNY alumni. The region's alumni supply is relatively smaller for the fields of hospitality, education and the technical trades.

Long Island SUNYs graduated 13,100 in 2008-09, representing nearly half of all college degrees granted in this

region. Among these degree-holders are a significant number prepared to work in cluster industries targeted for development by the state. The fields to which the region contributes the most graduates (relative to the total SUNY pool of cluster graduates) point to academic strengths at the region's SUNYs, including health and medicine, science and engineering and information technology.

With two in three SUNY graduates settling here (the highest graduate retention rate in the state), SUNY will continue to play a core role in workforce preparation for Long Island.

SUNY is also working in other ways to provide training and workforce support to Long Island industries. These include Farmingdale's skills-building programs for the growing energy sector and Suffolk County Community College's specialized programs to address regional workforce shortages.

Long Island SUNYs Generate a Large Share of Degrees for NYS Cluster Industries

Distribution, Biomedical, Information Technology, Electronics & Imaging

SUNY prepares the state's workforce for strategic cluster industries by granting degrees required by jobs in those industries. A "large share" of cluster-related degrees indicates this region's SUNYs contribute proportionally more to SUNY's total degrees for one or more clusters than they do to SUNY degrees overall.

CASE IN POINT

Suffolk County Community College

Suffolk County Community College Tackles Acute Shortages in the Long Island Workforce

HOW SUNY MATTERS TO THE COMMUNITY

For years, Long Island faced a serious shortage of nurses to staff its large health care industry. Suffolk County Community College partnered with Good Samaritan Hospital Medical Center in an innovative approach to help address this problem. The hospital prescreens student applicants and commits to hiring them after their training at Suffolk. Leveraging this multi-year contract with the hospital, Suffolk hired more faculty and leased space in a distressed downtown neighborhood for training. Suffolk built on this model with six other health care facilities; now Suffolk's nursing education program is the largest such campus-based effort in New York — and the ninth largest in the nation.

Suffolk County Community College has worked with employers, the Department of Labor and local development agencies to secure funding for workforce programs in skill areas needed in the Long Island economy.

Similarly, Suffolk greatly expanded its Culinary Arts program to meet the growing needs of Suffolk County's hospitality and tourism industry. The college partnered with a private developer who built a facility to house Suffolk's Culinary Arts and Hospitality Center. Linkages have been formed with the local wine industry, hotels, suppliers and catering firms and Suffolk added two new degrees and three certificates. Using the space leased from its private partner, Suffolk has been able to expand enrollment to 400 students, eight times the 50 students who could be accommodated at the college's own facility.

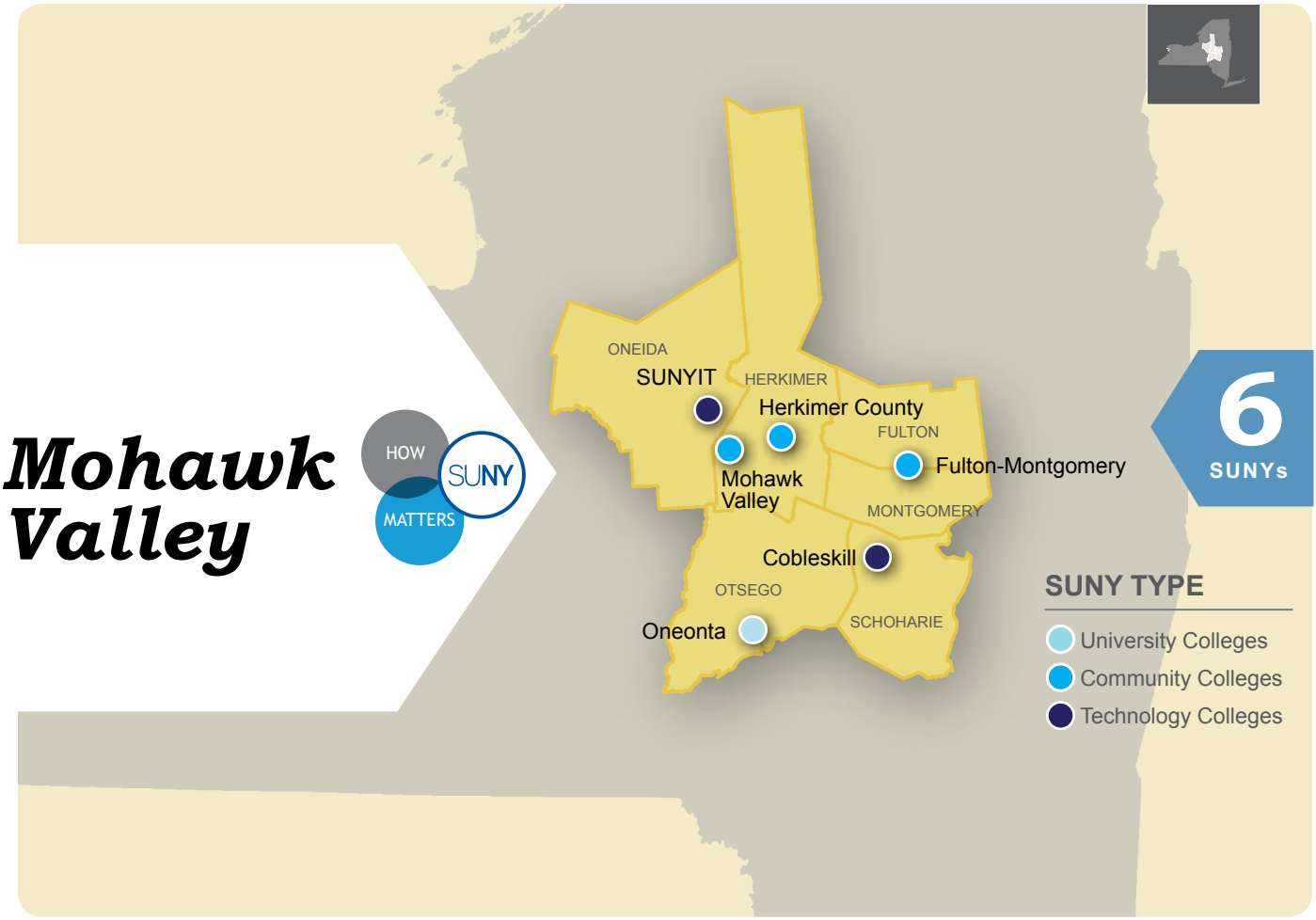
BY THE NUMBERS

SUNY alumni living in region as % of region's total labor supply **22%**

Total degrees from region's SUNYs (2008-09) **13,100**

SUNY grads as a % of total grads in this region **45%**

Source: SUNY institutions provided current alumni data; labor supply is from NYS Dept. of Labor. Degrees awarded are from U.S. Dept. of Education, IPEDS, 2008-09. See "Alumni Data" and "Student Location Data" in Data Notes for more information.

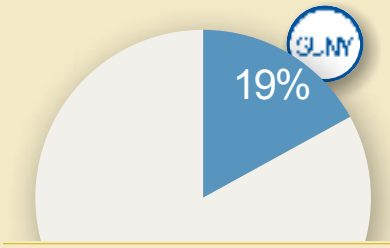


SUNY in the Mohawk Valley

Spanning six counties in central New York State, the Mohawk Valley holds six diverse SUNY institutions, including three community colleges, two technology colleges and one university college. The Mohawk Valley SUNYs draw their students primarily from within the region, and this region is one of the smaller ones for enrollment. The region's SUNYs are the alma mater for about two in three of the 75,000 SUNY alumni living in the region, a proportion higher than most regions. About 19 percent of the region's population is connected to SUNY as a student, employee or alumnus.

The Mohawk Valley Economy

With an industrial foundation in distribution, materials processing, industrial machinery and agriculture, the Mohawk Valley economy is also experiencing spillover growth in information technology from the neighboring Capital District. SUNY is actively supporting the growth of innovation and economic vitality in this region through a range of programs, from community development efforts at SUNY Cobleskill to a new Center for Engineering and Technology at Fulton-Montgomery Community College. Mohawk Valley SUNYs create a $683 million economic impact and support nearly 3,400 jobs in the region over and above SUNY's 3,700 employees. SUNY also provides a critical supply of approximately 4,200 new graduates every year.



In '08-'09, SUNY students, employees and alumni accounted for ***19% of Mohawk Valley's population.***

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment and employee counts. Current alumni counts are from SUNY campuses. Population data are from 2009 American Community Survey. See "Alumni Data" and "Demographic & Housing Data" in Data Notes for more information.

STUDENTS

25,200 students attended a Mohawk Valley SUNY.

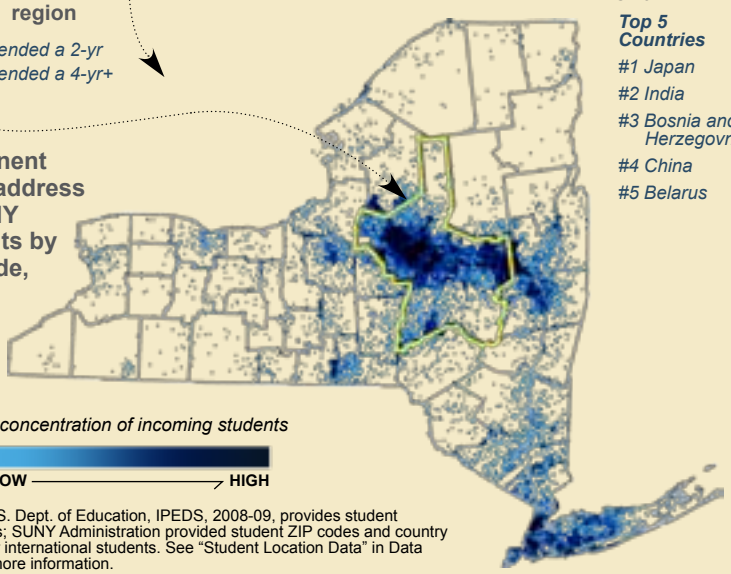
Where these students originated...

- **55%** from within this region
  - *41% attended a 2-yr*
  - *14% attended a 4-yr+*
- **41%** from elsewhere in NYS
- **2%** from elsewhere in U.S.
- **3%** from elsewhere in world

Top 5 Countries

#1 Japan
#2 India
#3 Bosnia and Herzegovnia
#4 China
#5 Belarus

Permanent home address of SUNY students by ZIP code, 2010



By concentration of incoming students

LOW ——— HIGH

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollments; SUNY Administration provided student ZIP codes and country of origin for international students. See "Student Location Data" in Data Notes for more information.

EMPLOYEES

3,700

SUNY faculty and staff employed in the Mohawk Valley.

Source: U.S. Dept. of Education, IPEDS, 2008-09, and SUNY Research Foundation. See "Employment by SUNY" in Data Notes for more information.

ALUMNI

75,000

SUNY alumni live in the Mohawk Valley.

- **44,000** ...graduated from a SUNY in this region and stayed in this region.
- **31,000** ...graduated from a SUNY elsewhere in NYS and now live in this region.

Source: SUNY institutions provided current alumni data. See "Alumni Data" in Data Notes for more information.

SUNY DIVERSITY

- **15%** Minority students
- **28%** Students from a low-income ZIP code (20%+ children live below poverty line)
- **15%** Non-traditional students (age 30+)

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment by race/ethnicity and age. Students from low-income ZIP codes are from 2010 student ZIP codes from SUNY Administration, and poverty data by ZIP code are from 2005-09 American Community Survey. See "Diversity of SUNY Students" in Data Notes for more information.

Mohawk Valley SUNYs Generate a $683 Million Economic Impact

HOW SUNY MATTERS TO THE ECONOMY

Here's how it happens...

SUNY attracts revenues from a range of public and private sources...

$375 million in revenues

$65 M tuition & fees
$68 M auxiliary service sales
$151 M NYS appropriations, grants & contracts
$49 M federal appropriations, grants & contracts
$42 M other sources

3% Sponsored research dollars
16% Estimated out-of-state revenues

SUNY campuses, employees, students and visitors purchase goods and services...

$495 million in spending

$215 M by SUNY on employee wages & benefits
$158 M by SUNY on other institutional purchases
$115 M by students
$6 M by overnight visitors
(215,200 visitors, 18% overnight)

91% Estimated spending in NYS
68% Estimated spending in region

Those dollars circulate through the state and regional economy, stimulating additional economic activity and greater total impacts...

Economic Output

$683 million in NYS, and 54%, or $369 million, in the Mohawk Valley

Employment Impact

7,100 jobs

SUNY employment: 3,700
Jobs indirectly supported: 3,400

Taxes Generated

$13 M in total taxes generated for NYS and the Mohawk Valley

$4 M income taxes
$7 M sales taxes
$2 M property taxes

**Sum total may differ slightly due to rounding*

$683 M / $151 M

*Represents a **$4.50** return on investment for every dollar of state funding*

Driving the Economy

Mohawk Valley SUNYs' $683 million economic impact accounts for a relatively small portion of SUNY's overall statewide impact, at 3 percent. Yet, from a regional perspective, Mohawk Valley SUNYs are a powerful economic engine. Most directly, $369 million, or 54 percent of the total impact, goes into the regional economy. Additionally, Mohawk Valley SUNYs generated $13 million in property, sales and income taxes for local governments in the region as well as state government. Spin-off economic activity from Mohawk Valley SUNYs supported more than 3,400 additional jobs in the region and across the state, on top of 3,700 SUNY faculty and staff.

SUNY also fills a prominent role in building communities and supporting businesses in the Mohawk Valley. These institutions drew more than 215,000 visitors to their campuses for arts, cultural, recreational and other events and resources in 2008-09, with an estimated $6 million spent on lodging, food and entertainment

SUNY & the Innovation Economy

In the best of the last three years, Mohawk Valley SUNYs generated....

5 invention disclosures

1 patent application

Source: Interview and survey data from SUNY institutions.

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides revenues, spending and employment counts. SUNY campuses provided data on out-of-state revenue and spending. Impacts have been calculated using IMPLAN. Tax impacts are based on data from NYS Dept. of Taxation and Finance and NYS Office of Real Property Tax Services. See "Economic Impact," "Employment by SUNY," "Revenues and Spending of SUNY Institutions," "Student Spending," "Survey of SUNY Campuses," "Tax Impacts" and "Visitor Spending" in Data Notes for more information.

in the region. Specific initiatives and programs at Mohawk Valley SUNYs also contribute to stronger communities. Whether training unemployed and underemployed individuals at Mohawk Valley Community College or developing new technologies to convert agricultural waste to clean energy at the College of Agriculture and Technology at Cobleskill, SUNY is helping to improve the quality of life and economic opportunity for the Mohawk Valley.

CASE IN POINT

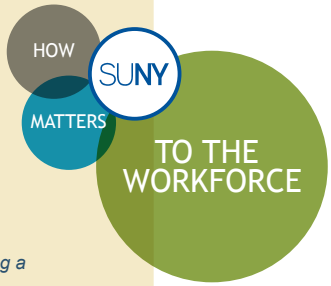
SUNY Cobleskill

A College That Brings Food, Music and Transport to its Downtown

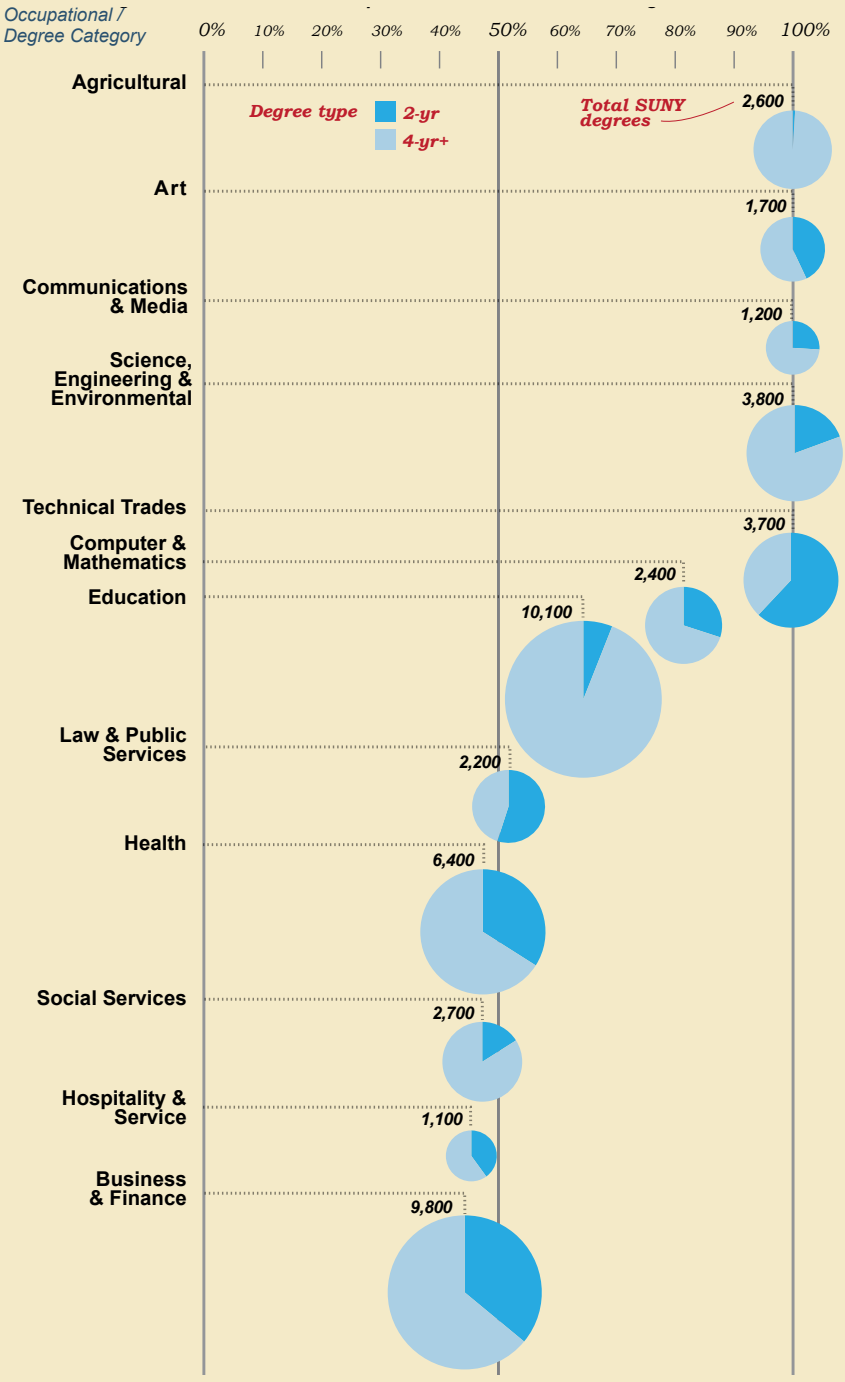
SUNY Cobleskill operates a downtown diner, Coby's, through its auxiliary services corporation. It constitutes the only coffee shop in the Village of Cobleskill's historic district. This venue has helped spur additional economic development on Main Street and also serves to support the arts by showcasing area musicians and artists. The college also contracts with the Schoharie County Public Transit Authority to extend public bus routes and hours for students and the public at large, which enables students to visit area merchants and employers in the village and surrounding region more consistently throughout the academic year.

Rural villages don't always find it easy to develop an attractive downtown. SUNY Cobleskill has stepped in to help.

How SUNY graduates match up with workforce needs across the range of industries in the Mohawk Valley



Degrees held by SUNY alumni as a proportion of jobs requiring a degree or advanced skill in related industries



While bringing important capacities to the workforce, liberal arts degrees are too broad to be matched to a specific occupational field and were thus excluded from this analysis.

Source: SUNY institutions provided alumni ZIP codes and field of study; occupational data are from NYS Dept. of Labor. See "Alumni Data" in Data Notes for more information.

Preparing the Workforce

Although one of the smallest concentrations of SUNY alumni in the state, the 75,000 SUNY graduates living in the Mohawk Valley are the key labor supply for this region. SUNY is the primary higher education provider in the region, with nearly 75 percent of college graduates in the Mohawk Valley tied to SUNY. For industries ranging from technical trades and education to computers and law, these alumni have the capacity to fill a majority of degree-requiring jobs.

Specifically, the region's 3,700 alumni holding degrees in the technical trades and 3,800 with science & engineering degrees could fill 100 percent of related degree-requiring jobs in the region. The proportionally high number of alumni trained in these fields can be attributed to the large presence of two-year colleges in the region, particularly Mohawk Valley Community College, which features academic and certificate programs in air conditioning, welding, carpentry and masonry, as well as engineering and the physical sciences. In fact, this school alone accounts for 20,000, or more than one in four, of all SUNY alumni living in the region.

SUNY Oneonta and SUNY Cortland in Central New York supply the bulk of the region's 10,100 SUNY teaching degrees. SUNY Cobleskill is the primary source of the Mohawk Valley's abundant supply of alumni with four-year agricultural degrees.

Every year, these SUNYs graduate 4,200 knowledge workers armed with the degrees and skills needed most by employers. Likely an indicator of this region's slow economic growth, about three-quarters of these graduates will leave the region to find work, though most will stay in the state.

The region's contributions to workforce preparation in the state's cluster industries, or groups of related industries targeted for development by the state, suggest SUNY is serving both the Mohawk Valley's core industry base — manufacturing and tourism — while building capacity for emerging industries such as electronics & imaging and information technology.

The same broad approach is being applied through the workforce development and training programs offered by these institutions. For instance, the SUNY Institute of Technology at Utica-Rome is on the cutting edge in its partnership with the University at Albany's College of Nanoscale Science and Engineering to develop nanotechnology workforce training programs. Fulton-Montgomery Community College is also responding to the burgeoning technology industry. At the same time, Mohawk Valley Community College recently met the needs of a major aircraft repair employer with a customized certificate program in airplane repair and maintenance, and SUNY Oneonta is working with local schools to encourage youth in pursuing careers in science, technology and mathematics.

Mohawk Valley SUNYs Generate a Large Share of Degrees for NYS Cluster Industries

Distribution, Biomedical, Information Technology, Electronics & Imaging

SUNY prepares the state's workforce for strategic cluster industries by granting degrees required by jobs in those industries. A "large share" of cluster-related degrees indicates this region's SUNYs contribute proportionally more to SUNY's total degrees for one or more clusters than they do to SUNY degrees overall.

CASE IN POINT

Fulton-Montgomery Community College

Fulton-Montgomery Works to Provide Hands-On Experience in Skills Employers Need

Launched with a federal grant of nearly $1 million, the new Center for Engineering and Technology is part of Fulton-Montgomery Community College's response to the burgeoning technology industry spreading out from the greater Capital region. The center is an innovative collaboration of programs in science and technology. Rather than a single building, the initiative includes equipment, classrooms, a modified clean room and a manufacturing lab — resources that provide students with hands-on experience in emerging occupational environments.

The center is essentially a resource that supports existing curriculum and fosters the development of new courses and programs. Its resources are used by students pursuing a wide range of academic interests, including biology and engineering science. Fulton-Montgomery plans to expand programming to alternative energy and distributed computing.

One such program is Electrical Technology, which is designed for students seeking employment in diverse technical fields including engineering technician, clean-room technician, computer-aided design (CAD) technician, lab assistant and service technician. Responsive to emerging employment needs at the chip-fab plant being built in neighboring Saratoga County and its expected suppliers and the University at Albany's Nano campus, the Electrical Technology program introduces students to fundamental electronics, electronic circuit design, digital circuitry and the circuit fabrication and testing process through a variety of lecture and laboratory experiments. Students also learn the basic protocols needed to operate and maintain the complex infrastructure supporting clean rooms.

The program also directly matriculates students into various four-year colleges, enabling Fulton-Montgomery graduates to continue their education with a bachelor's degree in Electrical Engineering Technology.

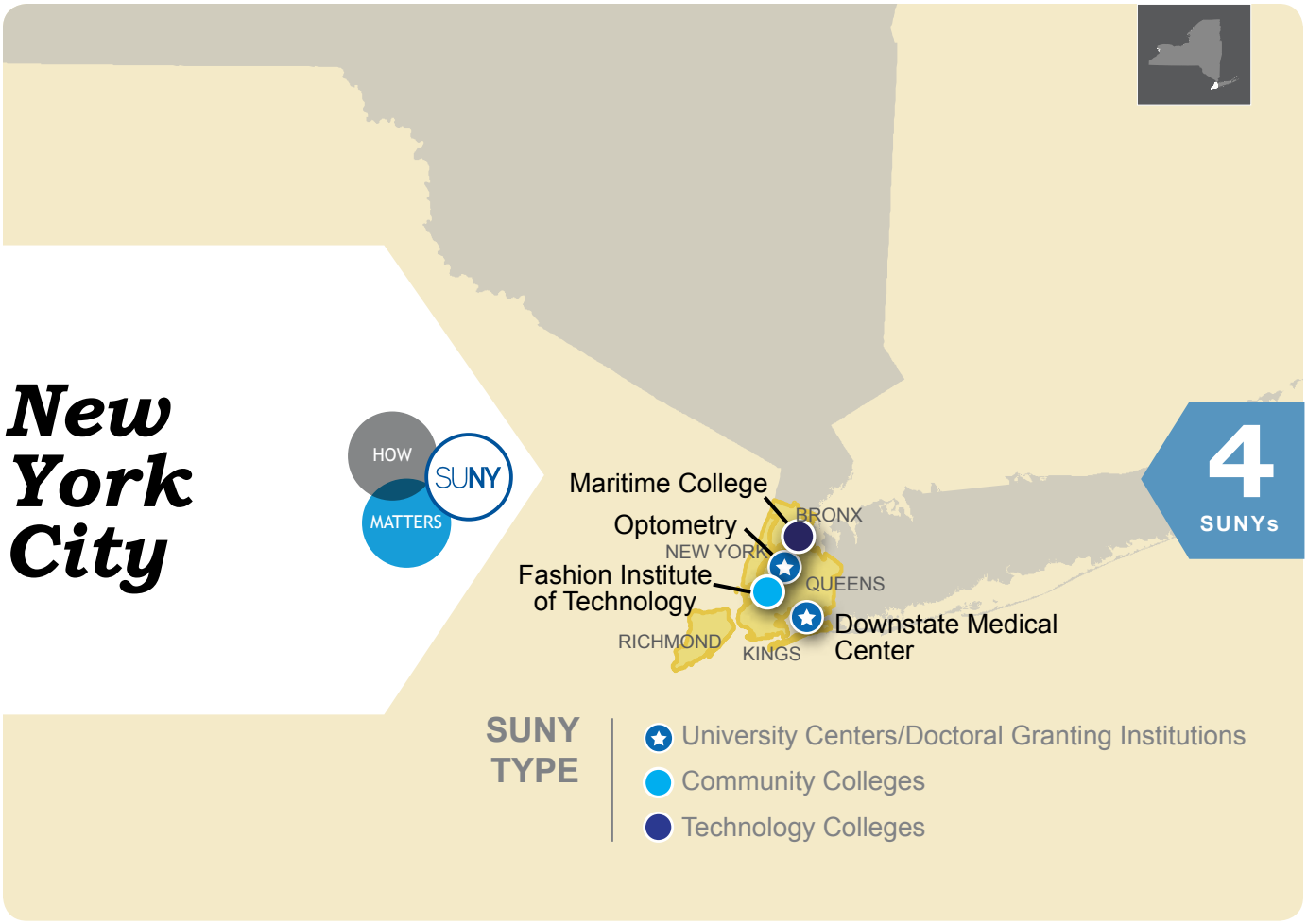
BY THE NUMBERS

SUNY alumni living in region as % of region's total labor supply **31%**

Total degrees from region's SUNYs (2008-09) **4,200**

SUNY grads as a % of total grads in this region **73%**

Source: SUNY institutions provided current alumni data; labor supply is from NYS Dept. of Labor. Degrees awarded are from U.S. Dept. of Education, IPEDS, 2008-09. See "Alumni Data" and "Student Location Data" in Data Notes for more information.

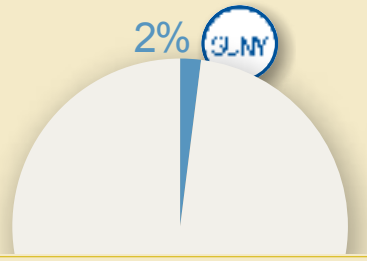


SUNY in New York City

New York City is the nation's largest city and the core of economic activity in the state. Its City University of New York enrolls a quarter of a million students. Yet even here, SUNY is a force. Its four institutions in the city offer high-quality, specialized degree programs, among them fashion, medicine, maritime transportation and optometry, luring students from far and wide. More than one in five of the region's 17,800 SUNY students hails from across the United States and 11 percent from other parts of the globe. New York City also has the largest cluster of SUNY alumni from other parts of the state, undoubtedly drawn by the city's diverse and perennially strong economy and distinct quality of life. Not surprising given the city's size, the 172,500 SUNY students, employees and alumni in New York City represent just 2 percent of New York City's total population.

The New York City Economy

SUNY is a critical asset for workforce training and economic support in niche industries for New York City, as well as a significant economic generator for the state as a whole. Its five small institutions send $1.9 billion into the state economy on an annual basis. And the 4,700 students graduating from these SUNYs every year represent nearly one in 10 of all new graduates in the city with vocational degrees or certificate training. From the Fashion Institute of Technology's robust internship program and customized training to Downstate Medical Center's initiative to nurture research and development in biotechnology, New York City's SUNYs provide state-of-the-art workforce training for core industries while advancing the state's innovation economy.



In '08-'09, SUNY students, employees and alumni accounted for ***2% of New York City's population.***

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment and employee counts. Current alumni counts are from SUNY campuses. Population data are from 2009 American Community Survey. See "Alumni Data" and "Demographic & Housing Data" in Data Notes for more information.

STUDENTS

17,800 students attended a New York City SUNY.

Where these students originated...

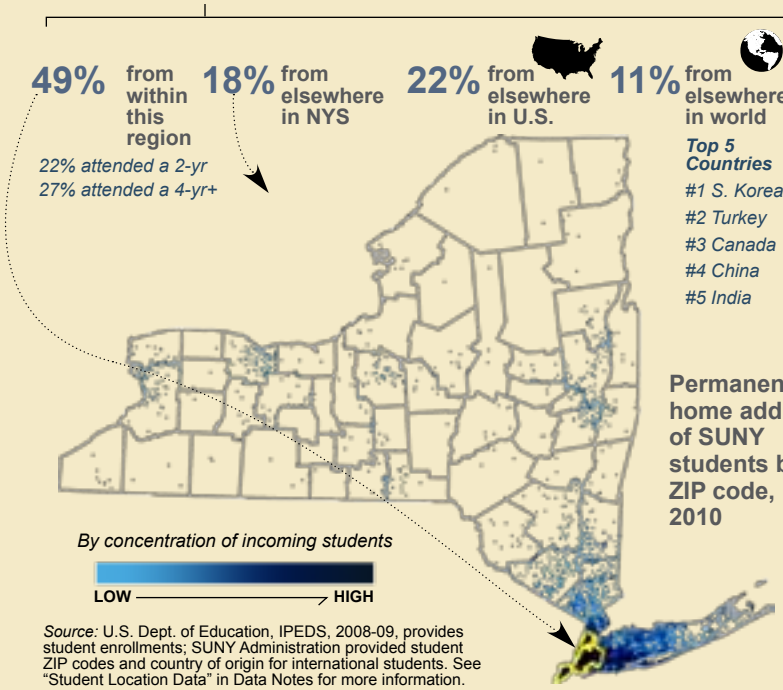
49% from within this region
22% attended a 2-yr
27% attended a 4-yr+

18% from elsewhere in NYS

22% from elsewhere in U.S.

11% from elsewhere in world

Top 5 Countries
#1 S. Korea
#2 Turkey
#3 Canada
#4 China
#5 India



Permanent home address of SUNY students by ZIP code, 2010

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollments; SUNY Administration provided student ZIP codes and country of origin for international students. See "Student Location Data" in Data Notes for more information.

EMPLOYEES

4,700

SUNY faculty and staff employed in New York City.

Source: U.S. Dept. of Education, IPEDS, 2008-09, and SUNY Research Foundation. See "Employment by SUNY" in Data Notes for more information.

ALUMNI

150,000

SUNY alumni live in New York City.

28,000 ...graduated from a SUNY in this region and stayed in this region.

122,000 ...graduated from a SUNY elsewhere in NYS and now live in this region.

Source: SUNY institutions provided current alumni data. See "Alumni Data" in Data Notes for more information.

SUNY DIVERSITY

36% Minority students

37% Students from a low-income ZIP code (20%+ children live below poverty line)

18% Non-traditional students (age 30+)

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment by race/ethnicity and age. Students from low-income ZIP codes are from 2010 student ZIP codes from SUNY Administration, and poverty data by ZIP code are from 2005-09 American Community Survey. See "Diversity of SUNY Students" in Data Notes for more information.

New York City SUNYs Generate a $1.9 Billion Economic Impact

HOW SUNY MATTERS TO THE ECONOMY

Here's how it happens...

SUNY attracts revenues from a range of public and private sources...

$1.1 billion in revenues

$93 M tuition & fees
$489 M auxiliary service sales
$317 M NYS appropriations, grants & contracts
$46 M federal appropriations, grants & contracts
$115 M other sources

5% Sponsored research dollars
9% Estimated out-of-state revenues

SUNY campuses, employees, students and visitors purchase goods and services...

$1.3 billion in spending

$749 M by SUNY on employee wages & benefits
$414 M by SUNY on other institutional purchases
$119 M by students
$16 M by overnight visitors
(336,200 visitors, 18% overnight)

87% Estimated spending in NYS
70% Estimated spending in region

Those dollars circulate through the state and regional economy, stimulating additional economic activity and greater total impacts...

Economic Output
$1.9 billion in NYS, and 63%, or $1.2 billion, in New York City

Employment Impact
12,000 jobs
SUNY employment: 4,700
Jobs indirectly supported: 7,300

Taxes Generated
$45 M in total taxes generated for NYS and the New York City
$25 M income taxes
$13 M sales taxes
$7 M property taxes

**Sum total may differ slightly due to rounding*

$1.9 B / $317 M

*Represents a **$5.90** return on investment for every dollar of state funding*

Driving the Economy

The $1.9 billion economic impact generated by New York City SUNYs represents about 10 percent of the overall SUNY impact, a powerful contribution to the state economy for a region that accounts for less than 5 percent of overall SUNY student enrollment. This SUNY impact is buoyed by relatively high wages paid to SUNY employees in one of the country's most expensive places to live. The average full-time wage for a SUNY employee in New York City is $133,200, almost double the average SUNY employee wage. (Contributing to higher wages is the academic focus areas of the schools and the highly specialized knowledge and skills needed by faculty and staff.)

In addition to $1.9 billion in economic output, two-thirds of which goes directly into the New York City economy, these institutions generate $45 million in state and local taxes and support 7,300 jobs across the

SUNY & the Innovation Economy

In the best of the last three years, New York City SUNYs generated....

- 22 invention disclosures
- 18 patent applications
- 10 patents
- 1 spin-off
- 4 licenses

Source: Interview and survey data from SUNY institutions.

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides revenues, spending and employment counts. SUNY campuses provided data on out-of-state revenue and spending. Impacts have been calculated using IMPLAN. Tax impacts are based on data from NYS Dept. of Taxation and Finance and NYS Office of Real Property Tax Services. See "Economic Impact," "Employment by SUNY," "Revenues and Spending of SUNY Institutions," "Student Spending," "Survey of SUNY Campuses," "Tax Impacts" and "Visitor Spending" in Data Notes for more information.

state, over and above 4,700 SUNY employees.

Revenues from hospital services connected with Downstate Medical Center account for about half of overall revenues for the five New York City SUNYs. In large part due to these auxiliary revenues, these institutions are somewhat less dependent on state funding than SUNYs in other regions across the state. Focusing more on workforce development and professional education, these institutions generate fewer research dollars than their SUNY peers (5 percent of total revenues compared to 8 percent SUNY average). At the same time, research funding for these SUNYs has increased in recent years, particularly at the College of Optometry, which launched an aggressive grant campaign in 2006. Research activity within New York City SUNYs has generated 22 invention disclosures and 10 patents in one recent year.

SUNY institutions further drive the economy of New York City by actively supporting businesses as well as the community. The SUNY University Hospital and the College of Optometry's University Eye Center provide widely accessible health care services rooted in the latest research. The Fashion Institute of Technology brings new ideas and expertise to more than 4,000 industry partners through its highly successful internship program.

See also SUNY at Work: Downstate Medical Center: A Future in BioTech Grows in Brooklyn (p. 24).

CASE IN POINT

Fashion Institute of Technology

Fashion Institute of Technology Supports the Needs of New York's Garment Industry

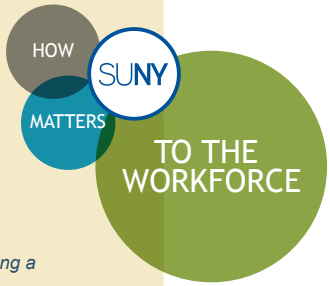
The Fashion Institute of Technology has robust partnerships with more than 4,000 company sponsors and over 5,200 active internship positions. About one-third of its internship placements lead directly to offers of full-time employment.

The program combines on-site, professional/work experience supervised by an organization executive, with classroom instruction at FIT on best practices and trends that place the internship experience in context.

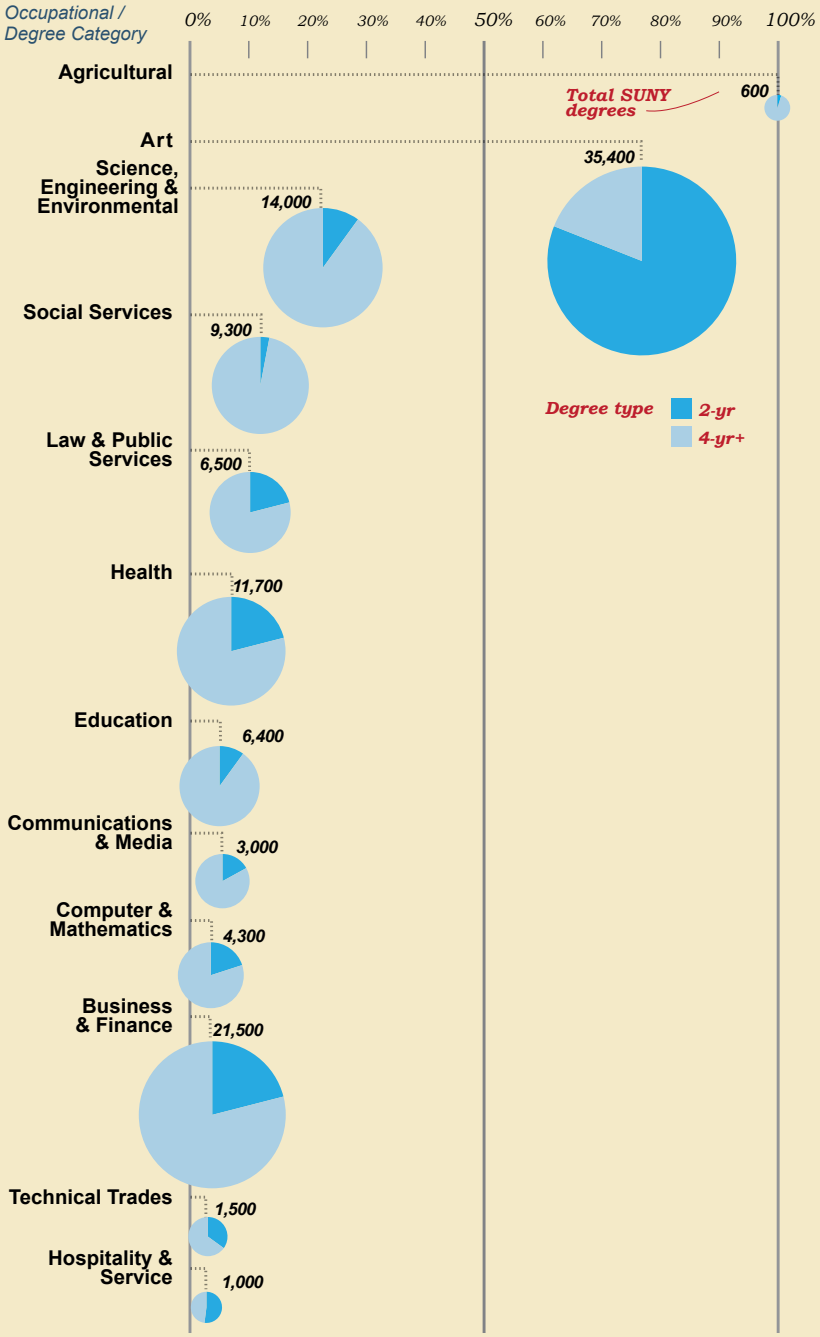
The Internship Center at SUNY's Fashion Institute of Technology helps train the next generation of fashion industry leaders — serving companies from large to small and local to international, including Marc Jacobs, Donna Karan, Harper's Bazaar and Bloomingdales.

Sponsors benefit from the energy of enthusiastic young thinkers with fresh approaches, and from being the first to encourage talented young people to enter their industries. Interns earn college credit while gaining valuable experience that helps them make better-informed career decisions and to improve their marketability upon graduation.

How SUNY graduates match up with workforce needs across the range of industries in New York City



Degrees held by SUNY alumni as a proportion of jobs requiring a degree or advanced skill in related industries



While bringing important capacities to the workforce, liberal arts degrees are too broad to be matched to a specific occupational field and were thus excluded from this analysis.

Source: SUNY institutions provided alumni ZIP codes and field of study; occupational data are from NYS Dept. of Labor. See "Alumni Data" in Data Notes for more information.

Preparing the Workforce

The source of just 4 percent of college degrees granted in New York City, SUNY certainly is not a dominant factor in the city's overall workforce characteristics and labor supply. However, within certain industries — fashion, in particular — SUNY's workforce impacts are undeniable. Nearly one in four of the city's 149,000 SUNY alumni have earned their degree from the SUNY Fashion Institute of Technology, representing perhaps the single most important source of labor for this major industry. The city's arts industry also draws SUNY art graduates from outside the region, with over 7,300 living in the five-borough region. Consequently, SUNY graduates living in New York City number enough to fill three in four degree-requiring jobs in the arts sector.

Most of the city's remaining SUNY alumni have migrated in from other regions, with the bulk of these holding degrees in business & finance. Large numbers of alumni also come to the city equipped with degrees in science & engineering, health, law and social services. The draw of New York City also helps retain close to 70 percent of the city's 4,800 annual SUNY graduates.

As part of SUNY's overall efforts to prime a workforce for the state's strategic cluster industries, New York City's institutions are important contributors. Beyond fashion, these SUNYs generate a high level of graduates ready for work in the manufacturing cluster through SUNY Maritime College's maritime industry and transportation programs.

New York City's specialized SUNY institutions are undertaking creative approaches to workforce development by working closely with industry leaders and major employers. For instance, the Fashion Institute of Technology has partnered with thousands of fashion enterprises to cultivate practical skills, management capacity and entrepreneurship. Also, Downstate Medical Center's Advanced Biotechnology Incubator is collaborating with other higher education institutions in the area to provide job training for bioscience and biotechnology technicians.

New York City SUNYs Generate a High Share of Degrees for NYS Cluster Industries

Fashion; Manufacturing; Travel & Tourism; Front Office & Producer Services

SUNY prepares the state's workforce for strategic cluster industries by granting degrees required by jobs in those industries. A "large share" of cluster-related degrees indicates this region's SUNYs contribute proportionally more to SUNY's total degrees for one or more clusters than they do to SUNY degrees overall.

CASE IN POINT

Fashion Institute of Technology

The Fashion Industry Changes Fast – and SUNY's Fashion Institute of Technology Helps it Keep Up

The garment industry weaves through the history of New York City, remaining a mainstay of the manufacturing and export economy of the region and a doorway welcoming generations of new Americans.

The Fashion Institute of Technology's School of Continuing and Professional Studies provides customized programs for businesses and individuals in fashion and related industries. The school's Center for Innovation Management offers customized and on-site training programs for senior management in large organizations such as Cuisinart, Croscill, Haddad and Lafayette 148 align processes with key operational goals, create high-performance teams with unified strategies, and develop a culture for idea generation and development throughout the entire workforce.

The Center for Professional Studies offers some 500 programs a year to help advance knowledge and practical skills in fashion, business, merchandising, marketing, home goods and design for corporate, entrepreneurial, and design communities, including Saks, Aeropostale, Marc Jacobs and QVC, among many others.

The Enterprise Center offers skills training in entrepreneurship and small business development to individuals, groups and companies looking for courses in business strategy, marketing, sustainability, computer training and small business ownership. SUNY Workforce Development grants have enabled the Enterprise Center to run targeted training workshops in "green entrepreneurship."

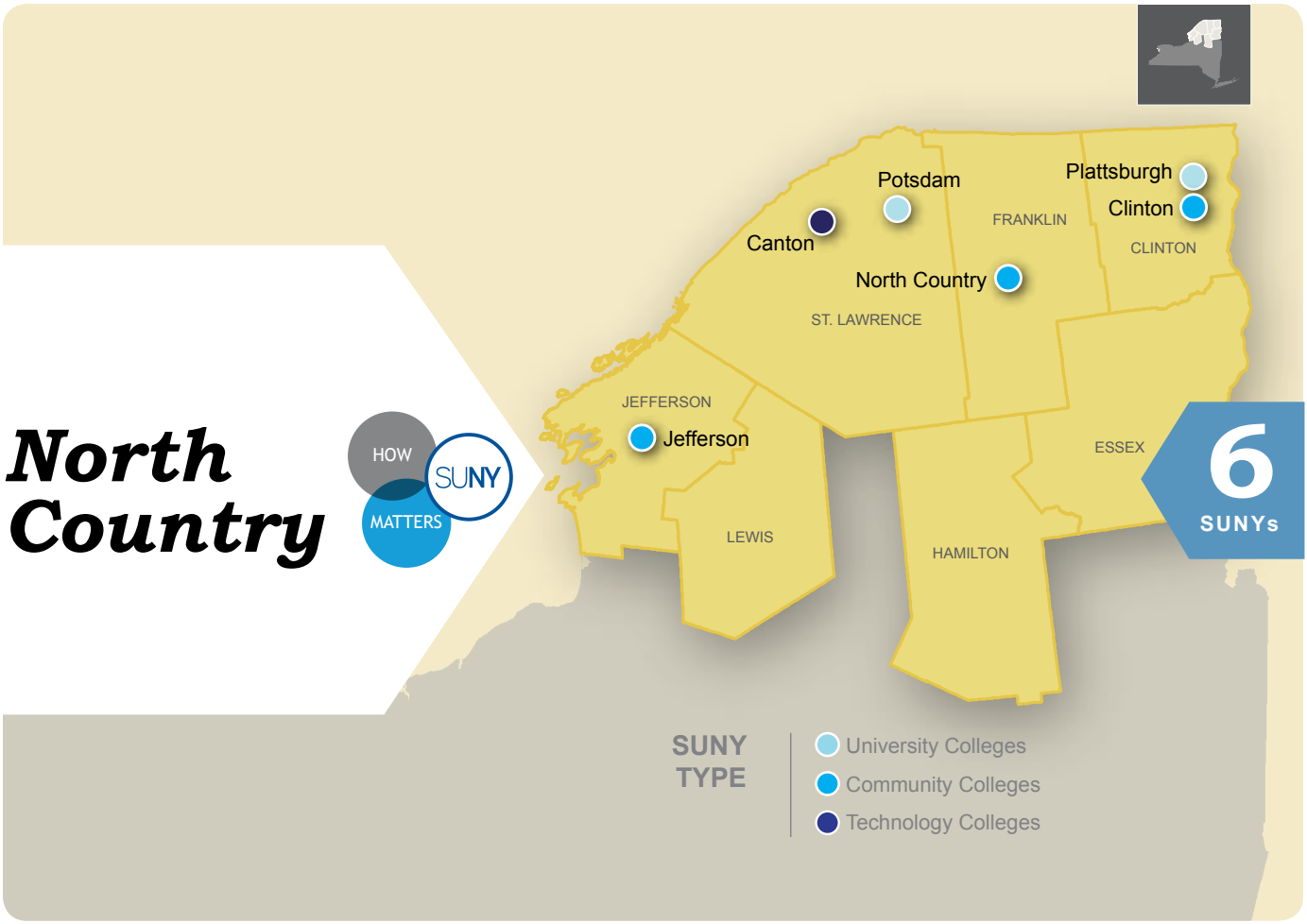
BY THE NUMBERS

SUNY alumni living in region as % of region's total labor supply **4%**

Total degrees from region's SUNYs (2008-09) **4,800**

SUNY grads as a % of total grads in this region **4%**

Source: SUNY institutions provided current alumni data; labor supply is from NYS Dept. of Labor. Degrees awarded are from U.S. Dept. of Education, IPEDS, 2008-09. See "Alumni Data" and "Student Location Data" in Data Notes for more information.

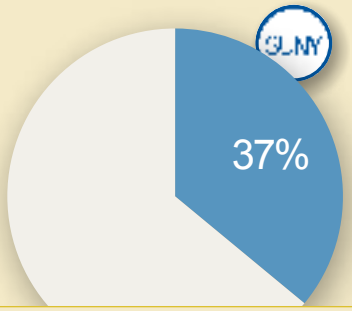


SUNY in the North Country

Situated at the northern tip of New York State are six SUNY institutions of the North Country region, including three community colleges, two university colleges and one technology college. Among the state's smaller SUNY footprints, North Country institutions enroll 22,300 and employ 3,500 faculty and staff. The region is home to 61,000 SUNY alumni, with three in four of these products of North Country SUNYs. As a sparsely populated region, the North Country is closely linked to its SUNY institutions — 37 percent of the population is a SUNY student, employee or alumnus, the highest of all regions of the state.

The North Country Economy

The North Country economy is defined by industry clusters in manufacturing, distribution, transportation and tourism as well as an emerging alternative energy sector. SUNY has been a key partner on economic and community development efforts in the region — from Clinton Community College helping to lure Nova Bus to the region through customized training, to SUNY Plattsburgh expanding health care access through advanced technology. Additionally, these six schools are a direct force on the state and regional economy, supporting $604 million in economic activity and 6,700 jobs.



In '08-'09, SUNY students, employees and alumni accounted for ***37% of North Country's population.***

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment and employee counts. Current alumni counts are from SUNY campuses. Population data are from 2009 American Community Survey. See "Alumni Data" and "Demographic & Housing Data" in Data Notes for more information.

STUDENTS

22,300 students attended a North Country SUNY.

Where these students originated...

59% from within this region

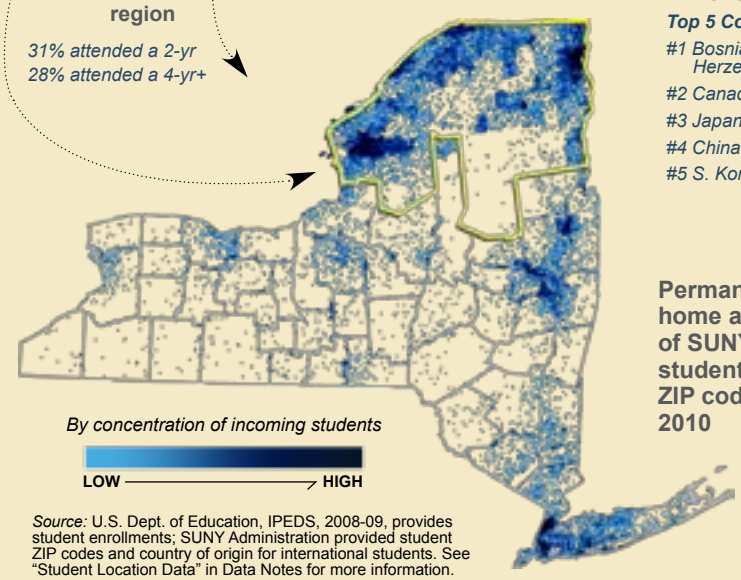
31% attended a 2-yr
28% attended a 4-yr+

32% from elsewhere in NYS

3% from elsewhere in U.S.

5% from elsewhere in world

Top 5 Countries
#1 Bosnia and Herzegovina
#2 Canada
#3 Japan
#4 China
#5 S. Korea



Permanent home address of SUNY students by ZIP code, 2010

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollments; SUNY Administration provided student ZIP codes and country of origin for international students. See "Student Location Data" in Data Notes for more information.

EMPLOYEES

3,500

SUNY faculty and staff employed in the North Country.

Source: U.S. Dept. of Education, IPEDS, 2008-09, and SUNY Research Foundation. See "Employment by SUNY" in Data Notes for more information.

ALUMNI

61,000

SUNY alumni live in the North Country.

45,000 ...graduated from a SUNY in this region and stayed in this region.

16,000 ...graduated from a SUNY elsewhere in NYS and now live in this region.

Source: SUNY institutions provided current alumni data. See "Alumni Data" in Data Notes for more information.

SUNY DIVERSITY

18% Minority students

33% Students from a low-income ZIP code (20%+ children live below poverty line)

20% Non-traditional students (age 30+)

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment by race/ethnicity and age. Students from low-income ZIP codes are from 2010 student ZIP codes from SUNY Administration, and poverty data by ZIP code are from 2005-09 American Community Survey. See "Diversity of SUNY Students" in Data Notes for more information.

North Country SUNYs Generate a $604 Million Economic Impact

HOW SUNY MATTERS TO THE ECONOMY

Here's how it happens...

SUNY attracts revenues from a range of public and private sources...

$346 million in revenues

$64 M tuition & fees
$70 M auxiliary service sales
$144 M NYS appropriations, grants & contracts
$38 M federal appropriations, grants & contracts
$30 M other sources

3% Sponsored research dollars
17% Estimated out-of-state revenues

SUNY campuses, employees, students and visitors purchase goods and services...

$466 million in spending

$220 M by SUNY on employee wages & benefits
$139 M by SUNY on other institutional purchases
$98 M by students
$8 M by overnight visitors
(180,200 visitors, 32% overnight)

85% Estimated spending in NYS
76% Estimated spending in region

Those dollars circulate through the state and regional economy, stimulating additional economic activity and greater total impacts...

Economic Output

$604 million in NYS, and 59%, or $357 million, in the North Country

Employment Impact

6,700 jobs

SUNY employment: 3,500
Jobs indirectly supported: 3,200

Taxes Generated

$12 M in total taxes generated for NYS and the North Country

$4 M income taxes
$6 M sales taxes
$2 M property taxes

**Sum total may differ slightly due to rounding*

$604 M / $144 M

*Represents a **$4.20** return on investment for every dollar of state funding*

Driving the Economy

The $604 million economic impact leveraged by North Country SUNY institutions accounts for a proportionally small, 3-percent slice of the overall SUNY economic impact. However, at the regional scale, North Country SUNYs play a central economic role. Fifty-nine percent of this economic output — or $357 million — circulates throughout the regional economy. Across the region and state, these SUNYs support over 3,200 jobs in related industries in addition to 3,500 direct employees.

SUNY & the Innovation Economy

In the best of the last three years, North Country SUNYs generated....

- 5 invention disclosures
- 1 patent application
- 1 patent

Source: Interview and survey data from SUNY institutions.

Similar to other regions lacking a SUNY university center, the North Country sees relatively few research dollars as a result of its SUNY institutions. While generating five invention disclosures and one patent in one year, SUNYs in the North Country are generally more active in workforce and community development than in research-based innovation and commercialization. Among these efforts is the extension of telemedicine infrastructure to expand health care access in this

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides revenues, spending and employment counts. SUNY campuses provided data on out-of-state revenue and spending. Impacts have been calculated using IMPLAN. Tax impacts are based on data from NYS Dept. of Taxation and Finance and NYS Office of Real Property Tax Services. See "Economic Impact," "Employment by SUNY," "Revenues and Spending of SUNY Institutions," "Student Spending," "Survey of SUNY Campuses," "Tax Impacts" and "Visitor Spending" in Data Notes for more information.

rural region. Also, SUNY Potsdam was ahead of its time when it instituted 10 years ago a buy-local policy for food service to support local farmers and promote student and community health.

Cultural performances at SUNY Potsdam's highly-regarded Crane School of Music and campus connections to the region's outdoor attractions contribute to a high draw of SUNY visitors to the North Country region — over 180,000 in 2008-09. Proportionally more of these visitors are estimated to stay overnight relative to other regions, bolstering economic vitality in the region through more than $8 million in hotel, food and entertainment purchases from local businesses.

CASE IN POINT

SUNY Plattsburgh

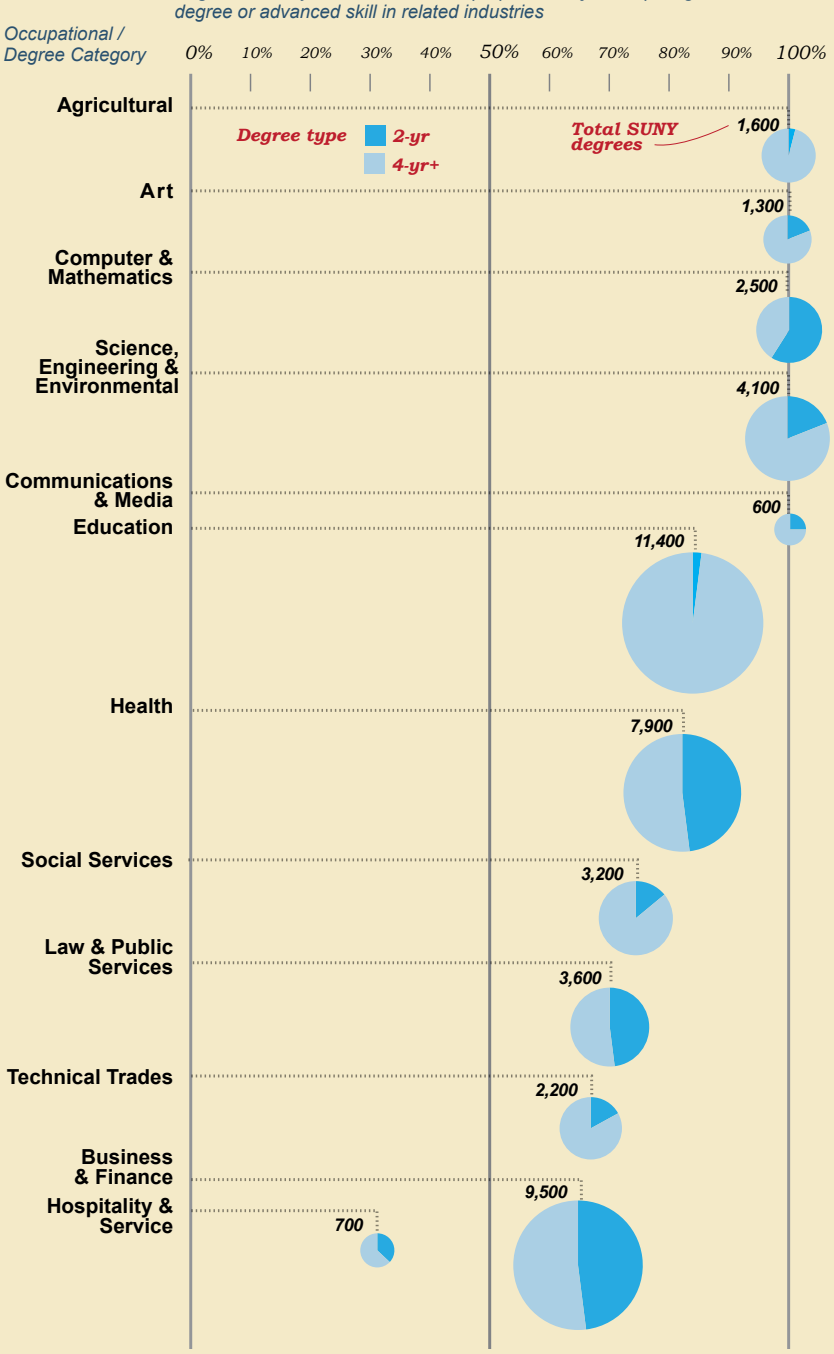
SUNY Plattsburgh Helps Bring Advanced Medical Knowledge to the North Country

Organized and managed by the Technical Assistance Center at SUNY Plattsburgh, a state-of-the art fiber optic network is connecting key health care providers in Clinton, Essex and Franklin counties to each other and to Internet2, the next generation of the global computer network. Fueled by a $7.6 million rural health initiative grant from the Federal Communications Commission, the Adirondack-Champlain Telemedicine Information Network, or ACTION, provides area patients with access to critically needed medical specialists in cardiology, pediatrics, radiology and other practices, in some instances without leaving their homes or communities. The high-speed connection enables intensive care doctors and nurses to monitor critically ill patients around the clock, and to consult by video conference with specialists in distant locations. Nursing students at local colleges can use this technology to interact in real time with health care specialists between classroom and medical center. ACTION members include CVPH Medical Center, Alice Hyde Medical Center, Adirondack Medical Center, Elizabethtown Community Hospital, the Saint Regis Mohawk Tribe Health Center, Clinton Community College, North Country Community College and SUNY Plattsburgh.

Broadband Internet access is increasingly important for health care providers, but it's hardest to come by in the rural areas that need it the most.

How SUNY graduates match up with workforce needs across the range of industries in the North Country

Degrees held by SUNY alumni as a proportion of jobs requiring a degree or advanced skill in related industries



While bringing important capacities to the workforce, liberal arts degrees are too broad to be matched to a specific occupational field and were thus excluded from this analysis.

Source: SUNY institutions provided alumni ZIP codes and field of study; occupational data are from NYS Dept. of Labor. See "Alumni Data" in Data Notes for more information.

Preparing the Workforce

Supplying more than seven in 10 college degrees in the North Country, SUNY is essential to building a prepared workforce in this region. The 61,000 SUNY alumni living in the region either meet labor demand or approach full labor supply for nearly every industry, including those where worker shortages are common, such as computer & mathematics and health.

SUNY Potsdam and Plattsburgh are the main source of the region's 11,400 education alumni, enough to fill four of every five degree-requiring jobs in this field. The health sector in this region also relies heavily on SUNY alumni, which provide a labor capacity of over 80 percent. More than 4,400 of these 7,900 alumni hold degrees in nursing, while most others are graduates of SUNY pharmacy, medical technology and physical therapy programs. SUNY medical doctors in the region number 100 and come from SUNY Downstate Medical Center and Upstate Medical University, as well as the medical schools at Stony Brook University and the University at Buffalo.

Alumni with degrees related to science, engineering & environment exist in relatively high numbers in the region, many of them products of the SUNY Canton College of Technology. The region's emerging industries in natural resources and alternative energy are likely factors in retaining and attracting these alumni.

Hospitality & services is the industry for which SUNY alumni hold the least capacity to fill related jobs, perhaps indicative of the high demand for talent to serve the region's growing recreational tourism niche.

A remote rural region, the North Country faces significant economic hurdles, including high poverty levels and declining population. To this point, only one in four of the

4,100 annual graduates of North Country SUNYs will settle in the region. Yet SUNYs in the North Country are playing a critical role in expanding economic opportunity in the region through workforce development. For instance, these SUNYs produce significant numbers of graduates trained in cluster industries, or groups of related industries that are the focus of state economic development efforts. These include communications, travel & tourism, back office and financial services. Also, North Country SUNYs enroll high levels of students from low-income communities as well as non-traditional students seeking updated or new skills.

Many degree and training programs offer flexible services and prepare graduates for work in fields with sustainable wages. These include a weekend nursing program at Jefferson Community College and North Country Community College's programs in sports and event management. Meanwhile, innovative programs such as customized training in industrial technology at Clinton Community College support core industries in the region.

North Country SUNYs Generate a Large Share of Degrees for NYS Cluster Industries

Communications, Software & Media Services; Back Office; Travel & Tourism; Financial Services

SUNY prepares the state's workforce for strategic cluster industries by granting degrees required by jobs in those industries. A "large share" of cluster-related degrees indicates this region's SUNYs contribute proportionally more to SUNY's total degrees for one or more clusters than they do to SUNY degrees overall.

CASE IN POINT

Clinton Community College

Clinton Community College Helps the North Country Attract a New Manufacturing Plant

Clinton Community College played a key role in helping New York State and the Plattsburgh area attract a new manufacturing facility – Nova Bus.

Owned by Volvo and Quebec's Prévost Car, Nova Bus manufactures sustainable buses including high-capacity and environmentally friendly vehicles.

Nova Bus searched for a manufacturing site in the United States to increase capacity beyond its Quebec facility and strengthen its ability to compete for U.S. procurement contracts. Company officials investigated several U.S. locations but chose Plattsburgh and opened a 140,000-square-foot plant in 2009. Landing Nova was the result of a concerted effort involving the college, New York State, The Development Corporation of Clinton County and others.

Clinton Community College worked closely with the area Workforce Investment Board, other training organizations and the firm to provide new employees with customized training specifically geared to Nova and the new plant, including training in industrial technology, blueprint reading, management skills and Nova's corporate culture. Clinton developed a training schedule that was flexible and tailored to Nova's plan to hire waves of new trainees at regular intervals and that could be adapted to revise or add training modules as needed.

Relevant training was also provided to Nova suppliers that have clustered around the Plattsburgh site. Thanks in large part to Clinton Community College's efforts, Nova alone now employs more than 200 permanent workers at its new Plattsburgh facility and several Nova suppliers have located in Plattsburgh as well.

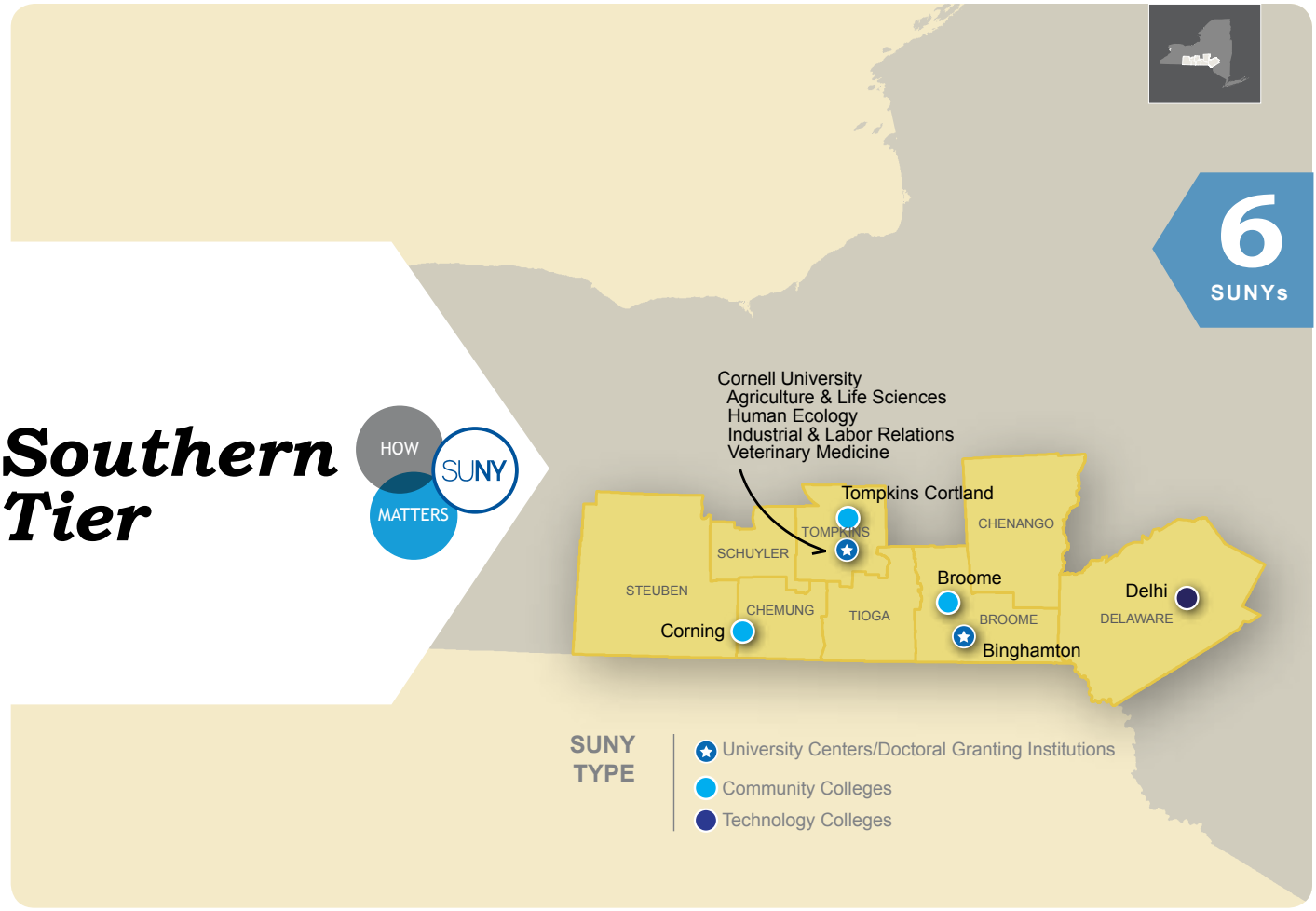
BY THE NUMBERS

SUNY alumni living in region as % of region's total labor supply **31%**

Total degrees from region's SUNYs (2008-09) **4,200**

SUNY grads as a % of total grads in this region **73%**

Source: SUNY institutions provided current alumni data; labor supply is from NYS Dept. of Labor. Degrees awarded are from U.S. Dept. of Education, IPEDS, 2008-09. See "Alumni Data" and "Student Location Data" in Data Notes for more information.

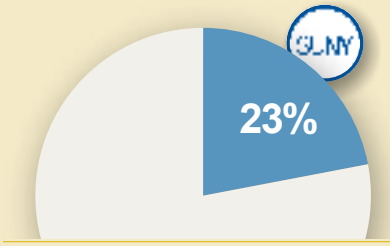


SUNY in the Southern Tier

The Southern Tier has both the university center at Binghamton and SUNY's statutory colleges at another major research university, Cornell. Its SUNY offerings also include three community colleges and one technology college. SUNY's presence at Cornell University, a predominantly privately-funded institution, includes four state-funded colleges: the School of Industrial and Labor Relations and the Colleges of Agriculture and Life Sciences, Veterinary Medicine, and Human Ecology. Largely because of Binghamton and Cornell, SUNY in the Southern Tier has a broad student draw — 11 percent of its 44,700 students hail from another state, and 15 percent from another country (the highest level of international enrollment in the SUNY system). The Southern Tier is also home to 97,000 SUNY alumni. Altogether, the region's SUNY presence — including students, employees and alumni - represents more than 20 percent of the Southern Tier population.

The Southern Tier Economy

The Southern Tier economy leverages its strategic location along the Pennsylvania border with major industries including manufacturing and distribution, as well as flight simulation and defense. SUNY advances the regional economy through cutting-edge economic development programs and initiatives. For instance, Binghamton University's Small Scale Systems Integration and Packaging Center (S^3IP) cultivates the emerging microelectronics industry in the region through innovative research. Meanwhile, community and technology colleges provide workforce training for a rapidly evolving manufacturing base. These SUNYs' bottom-line contribution to the economy totals over $2 billion annually.



In '08-'09, SUNY students, employees and alumni accounted for ***23% of the Southern Tier's population.***

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment and employee counts. Current alumni counts are from SUNY campuses. Population data are from 2009 American Community Survey. See "Alumni Data" and "Demographic & Housing Data" in Data Notes for more information.

STUDENTS

44,700 students attended a Southern Tier SUNY school.

Where these students originated...

39% from within this region

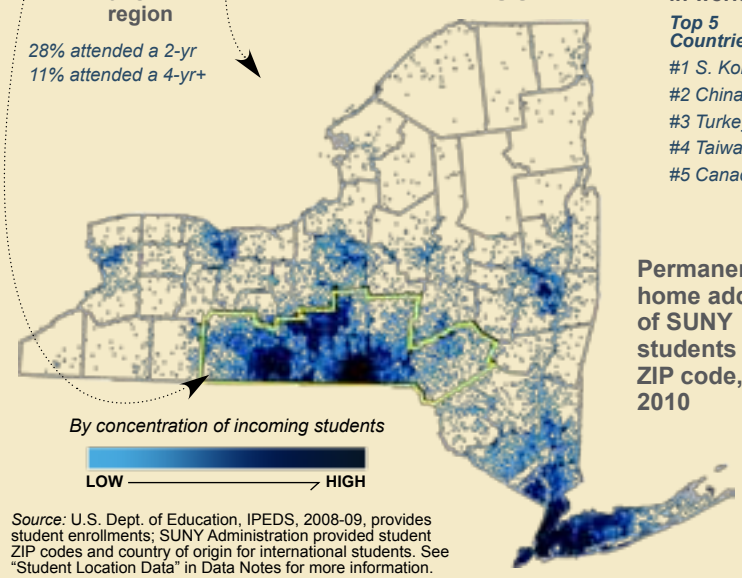
35% from elsewhere in NYS

11% from elsewhere in U.S.

15% from elsewhere in world

28% attended a 2-yr
11% attended a 4-yr+

Top 5 Countries
#1 S. Korea
#2 China
#3 Turkey
#4 Taiwan
#5 Canada



Permanent home address of SUNY students by ZIP code, 2010

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollments; SUNY Administration provided student ZIP codes and country of origin for international students. See "Student Location Data" in Data Notes for more information.

EMPLOYEES

9,400

SUNY faculty and staff employed in the Southern Tier.

Source: U.S. Dept. of Education, IPEDS, 2008-09, and SUNY Research Foundation. See "Employment by SUNY" in Data Notes for more information.

ALUMNI

97,000

SUNY alumni live in the Southern Tier.

53,000 ...graduated from a SUNY in this region and stayed in this region.

44,000 ...graduated from a SUNY elsewhere in NYS and now live in this region.

Source: SUNY institutions provided alumni data as of 2010. Excludes alumni from state-funded colleges at Cornell University. See "Alumni Data" in Data Notes for more information.

SUNY DIVERSITY

28% Minority students

25% Students from a low-income ZIP code (20%+ children live below poverty line)

13% Non-traditional students (age 30+)

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment by race/ethnicity and age. Students from low-income ZIP codes are from 2010 student ZIP codes from SUNY Administration, and poverty data by ZIP code are from 2005-09 American Community Survey. See "Diversity of SUNY Students" in Data Notes for more information.

Southern Tier SUNYs Generate a $2.0 Billion Economic Impact

HOW SUNY MATTERS TO THE ECONOMY

Here's how it happens...

SUNY attracts revenues from a range of public and private sources...

$1.1 billion in revenues

$250 M tuition & fees
$149 M auxiliary service sales
$413 M NYS appropriations, grants & contracts
$162 M federal appropriations, grants & contracts
$134 M other sources

3% Sponsored research dollars
34% Estimated out-of-state revenues

SUNY campuses, employees, students and visitors purchase goods and services...

$1.4 billion in spending

$765 M by SUNY on employee wages & benefits
$401 M by SUNY on other institutional purchases
$235 M by students
$14 M by overnight visitors
(391,200 visitors, 23% overnight)

90% Estimated spending in NYS
76% Estimated spending in region

Those dollars circulate through the state and regional economy, stimulating additional economic activity and greater total impacts...

Economic Output

$2.0 billion in NYS, and 70%, or $1.4 billion, in the Southern Tier

Employment Impact

18,200 jobs

SUNY employment: 9,400
Jobs indirectly supported: 8,800

Taxes Generated

$35 M in total taxes generated for NYS and the Southern Tier

$20 M income taxes
$9 M sales taxes
$6 M property taxes

**Sum total may differ slightly due to rounding*

$2.0 B / $413 M

Represents a ***$4.90*** *return on investment for every dollar of state funding*

Driving the Economy

Southern Tier SUNYs create a $2 billion annual economic force on the state economy, $1.4 billion of which directly benefits the regional economy. This economic activity supported nearly 9,000 jobs in related industries across the state in 2008-09, with direct SUNY employment at nearly 9,400. State and local taxes generated totaled nearly $35 million.

Driving this $2 billion economic impact are the out-of-state revenues Southern Tier SUNYs receive, the highest level in the state at 34 percent of total revenues. This can be attributed primarily to the region's — more specifically, Cornell's — high draw of out-of-state students paying higher levels of tuition. Additionally, in-state tuition for Cornell's four contract schools is greater than that of other SUNY colleges. Finally, research dollars and federal grants generated by Cornell, Binghamton University and SUNY Delhi bolster out-of-state revenues.

SUNY & the Innovation Economy

In the best of the last three years, Southern Tier SUNYs generated....

- 29 invention disclosures
- 2 patent applications
- 7 patents
- 2 spin-offs
- 1 start-up
- 5 licenses

Source: Interview and survey data from SUNY institutions.

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides revenues, spending and employment counts. SUNY campuses provided data on out-of-state revenue and spending. Impacts have been calculated using IMPLAN. Tax impacts are based on data from NYS Dept. of Taxation and Finance and NYS Office of Real Property Tax Services. See "Economic Impact," "Employment by SUNY," "Revenues and Spending of SUNY Institutions," "Student Spending," "Survey of SUNY Campuses," "Tax Impacts" and "Visitor Spending" in Data Notes for more information.

Overall wages for employees and staff of these institutions are relatively high, accounting for two-thirds of total revenues compared with an average of 50 percent for SUNY, despite a low cost of living in the Southern Tier. This is primarily the result of a high average wage at Cornell University, which is competing with other Ivy League schools for highly specialized research faculty.

SUNY supports a robust innovation economy in the Southern Tier with new inventions, patents and businesses. Also, SUNY Delhi has a center focused on watershed applications and technology, which targets economic growth through biomass renewable energy.

Meanwhile, SUNY's business support services and workforce training, including TC3.biz at Tompkins Cortland Community College, keep industries from manufacturing to aerospace moving forward with the latest expertise and skills.

Moreover, SUNY undoubtedly shapes the community in the Southern Tier — by building diversity with more than 10,000 out-of-state and international students, supporting farmers through advances in technology at the Cornell College of Veterinary Medicine, and enriching culture through dance, music and art at Binghamton's Anderson Center for the Performing Arts. These SUNYs attracted over 390,000 visitors to their campuses in 2008-09, with those staying overnight sending $14 million into the economy through purchases on hotels, food and entertainment.

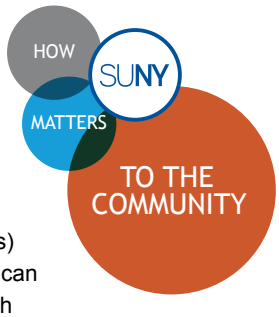
See also SUNY at Work: Binghamton University: Strengthening the Southern Tier's High-Tech Industries (p. 34).

CASE IN POINT

Tompkins Cortland Community College

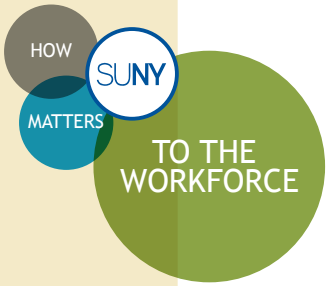
Tompkins Cortland Community College Positions Itself to Meet Employers' Training Needs

Tompkins Cortland Community College's workforce and economic development arm offers a wide array of services to a broad range of clients. The program, TC3.biz, stresses a "customer-driven" approach to programming and deploys more than 80 training specialists with diverse backgrounds and skills. Training programs are offered at three locations and on the employers' site, and can range from a half day to three years. Clients run the gamut from businesses (Ithaca Space Systems, Cargill and the Ithaca Journal) to education (Cornell University and Ithaca College) to government (U.S. Geological Survey, state agencies and area local governments and school districts) to nonprofits (American Red Cross) to health care (Cayuga Medical Center at Ithaca). BorgWarner, a Fortune 500 company, has several facilities in the region and has worked closely with the college to meet its continuing workforce development needs. Recently, TC3.biz conducted a skills assessment for approximately 500 new BorgWarner employees.

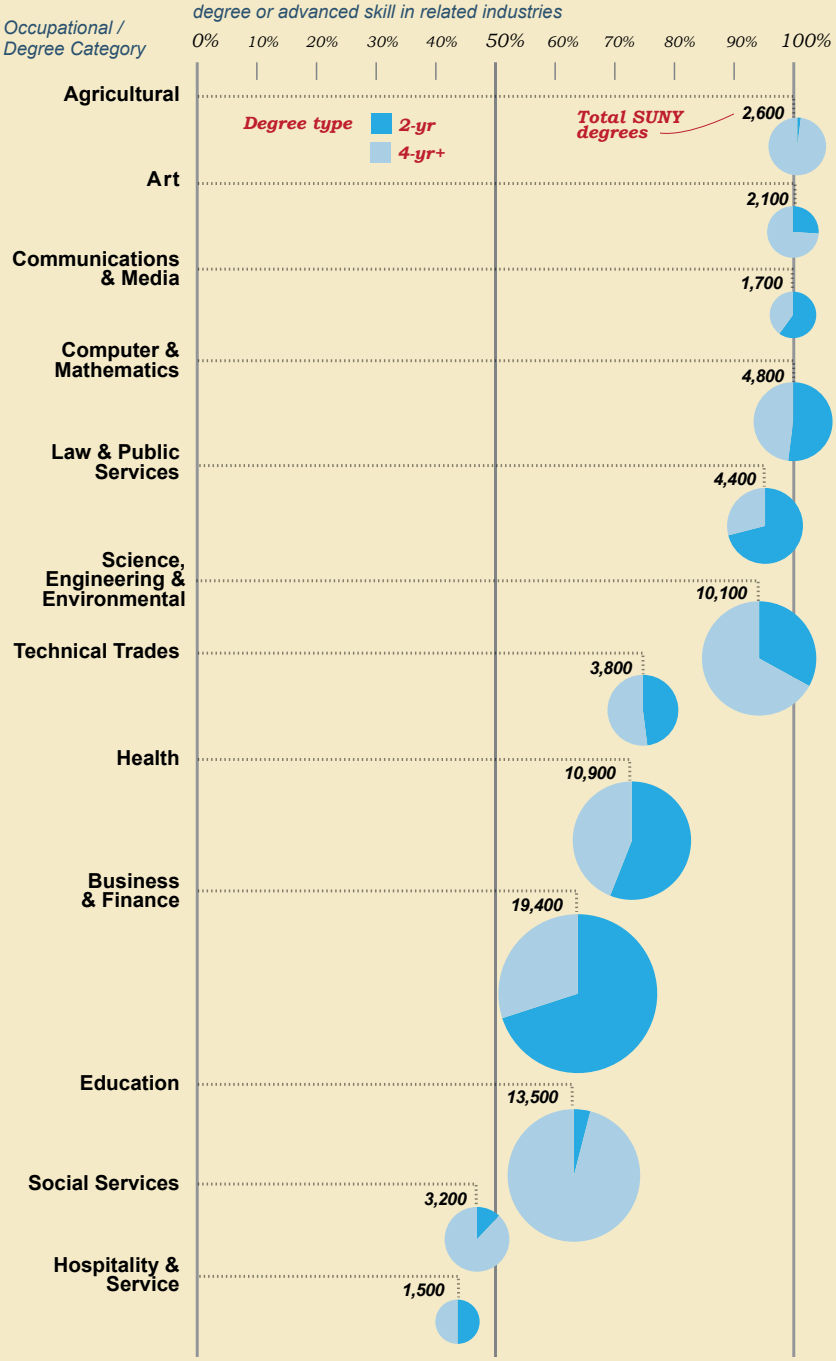


Tompkins Cortland offers employers what it calls customer-driven training services — with lots of flexibility as to topic, place, length of time and more.

How SUNY graduates match up with workforce needs across the range of industries in the Southern Tier



Degrees held by SUNY alumni as a proportion of jobs requiring a degree or advanced skill in related industries



While bringing important capacities to the workforce, liberal arts degrees are too broad to be matched to a specific occupational field and were thus excluded from this analysis.

Source: SUNY institutions provided alumni ZIP codes and field of study; occupational data are from NYS Dept. of Labor. See "Alumni Data" in Data Notes for more information.

Preparing the Workforce

Southern Tier SUNYs are a critical underpinning of the regional and state workforce, preparing an ample supply of graduates with the skills and degrees regional employers demand. The 97,000 SUNY alumni represent about one-third of the entire Southern Tier labor force.

Responding to large regional technology-based employers like Corning, Lockheed and Sikorsky, and a burgeoning industry base in electronics and imaging, alumni with degrees in engineering exist in large numbers in the region. In fact, there are enough SUNY-trained scientists and engineers — over 10,000 — to fill nearly every job in the Southern Tier requiring degrees in these fields.

A similarly healthy supply of SUNY alumni holding computer & mathematics degrees lives in the Southern Tier, matched nearly one-to-one to jobs in related fields. SUNYs in the Southern Tier are playing a critical role in preparing the health workforce. The region's 10,900 SUNY alumni holding health-related degrees, from nursing to medicine, have the capacity to fill three-quarters of related jobs in the Southern Tier. In addition to Binghamton, the region's two-year institutions contribute significantly to the region's large share of health alumni. SUNY alumni are less dominant as a source of labor in the fields of hospitality — a growing industry in the region — and social services.

The six SUNY institutions of the Southern Tier generate approximately 8,700 new graduates a year, though historic alumni patterns suggest these graduates will migrate out of the region to a greater degree than other regions, with one in three alumni of Southern Tier SUNYs settling outside the region.

In terms of priming the state's workforce for strategic industry clusters, SUNY's Southern Tier institutions contribute the most in the fields of information technology, back office and electronics & imaging, which also align with the region's high-growth industries.

Beyond degrees, SUNYs in the Southern Tier offer a range of specialized workforce training programs to propel businesses and emerging industries. These range from SUNY Delhi's solar energy technician program to courses and training programs for single employers or entire industries.

Southern Tier SUNYs Generate a Large Share of Degrees for NYS Cluster Industries

Distribution, Biomedical, Electronics and Imaging, Financial, Information Technology, Back Office

SUNY prepares the state's workforce for strategic cluster industries by granting degrees required by jobs in those industries. A "large share" of cluster-related degrees indicates this region's SUNYs contribute proportionally more to SUNY's total degrees for one or more clusters than they do to SUNY degrees overall.

CASE IN POINT

Broome Community College

Broome Community College Meets Requirements of Manufacturers

"Consortium" training represents a key part of the economic and workforce development strategy employed by Broome Community College.

Manufacturing continues to be a significant driver of the Southern Tier economy, and the consortium idea plays to that strength. Under this approach, Broome offers training in "lean" manufacturing, advanced manufacturing, leadership, Six Sigma and communications to groups of individuals from multiple employers. That's in contrast to the more traditional model of contract courses developed for workers from a single employer only.

Participating employers have included Lockheed Martin, IBM, BAE Systems and Universal Instruments. By participating in these learning and development consortiums, offered both at BCC and off campus, employers also learn from each other by sharing best practices and building operating and business relationships and networks.

Broome delivers more than 200 contract courses annually, many of which are consortium-oriented in structure. In cooperation with the local Workforce Investment Board, Broome worked with local manufacturers to identify the most critical skill new employees needed for manufacturing jobs such as assembly drawing, measuring devices and report writing. Broome then developed a Manufacturing Basics Certification Program that provides training in those skill sets. Individuals who earn the certificate are referred to local manufacturers, ready for employment. The program serves residents of five counties.

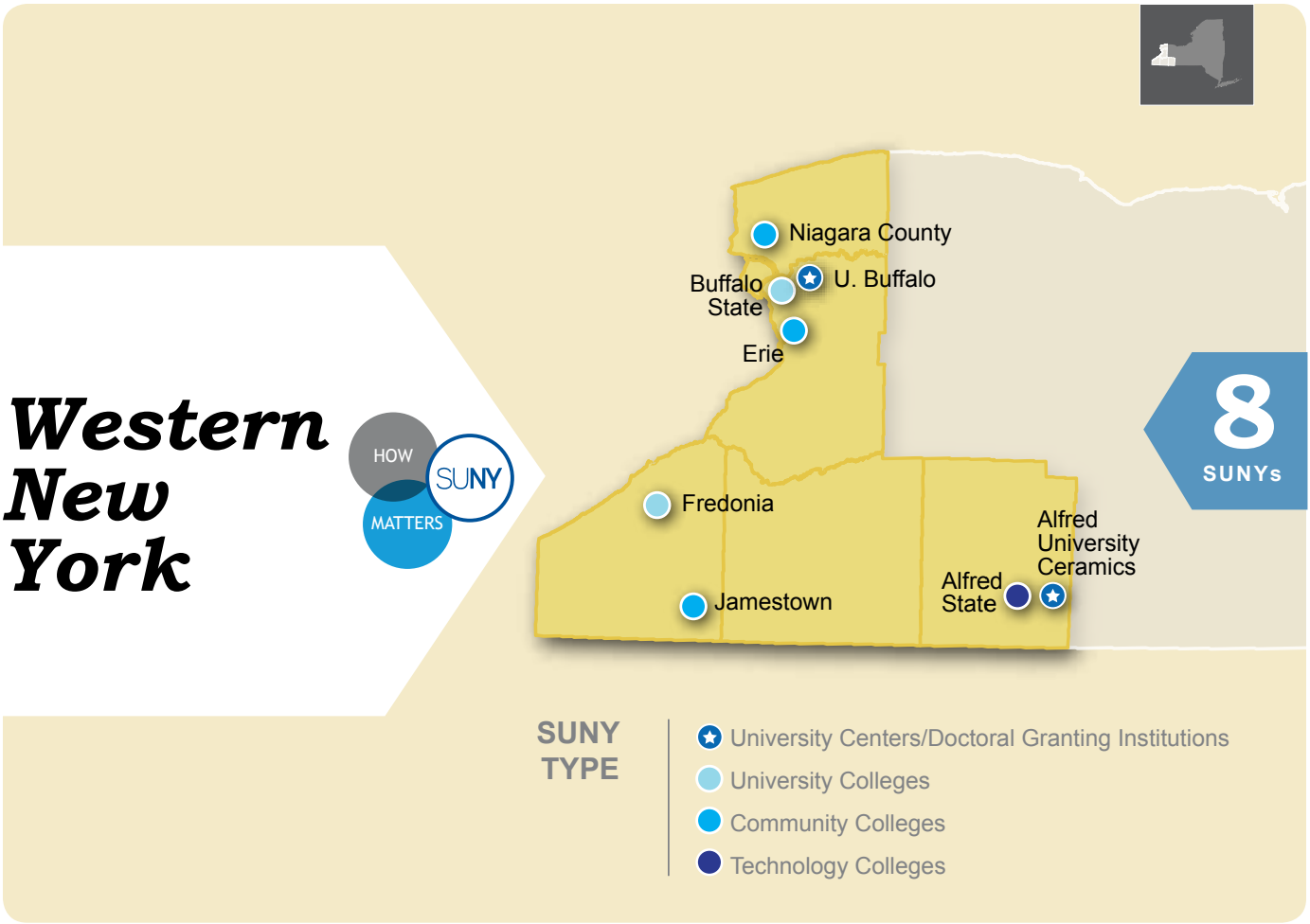
BY THE NUMBERS

SUNY alumni living in region as % of region's total labor supply **30%**

Total degrees from region's SUNYs (2008-09) **8,700**

SUNY grads as a % of total grads in this region **58%**

Source: SUNY institutions provided current alumni data; labor supply is from NYS Dept. of Labor. Degrees awarded are from U.S. Dept. of Education, IPEDS, 2008-09. See "Alumni Data" and "Student Location Data" in Data Notes for more information.

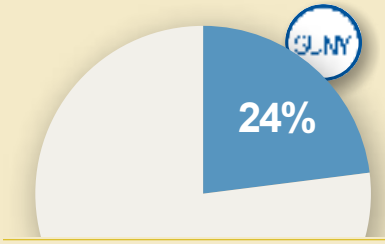


SUNY in Western New York

Western New York has one of the largest SUNY footprints in New York State, with eight institutions spanning five counties. The system's largest school, the University at Buffalo, sits in its metropolitan core. Western New York's student population is at once the state's most home-grown (two in three students are from within the region) and one of its most global (international enrollment here is double the SUNY average). With more than 16,400 faculty and staff, Western New York is the second largest critical mass of SUNY employment. And more than 85 percent of the 235,000 SUNY alumni living in the region are products of Western New York SUNYs, a level higher than any other region in the state.

The Western New York Economy

Western New York is rapidly emerging as a force in the innovation- and knowledge-based economy, and its SUNY institutions are leading the way. From the University at Buffalo's incubation of life sciences and biotechnology enterprises to Niagara County Community College's plans to build a hospitality center in downtown Niagara Falls, SUNY is a powerful economic driver in Western New York. The eight institutions pump $3.7 billion into the state and regional economy every year and support over 32,000 jobs. Awarding 15,100 college degrees every year, SUNY is the source of two in three new graduates in the region, and thus the key factor in preparing the "new economy" workforce.



In '08-'09, SUNY students, employees and alumni accounted for ***24% of Western New York's population.***

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment and employee counts. Current alumni counts are from SUNY campuses. Population data are from 2009 American Community Survey. See "Alumni Data" and "Demographic & Housing Data" in Data Notes for more information.

STUDENTS

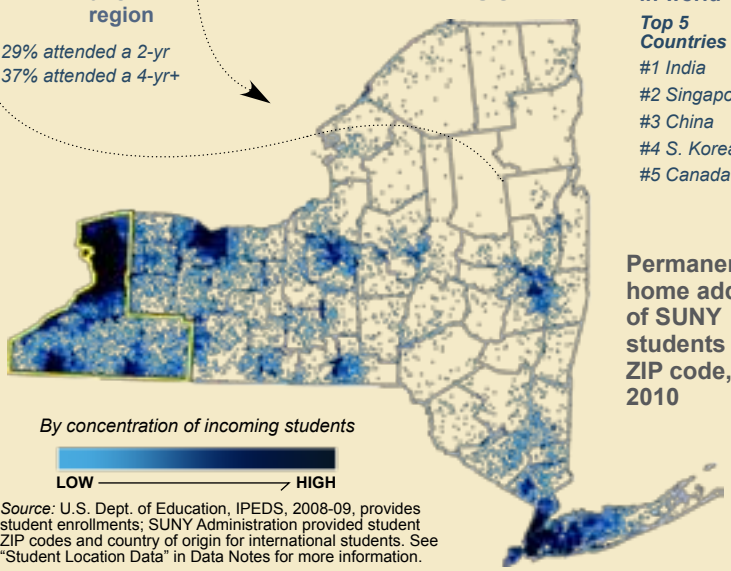
78,400 students attended a Western New York SUNY school.

Where these students originated...

- **66%** from within this region
  - *29% attended a 2-yr*
  - *37% attended a 4-yr+*
- **23%** from elsewhere in NYS
- **3%** from elsewhere in U.S.
- **8%** from elsewhere in world

Top 5 Countries

#1 India
#2 Singapore
#3 China
#4 S. Korea
#5 Canada



Permanent home address of SUNY students by ZIP code, 2010

By concentration of incoming students

LOW → HIGH

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollments; SUNY Administration provided student ZIP codes and country of origin for international students. See "Student Location Data" in Data Notes for more information.

EMPLOYEES

16,400

SUNY faculty and staff employed in Western New York.

Source: U.S. Dept. of Education, IPEDS, 2008-09, and SUNY Research Foundation. See "Employment by SUNY" in Data Notes for more information.

ALUMNI

235,000

SUNY alumni live in Western New York.

- **204,000** ...graduated from a SUNY in this region and stayed in this region.
- **31,000** ...graduated from a SUNY elsewhere in NYS and now live in this region.

Source: SUNY institutions provided alumni data as of 2010. Excludes alumni from state-funded colleges at Alfred University. See "Alumni Data" in Data Notes for more information.

SUNY DIVERSITY

- **24%** Minority students
- **25%** Students from a low-income ZIP code (20%+ children live below poverty line)
- **15%** Non-traditional students (age 30+)

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment by race/ethnicity and age. Students from low-income ZIP codes are from 2010 student ZIP codes from SUNY Administration, and poverty data by ZIP code are from 2005-09 American Community Survey. See "Diversity of SUNY Students" in Data Notes for more information.

Western New York SUNYs Generate a $3.7 Billion Economic Impact

HOW SUNY MATTERS TO THE ECONOMY

Here's how it happens...

SUNY attracts revenues from a range of public and private sources...

$1.6 billion in revenues

$283 M tuition & fees
$149 M auxiliary service sales
$726 M NYS appropriations, grants & contracts
$244 M federal appropriations, grants & contracts
$159 M other sources

12% Sponsored research dollars
21% Estimated out-of-state revenues

SUNY campuses, employees, students and visitors purchase goods and services...

$2.4 billion in spending

$1.1 B by SUNY on employee wages & benefits
$821 M by SUNY on other institutional purchases
$459 M by students
$26 M by overnight visitors
(1 M visitors, 15% overnight)

90% Estimated spending in NYS
86% Estimated spending in region

Those dollars circulate through the state and regional economy, stimulating additional economic activity and greater total impacts...

Economic Output

$3.7 billion in NYS, and 89%, or $3.3 billion, in Western New York

Employment Impact

32,500 jobs

SUNY employment: 16,400
Jobs indirectly supported: 16,100

Taxes Generated

$63 M in total taxes generated for NYS and Western New York

$20 M income taxes
$27 M sales taxes
$16 M property taxes

**Sum total may differ slightly due to rounding*

$3.7 B / $726 M

Represents a ***$5.10*** *return on investment for every dollar of state funding*

Driving the Economy

With its sizable SUNY presence, Western New York is the second largest contributor to the system's overall economic impact. Its eight colleges and universities sent $3.7 billion into the statewide economy in 2008-09, or about 19 percent of SUNY's total impact, second only to Long Island. The bulk of this economic activity — or $3.3 billion — stays in the Western New York region. Western New York SUNYs support or directly provide over 32,000 jobs and generate $63 million in local and state taxes.

Home to the system's largest research university, Western New York is also one of the top regions for generating revenues through research.

Sponsored research accounts for 12 percent of SUNY revenues in Western New York, significantly more than the 8 percent average across all SUNYs statewide. Many of these research dollars fund academic research that is commercialized through inventions,

SUNY & the Innovation Economy

In the best of the last three years, Western New York SUNYs generated....

113 invention disclosures
24 patent applications
21 patents
10 spin-offs
19 start-ups
20 licenses

Source: Interview and survey data from SUNY institutions.

Source: U.S. Dept. of Education, IPEDS, 2008-09, provides revenues, spending and employment counts. SUNY campuses provided data on out-of-state revenue and spending. Impacts have been calculated using IMPLAN. Tax impacts are based on data from NYS Dept. of Taxation and Finance and NYS Office of Real Property Tax Services. See "Economic Impact," "Employment by SUNY," "Revenues and Spending of SUNY Institutions," "Student Spending," "Survey of SUNY Campuses," "Tax Impacts" and "Visitor Spending" in Data Notes for more information.

patents and business start-ups — creating additional jobs and economic growth for the region and state. In one year, Western New York SUNYs generated 113 invention disclosures, 21 patents and 19 start-ups, with the University at Buffalo accounting for most of this activity.

Western New York SUNYs receive more state funding than any other region, with state appropriations, grants and contracts accounting for 50 percent of their overall budget. At the same time, every state dollar invested in Western New York SUNYs leverages a $5.10 return on investment based on the total economic impact of these eight institutions.

With the state's largest concentration of students, Western New York accounts for one-fifth of all SUNY student spending. Western New York SUNYs also draw more than a million visitors to their campuses for special events and attractions, from SUNY Fredonia's Rockefeller Arts Center to Division I athletics at the University at Buffalo. Those visitors staying overnight spent an estimated $26 million on hotels, food and other expenses in 2008-09. Additional contributions to vibrant communities include Niagara County Community College's plans to build its Hospitality and Tourism Center in an abandoned mall in downtown Niagara Falls and home-building initiatives at Alfred State.

See also SUNY at Work: The Broad Economic Reach of the University at Buffalo (p. 12).

CASE IN POINT

SUNY Fredonia

Fredonia Built a New Incubator to Help it Start, Grow and Keep Businesses in Western New York

SUNY Fredonia, a four-year liberal arts school in a picturesque small town south of Buffalo, is perhaps best known for the quality of its programs in the arts, music and other humanities.

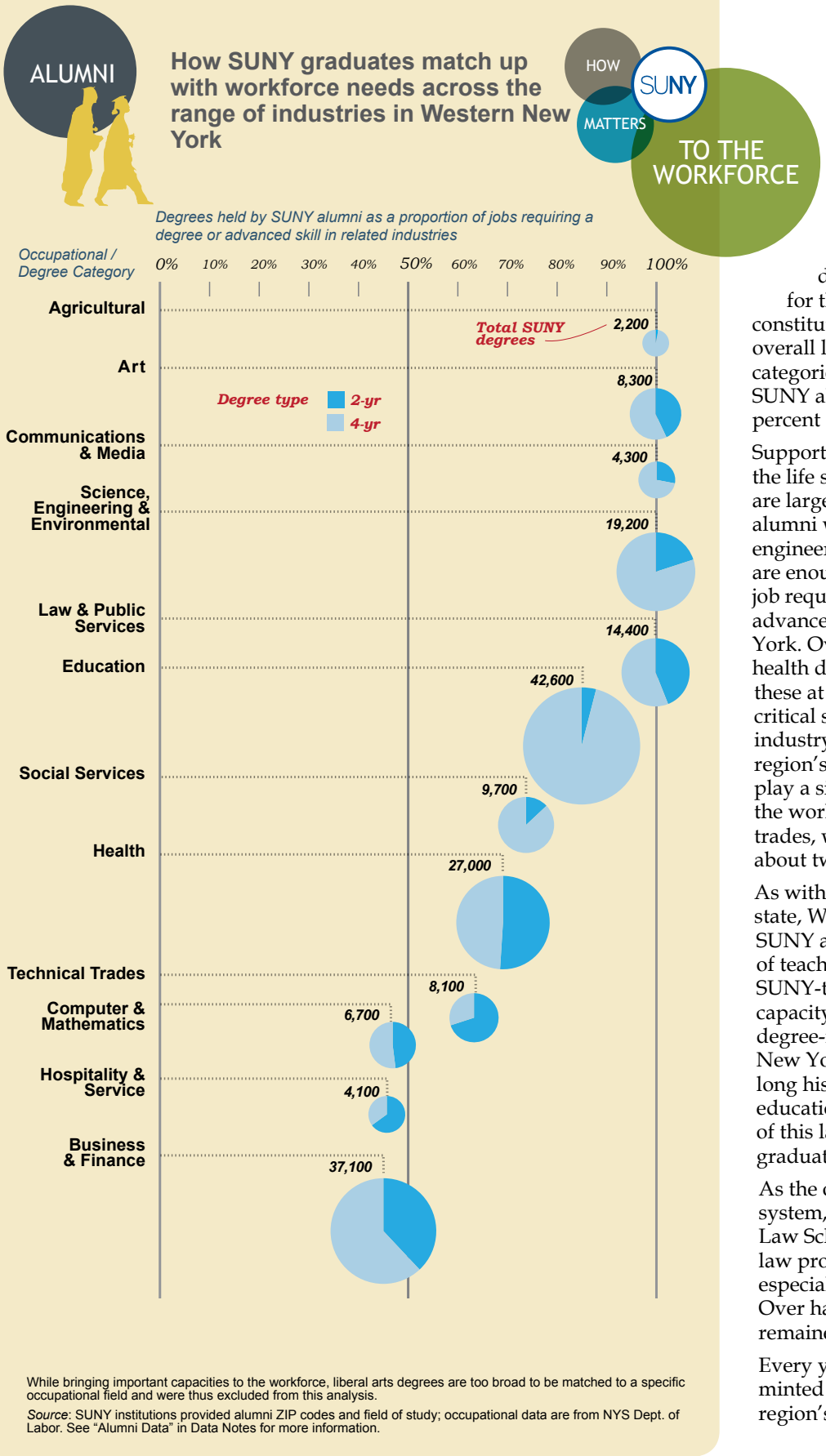
But Dennis L. Hefner, the president of the 5,700-student campus, has long sought to identify ways in which the college could have a direct impact on business development in the region. After an extensive period of fundraising and negotiating, in December 2009 he cut the ribbon on a new business incubator built not on the campus itself, but on a formerly abandoned plot on Main Street in the nearby industrial city of Dunkirk. The purpose, he said, was "to attract and build new businesses in the technology sector to our region, and then help them flourish here."

After not much more than a year, Fredonia's new Business Technology Incubator is well on its way to success, with 12 small businesses in residence and more on the way. What makes the project particularly interesting is that rather than a typical incubator, opened by a technology- or engineering-oriented university for businesses that are commercializing ideas that came from the campus, the Fredonia incubator is built around businesses that didn't necessarily grow out of the college — but that want to take advantage of building a relationship with it.

"The intersection of technology, the arts and business is the sweet spot for Fredonia," says Robert Fritzinger, who directs the incubator and is himself a successful entrepreneur. Tenants in the incubator have access to Fredonia labs and other resources, he says, and are "thrilled at the quality of the interns" they can recruit from the college's business, arts and science programs. "For a start-up company that's focused on the Web," he says, "an intern who's savvy in the arts and new media can be a huge advantage." After 15 months of operation the center was already a year ahead of its initial occupancy plan; its tenants had raised a combined total of $1.24 million in capital and more than 70 employees and interns are on-site.

The start-up companies include SellingHive, which is developing a networking site for sales professionals, and Academy Geeks, working on smartphone applications that can help academics coordinate research work. Another is Dunkirk Bio-Electric, which is working to develop waste-to-energy generators to serve Chautauqua County's large food-processing sector.

The facility is first-rate, but the networking and support available are even better, says Fritzinger. "In an incubator the clients start to add value to each other," he says. "And for me, this is a teaching job — I spend most of my time coaching them on how to raise money."



While bringing important capacities to the workforce, liberal arts degrees are too broad to be matched to a specific occupational field and were thus excluded from this analysis.

Source: SUNY institutions provided alumni ZIP codes and field of study; occupational data are from NYS Dept. of Labor. See "Alumni Data" in Data Notes for more information.

Preparing the Workforce

The more than 235,000 SUNY alumni living in Western New York supply a diversely trained labor supply for the region's workforce needs, constituting one-third of the region's overall labor pool. In fact, for all job categories in Western New York, SUNY alumni represent at least 40 percent of the region's labor supply.

Supporting emerging industries in the life sciences and biomedicine are large concentrations of SUNY alumni with degrees in science and engineering. These 19,200 alumni are enough to fill every related job requiring a college degree or advanced skill in Western New York. Over 27,000 alumni holding health degrees, more than half of these at the two-year level, are also a critical source of labor for this major industry in Western New York. The region's two-year institutions also play a significant role in preparing the workforce for jobs in the technical trades, with 8,100 alumni able to fill about two in three related jobs.

As with most other regions across the state, Western New York's base of SUNY alumni includes a large pool of teachers and educators. The 42,600 SUNY-trained educators have the capacity to fill over eight in 10 related degree-requiring jobs in Western New York. Buffalo State College's long history and specialization in education is an important source of this labor, as half of these alumni graduated from this institution.

As the only law school in the SUNY system, the University at Buffalo Law School is a critical source of law professionals statewide, but especially in Western New York. Over half of the school's alumni have remained in the region.

Every year more than 15,000 newly minted grads emerge from the region's SUNYs with the latest

skills, eager to fill jobs in fast-growing, knowledge industries. Those graduates account for the bulk — about 64 percent — of all recent college graduates in the region, indicative of the prominent role SUNY plays here in economic and workforce development. About two in five of these will stay in the region to live and work, suggesting both challenges in the supply of jobs in the region as well as potential to increasingly leverage SUNY as a knowledge workforce resource for Western New York.

Western New York accounts for a large share of SUNY graduates trained for work in cluster industries that are the focus of state economic development efforts. Nearly one in four of SUNY's overall 47,000 cluster-related degrees is granted by a SUNY institution in Western New York. The region is the biggest producer of cluster-related degrees in all but two of the 11 industries examined — that is, fashion and distribution.

SUNY is partnering with industry to align training with employer needs. For example, Erie Community College has formed innovative partnerships to help students achieve success. The Machining and Manufacturing Alliance offers a 32-credit certificate that is both a key credential for employment and a stepping-stone for an associate's degree in Industrial Technology. The Cisco Networking Academy trains students to design, build and maintain computer networks, while the Industrial Refrigeration program trains personnel needed for the food processing, refrigerated warehousing, petrochemical and pharmaceutical industries.

Western New York SUNYs Generate a Large Share of Degrees for NYS Cluster Industries *Biomedical, Manufacturing, Electronics & Imaging, Information Technology, Back Office, Front Office & Producer Services, Financial Services, Communications, Software & Media*

SUNY prepares the state's workforce for strategic cluster industries by granting degrees required by jobs in those industries. A "large share" of cluster-related degrees indicates this region's SUNYs contribute proportionally more to SUNY's total degrees for one or more clusters than they do to SUNY degrees overall.

CASE IN POINT

Jamestown Community College

Jamestown Community College Collaborates with Manufacturers to Address Workforce Needs

Don't tell people in the Southern Tier that the days of manufacturing are over. The sector still accounts for 18.3 percent of the jobs in Chautauqua County — compared to a New York State average of only 5.3 percent.

But with a Baby Boom generation of workers nearing retirement age, local employers are concerned about whether they'll have the skilled workers they need in the years ahead. So Jamestown Community College worked with the Manufacturers' Association of the Southern Tier to open a new Manufacturing Technology Institute (MTI) — stuffed with machine tools, computers, welding equipment and prototyping gear on which students can train. The college now offers associate's degree programs in engineering science, digital computer technology, welding and mechanical technology (with certificate programs in computer-aided design, computer numerical control, electricity/electronics and machine tool technology).

Business leaders credit the MTI partnership with addressing area manufacturers' needs with academic programs that carry college credits and degrees — something they say helps convince young people that a manufacturing career can be attractive.

Chautauqua County has a storied record as a manufacturing center. The Crescent wrench was invented in Jamestown, to give just one example. Diesel engines, machine tools, furniture and food processing are still strengths today. But will the region have the skilled workforce it needs to compete tomorrow?

BY THE NUMBERS

SUNY alumni living in region as % of region's total labor supply **33%**

Total degrees from region's SUNYs (2008-09) **15,100**

SUNY grads as a % of total grads in this region **64%**

Source: SUNY institutions provided current alumni data; labor supply is from NYS Dept. of Labor. Degrees awarded are from U.S. Dept. of Education, IPEDS, 2008-09. See "Alumni Data" and "Student Location Data" in Data Notes for more information.

Conclusions

This study is the most comprehensive analysis to date of the economic roles performed by the State University of New York. It includes an economic impact analysis, which finds that SUNY is an economic anchor and dominant source of educated workers in nearly all regions of the state. The study also examines the many ways in which SUNY institutions help New York succeed in the knowledge-based economy, from educating people in highly specialized skills to assisting employers with the adoption and management of new technologies to transforming new ideas into commercial innovations. No doubt SUNY institutions can do more to promote economic growth. But this study has discovered a strong foundation to build on, including many creative methods and institutional capacities that support entrepreneurialism and innovation. The potential for growth in economic development within SUNY is underlined by the fact that many of the efforts have emerged out of diverse sources and under surprising circumstances—and that even incremental efforts can be pyramided into large economic impacts.

The study draws on many sources of data. In addition to data on campus expenditures, graduates, alumni, educational programs and revenues, the report is based on a survey of all campuses regarding their economic development activities and recent indicators of success, such as patents received and incubated businesses. The project team also conducted site visits to understand and describe the larger and more creative methods campuses are using to serve existing businesses, train employees in new technologies and transfer knowledge into commercial innovations.

Based on analyses of these data, several conclusions stand out:

1 *Even using conservative assumptions, SUNY spending and employment exert large effects on local and state economies and give New York State government a strong return on its investment.*

One set of quantifiable impacts flows from SUNY revenues and expenditures. Each SUNY campus attracts funds from families, students, governments, research grants and other sources. The college or university then spends these dollars on new buildings and facilities, equipment, wages and salaries for faculty and staff, work-study wages for students with financial needs and other items. These expenditures continue to circulate, generating tax dollars for state and local governments and contributing to regional and state economies.

This analysis estimates the input-output effect of SUNY's expenditures—taking into account direct and indirect effects—is $19.8 billion and 173,000 jobs statewide in 2008-09. This impact was fueled by the nearly $10.3 billion SUNY received in revenues from a wide variety of sources. Of these revenues, $1.3 billion came from research grants and contracts, about half of which were awarded by the federal government.

This is a careful estimate, more prudent than those in many studies of universities' economic effects.[i] It uses conservative assumptions in the input-output model, and it does not include many effects that are hard to measure across multiple campuses, such as the impacts of incubated businesses, productivity gains from businesses that draw directly from SUNY's workforce training and entrepreneurial services, and businesses attracted to a community because of SUNY's presence. Despite these cautious assumptions, this study found that state spending on SUNY yields a strong return. New York State government provided $3.9 billion of SUNY's revenues in appropriations, grants, contracts and other types of support in 2008-09. In light of the $19.8 economic impact estimate, that is a 5-to-1 return rate for state spending.

Economic impacts vary across regions. The largest impacts were found in Long Island ($3.9 billion) and Western New York ($3.7 billion). But though these two regions were much higher than any others, a striking finding was that, out of 10 regions in the state, six had impacts of nearly $2 billion or more.

2 *SUNY provides a large share of the well-educated workforce in the state, though its role varies greatly from one region to another.*

The system's primary mission is education, and SUNY's educational role in New York is immense. As of 2008-09, 1.59 million SUNY alumni live in New York, making up a large part of the state's highly educated workforce. Two out of three of all SUNY degrees awarded were in fields related to the 16 clusters that the state government has identified as key to the state's future growth. SUNY alumni often stay in their communities, an important contribution in the Northeast, where population losses have been widespread. SUNY students, employees and alumni account for large shares of the populations in most major regions, such as 15 percent of the population in Long Island, 20 to 25 percent in the Capital District, Central New York, Finger Lakes, Southern Tier and Western New York, and 37 percent in the North Country. New York City shows the lowest percentage of SUNY

"affiliates"—only 2 percent of that area's large population in 2008-09. But even here, SUNY's impact is great. Its Fashion Institute of Technology is the garment industry's most important source of skilled workers, and Downstate Medical Center and the College of Optometry provide vital sources of health care workers for the region.

3 *SUNY universities and colleges provide an extraordinary range of direct services to state and local businesses — often tailored to meet the particular needs of specific businesses and address the challenges and opportunities of different regions.*

All types of SUNY campuses typically have offices that assist small businesses and offer training programs fitted to the special needs of individual employers. Examples are found throughout the state and in all types of SUNY colleges and universities. For instance:

- In the Capital District, community colleges have added training programs and facilities to enable local workers to take advantage of the jobs created by the University at Albany's College of Nanoscale Science and Engineering.
- In the Finger Lakes, SUNY Geneseo's Microenterprise Assistance Program provides low- and moderate-income entrepreneurs with free training and technical assistance to start and maintain businesses.
- In the Hudson Valley, six community colleges have created a Clean Energy Technology Training Consortium that pools their resources to provide the training needed by the region's growing "green" businesses.
- On Long Island, Farmingdale State College operates an Institute for Research and Technology that gives industry access to specialized equipment and faculty consultation.
- In New York City, SUNY's Fashion Institute of Technology has partnerships with more than 4,000 company sponsors and fills over 5,200 internship positions.
- In the North Country, Clinton Community College developed a specialized training program that was essential in attracting a new bus manufacturer to the region.
- And in the Southern Tier, Tompkins Cortland Community College offers employers customized, specialized training programs at three sites or at a company's own location.

Other examples of direct business assistance include help in finding grants, preparing business plans, improving manufacturing processes and analyzing markets. These services can increase productivity and sustainability of local businesses and add to the supply of trained employees and entrepreneurs in communities throughout the state.

Some universities make their extensive services easy to access. The University at Buffalo offers more than a dozen facilities and initiatives aimed at spurring innovation and increasing productivity, from high-tech incubators and labs to consulting services for manufacturers to training programs for small business owners. But because these offerings are spread across such a large research university, UB has created an Office of Economic Engagement to give businesses a helpful, easy-to-use point of entry—or, in the words of one county economic development official, a "permeable membrane between the university and the community."

4 *Some SUNY campuses already have experience working with New York State and local government agencies in performing economic and workforce development functions.*

New York's state economic and workforce development agencies and its public universities have not worked closely together in the past, in contrast to the practices in a growing number of states.[ii] Nonetheless, we found important examples of local-level collaboration, which offer useful models and experiences to build on if and when the state chooses to strengthen and expand such relationships. Cayuga Community College, for instance, brings together the college, county and town's economic development efforts within a single facility in downtown Auburn, the Stardust Entrepreneurial Institute. Corning Community College and Columbia-Greene Community College operate one-stop centers that provide state and federal workforce development programs for their respective regions. SUNY Cortland's Main Street outreach facility houses economic development programs offered by the City of Cortland's Downtown Partnership Alliance. And SUNY provides federally funded services to enterprises across the state through 24 Small Business Development Centers, most of which are located on SUNY campuses. These services help entrepreneurs write business and marketing plans, find potential sources of funding, assess the viability of an invention, prepare for e-commerce, and comply with government licensing and regulatory requirements.

5 *SUNY university centers have developed extensive supports for entrepreneurial efforts to draw on new knowledge to produce commercial innovations.*

"Universities, as hubs of creativity, are the keepers of an enduring culture of innovation that is unique among the world's great institutions," write Holden Thorp, chancellor of the University of North Carolina at Chapel Hill, and Buck Goldstein, university entrepreneur in residence at Chapel Hill.[iii] But to bring this culture of innovation to bear on the state, nation and world's great problems requires more than great research; it also requires, as Thorp and Goldstein argue, entrepreneurship, a focused, persistent effort to apply new ideas to concrete problems. As this study shows, several SUNY institutions have done a great deal to provide institutional supports for academic entrepreneurship—for transforming new knowledge into market innovations.

Nearly all university centers (and some university colleges) have incubators to house new start-up companies, financial support for patent and copyright applications, and laboratories or office space for commercial research and development. Most university centers also have seed or bridge funds for researchers/entrepreneurs, and many technology colleges attempt to recruit and promote faculty who want to use their knowledge to produce innovative products or services.

The University at Buffalo, Stony Brook University, Binghamton University and the University at Albany all offer extensive institutional supports for innovation. UB has built on its strengths in engineering, management and bioscience in establishing facilities and initiatives aimed at spurring innovation and economic development, including its Center of Excellence in Bioinformatics and Life Sciences, the Technology Incubator, the Center for Industrial Effectiveness and the Center for Engineering Design and Industrial Innovation. UB's Technology Incubator has housed 100 companies since it was established in 1988, with more than two out of three graduating, and generating about 500 jobs among them.

Stony Brook builds on Long Island's leadership role in the communications industry in its Center for Excellence in Wireless and Information Technology. It also offers several other supports for high-tech entrepreneurship through its incubators (such as the Long Island High Technology Incubator) and its technology assistance

Peter Drucker on entrepreneurship

"Entrepreneurship.... is not a personality trait; in thirty years I have seen people of the most diverse personalities and temperaments perform well in entrepreneurial challenges. To be sure, people who need certainty are unlikely to make good entrepreneurs.... But everyone who can face up to decision making can learn to be an entrepreneur and to behave entrepreneurially. Entrepreneurship, then, is behavior rather than personality trait. And its foundation lies in concept and theory rather than in intuition....

"Entrepreneurship is 'risky' mainly because so few of the so-called entrepreneurs know what they are doing. They lack the methodology.... High-tech entrepreneurship need not be 'high-risk'.... It does need, however, to be systematic. It needs to be managed. Above all, it needs to be based on purposeful innovation."

— Innovation and Entrepreneurship, 1995

offerings (for instance, its Strategic Partnership for Industrial Resurgence)—all as part of its "cradle-to-Fortune 500" approach to supporting businesses at any stage of their development.

Binghamton draws on its historical connection with the electronics industry in operating the Small Scale Systems Integration and Packaging Center, which focuses on electronics research with commercial potential and offers lab facilities and high-end equipment to a wide array of firms in the Southern Tier's electronics industry. Other SUNY institutions also support technology transfer: in Central New York, for instance, Upstate Medical University and the College of Environmental Science and Forestry are creating a new biotechnology research center to house companies spun off from their research.

These and other centers, facilities and programs have produced many patents, companies, jobs, improvements in products and processes, and other economic successes. They account for a large share of SUNY's success with innovations, such as our survey's tally of 360 invention disclosures with potential commercial impact, 79 patents, 22 spin-offs of companies, 25 start-ups of new companies and some 60 licenses that yield revenue for the commercial use of university discoveries.

6 *Opportunities for successful academic entrepreneurship are not limited to situations where supportive facilities and services are already available, where efforts can draw on faculty in "translational disciplines" or even where new ideas or technologies exist. Academic entrepreneurship can emerge and succeed under many circumstances.*

Although analyses such as those of Thorpe and Goldstein suggest that innovation is most likely to emerge out of "translational disciplines," such as engineering and medicine, this study reveals that SUNY's most striking entrepreneurial success story comes out of a basic science department, leading to UAlbany's eventual creation of the College of Nanoscale Science and Engineering (CNSE). Nor was there extensive institutional support in the beginning, when Alain Kaloyeros, a new assistant professor in the Physics Department, used borrowed or donated old parts to start building a device to work with and assess chip-making materials in a super-clean vacuum environment.

In fact, it is not even necessary to have a new idea or technology to be a successful entrepreneur. SUNY Fredonia's new Business Technology Incubator houses businesses that wanted a relationship with the college and its creative interns, its laboratories, and the opportunity to network with other high-tech start-ups. In the case of SUNY Downstate Medical Center, the seed for its Biotech Initiative was largely the recognition by Eva Cramer and her colleagues of two compatible and compelling needs: the demand for affordable space among local biotech start-ups and maturing firms and an interest among faculty and students in working with such companies. The space was not at first available. But leadership at Downstate and among Brooklyn members of the state Legislature led to the creation of a research project, funded by the state and New York City. Private sector leasing and development followed quickly, which then led to the construction of a large laboratory. This helped draw additional support from New York State, New York City and the federal government to create an incubator and space for expanding firms in the refurbished Brooklyn Army Terminal.

7 *Building on innovations and their effects in successive steps can produce very large economic impacts. This process of "innovative incrementalism" may be used by entrepreneurs to reach a tipping point beyond which a vibrant and sustainable ecology of organizations and people generates new activities and innovations on their own. This process highlights the utility of persistence and focus among academic entrepreneurs.*

As both the Downstate Medical Center and CNSE experiences illustrate, a process of innovative incrementalism — the "strategic decision to move forward in stages, as quickly as funding and demand allowed" — permits projects to show progress to potential funders and clients and avoid over-extension and debt. To produce this sustained and cumulative process, an essential ingredient was a "nucleus of committed, persistent people" who "worked within an organizational culture that encouraged and valued entrepreneurship." New activities and organizations were brought into the fold and new facilities were built, which in turn created a new ecology of organizations, facilities, projects and people. This outcome then offered additional opportunities to bring other activities and organizations on board, just as Kaloyeros and his colleagues used their success in building new infrastructure to seek additional partners across the United States and around the world.

More recently, Albany Nano is working to create a regional "cluster" of businesses connected to alternative energy, outside the small incubator it now has. Downstate also built up an array of organizations step by step until it grew to fill not only an enormous space but also established relationships and interdependencies that helped knit the community together. This incrementalism may often be a necessity at first, but it is also not a bad strategy overall. As Peter Drucker notes, "even high-tech entrepreneurship need not be 'high risk.'"[iv] Incrementalism may be a fine way to manage risk — of dealing with the enormous uncertainties regarding any effort to produce big change, by letting experience reveal weaknesses and strengths, and by assembling a community that then might reach a tipping point where it begins to be an attraction to other enterprises and entrepreneurial efforts on its own. As Kaloyeros noted, it was like recruiting businesses for a shopping mall: once he and his colleagues got some anchor tenants, the smaller ones came along. And, as Eva Cramer of Downstate observed, the addition of the International AIDS Vaccine Initiative and its lab to the Brooklyn Army Terminal "was like having a model home in a new development" — it was an example that "really showed the idea of what can be done" to other potential tenants. This dynamic also suggests that the largest economic payoffs may accrue when the most successful economic development efforts are discerned and followed up.

8 *One of SUNY's strengths is its capacity for joint projects across campuses. Such collaborations can multiply the resources brought to bear on economic development efforts.*

SUNY's 64 campuses need not act alone, and many times they don't. The study uncovered numerous instances of cooperative ventures across several campuses. One example is the recently announced dual-degree program in medicine and nanoscale science and engineering, jointly offered by Downstate and UAlbany. Another is the Strategic Partnership for Industrial Resurgence, which links university engineers at Stony Brook, UB and Binghamton with high-tech employers. This study also identified cooperation among six community colleges in the Hudson Valley region in their creation of the Clean Energy Technology Training Consortium; a partnership between the Upstate Medical University and the College of Environmental Science and Forestry in building the Biotechnology

Research Center in Syracuse; and coordination between Tompkins Cortland Community College and SUNY Delhi around workforce development and business assistance programs in the Southern Tier. While many individual campuses may be limited in their capacity to link faculty, curricula, businesses and students, SUNY's great variety of institutions offers entrepreneurs rich opportunities to make connections, achieve economies of scale and create the kind of multidisciplinary teams that some analysts argue are critical for innovation.[v]

9 *Another great strength of SUNY is the pluralism and diversity of its campuses. The 64-campus system offers many independent, potential sources of initiative, and the diversity of campuses and their specializations means that a wide range of economic needs may be recognized and addressed. In sum, opportunities for innovation, entrepreneurship and economic leadership are widespread in the SUNY system — and can be exploited more fully.*

Although SUNY campuses need not act alone, another strength of the system is the fact that they can. The large number of campuses means that SUNY offers many potential sources of economic responsiveness and leadership. If one campus does not see and act on an opportunity, another campus may do so, perhaps because the latter's specializations, educational mission and local circumstances make it more sensitive to certain economic needs or solutions. This diversity of perspective, when joined with the large number of campuses, may be one of SUNY's greatest assets in promoting growth. Suffolk County Community College, for instance, saw a shortage of nurses on Long Island and partnered with a local hospital to devise an innovative program that offers prospective nursing students multi-year contracts with assured jobs after graduation. SUNY Plattsburgh helped meet the acute need in the North Country to link widely dispersed health facilities by organizing and managing a fiber optic network among providers. And Stony Brook, with help from New York State, established the Center of Excellence in Wireless and Information Technology, in partial response to Long Island's growing role in the communications industry. A rich variety of such responses may emerge out of a pluralistic system of semi-autonomous campuses, each of which is receptive to different economic opportunities.

Some raise the question, "Where will New York State find the next Nano?" But that's probably the wrong question — or at least one that probably will not be answered until it's too late, that is, until someone else answers it through their actions. The real question is whether SUNY can find, nurture, develop and unleash the next dozen or two dozen or 200 faculty entrepreneurs; and give those who have some initial success the opportunity to pyramid those into much larger agglomerations of mutually strengthening academic and commercial activities. There is little likelihood that some think tank or planner in state government — or even administrator within a university — could predict which efforts will succeed or fail, much less the magnitude of growth.

Perhaps the clearest lesson is to create a context in which such risky efforts are feasible and follow-ups are encouraged. "It's a struggle to be entrepreneurial," says Kaloyeros. "Getting the culture right is difficult — the people, the leadership, the accountability, the willingness to take some risk… Part of changing the culture is realizing that our target is not tenure — our target is being successful. Remember our job is to educate, and innovate. If we do that, economic development will follow."

There may not be another home run on the scale of Albany Nano. But out of a total SUNY faculty of some 33,000, it would take only one out of every thousand faculty members, each building a success story one-tenth the size of Nano, to equal three times its impact. Students of entrepreneurship generally — and especially of its practice on university campuses — say entrepreneurial successes large and small are things that higher education systems can consciously encourage, teach and grow. As Thorp and Goldstein note, the University of North Carolina's burgeoning entrepreneurship program has demonstrated "that all kinds of people can be taught to think like entrepreneurs … The fundamental entrepreneurial mindset, and the techniques that go with it, are the same no matter what your interests, dreams and values happen to be."

"If entrepreneurial thinking can be introduced and integrated into the dialogue of the campuses of our great universities," Thorp and Goldstein continue, "these institutions can emerge as true engines of innovation — just what society expects of them."[vi]

Endnotes

About this Report

[i] Comparative job growth data are from the U.S. Bureau of Labor Statistics establishment data survey, total non-farm employment, seasonally adjusted: http://data.bls.gov/cgi-bin/surveymost?ce and http://data.bls.gov/pdq/querytool.jsp?survey=sm. Population data are from the U.S. Census Bureau: http://www.census.gov/prod/cen2010/briefs/c2010br-01.pdf. Income and wage data are from the U.S. Bureau of Economic Analysis: http://www.bea.gov/regional.

Building an Innovation Economy for New York State

[i] "Higher Education and Regions," *OECD Observer*, September 2007.

[ii] Edward L. Glaeser and Albert Saiz, "The Rise of the Skilled City" (Discussion Paper No 2025, Harvard Institute of Economic Research), 44.

[iii] University at Buffalo Regional Institute, "Innovation Impact: An Impact Analysis of University-industry Innovation." Oct. 2010.

[iv] Matt Glynn, "Manufacturing a turnaround: Hebeler Corp. went from 'worst vendor' to winning awards." *The Buffalo News*, July 20, 2009.

[v] "UAlbany nanotech expert discusses concerns for the future," www.ynn.com, Jan. 25, 2011.

[vi] Mary Fiess, "Profile: Alain Kaloyeros." *Researcher*, Fall 1990, University at Albany, 19.

[vii] Fiess, "Building a Better Computer Chip," *Albany* magazine, Spring 1997, University at Albany, 3, 5.

[viii] Office of the New York State Comptroller, "Fuller Road Management Corporation & The Research Foundation of the State University of New York: Use of State Funding for Research into Emerging Technologies at the State University of New York at Albany: Nanotechnology," report 2010-S-4, April 22, 2010.

[ix] Alain Kaloyeros, "The nanotechnology revolution is New York's 'moon shot' for the 21st Century," *Syracuse Post-Standard*, www.syracuse.com, Feb. 13, 2011.

[x] Paul Grondahl, "Alain Kaloyeros," *Albany Times Union*, Sept. 29, 2010.

[xi] "A Biotech Park Grows in Brooklyn." Profiles in Innovation Research: Downstate 2010, 5.

[xii] http://www.downstate.edu/news_releases/2010/news_release_full20.html.

[xiii] CNSE and SUNY Downstate Medical Center Partner to Launch First-Ever MD/PhD Program. CNSE press release; posted March 1, 2011.

An Economic Force in Its Own Right

[i] Figure reflects "capture rate," or percentage of New York State high school graduates enrolling in a SUNY institution in 2010. From "SUNY Fast Facts 2010," http://www.suny.edu/About_suny/fastfacts/index.cfm.

[ii] U.S. Dept. of Education, IPEDS, 2008-09, provides student enrollment by race/ethnicity and age. Students from low-income ZIP codes are from 2010 student ZIP codes from SUNY Administration and poverty data by ZIP code from 2005-09 American Community Survey. See "Diversity of SUNY Students" in Data Notes for more information.

Conclusions

[i] John J. Siegfried, Allen R. Sanderson, and Peter McHenry, "The Economic Impact of Colleges and Universities," Working Paper No. 06-W12 (Nashville, TN: Department of Economics, Vanderbilt University, 2006).

[ii] David F. Shaffer and David J. Wright, *A New Paradigm for Economic Development* (Albany, N.Y.: Rockefeller Institute, 2010), pp. 21-26.

[iii] Thorp and Goldstein, Engines of Innovation: The Entrepreneurial University in the Twenty-First Century (The University of North Carolina Press, Chapel Hill, 2010), p. 5.

[iv] Peter F. Drucker, *Innovation and Entrepreneurship* (New York: Harper, 1995), p. 29.

[v] Thorp and Goldstein, *Engines*, pp. 68-84.

[vi] Thorp and Goldstein, *Engines*, 5-7; 21.

Data Notes

Alumni Data

Source and Scope. During 2010, SUNY institutions provided for each living alumnus on record their ZIP code and the field of study corresponding to the highest degree obtained from the school. Based on the location of where current alumni are residing, the analysis generated counts of alumni residing in the state as well as in its 10 regions. To account for community college alumni who may continue their education at a four-year or above program within the SUNY system, counts of alumni from all community colleges were discounted by 15 percent. Data from Suffolk Community College and Columbia-Greene Community College were not available and were estimated based on analysis of alumni count and geographic distribution of similar schools. Current location of alumni from SUNY programs at Cornell University and Alfred University were unavailable and could not be included in this analysis.

Workforce Capacity. To determine potential workforce capacities offered by SUNY alumni still residing in the state, a general degree-occupation typology was created that incorporates existing occupational classifications and the mix of degrees earned by SUNY alumni. Each SUNY alumnus entry was coded based on the major study of degree earned and matched to a respective category. (Certain liberal arts and other degrees, while broadly useful, do not specifically prepare graduates for a particular line of work and were excluded from this analysis). Because degrees from Jamestown Community College and Niagara Community College were unavailable, estimates were generated based on the distribution of degrees at other schools. Degrees from the Fashion Institute of Technology, some of which were unavailable, were coded under the category 'Art' based on the types of degrees the school typically grants.

Statewide and Regional Calculations. To determine how workforce capacities offered by SUNY alumni correspond to the mix of jobs in New York State and its 10 regions, job titles were grouped in the same degree-occupation typology as the majors of SUNY alumni. Job titles and employment counts are from 2010 data of the Occupational Employment Statistics (OES) as published by the New York State Department of Labor. To isolate only jobs that are likely held by someone with a degree, the analysis included total employment at the state and regional level for any job defined by the Bureau of Labor Statistics as requiring vocational training or an associate's degree or higher. Also included are a percentage of the jobs that require moderate-term or long-term on-the-job training corresponding to the proportion of degree-holders filling these jobs across the nation.

Cluster Industries of New York State

Source and Scope. In conjunction with the New York State Department of Labor, New York State Empire State Development has identified 16 industry clusters important to the state's economy for the contributions they make to total employment, employment concentration, wages, and the generation of goods and services that can be exported outside New York State to create income and wealth. These 16 industries are: Back Office & Outsourcing; Biomedical; Communications, Software, & Media Services; Distribution; Electronics & Imaging; Fashion, Apparel & Textiles; Financial Services; Food Processing; Forest Products; Front Office & Producer Services; Industrial Machinery & Services; Information Technology Services; Materials Processing; Miscellaneous Manufacturing; Transportation Equipment; and Travel & Tourism. These 16 clusters represent over 100 industries, with each cluster defined by Empire State Development to include specific industries (at the six-digit North American Industry Classification System (NAICS) code) or portions of industries.

Regional Specialization Analysis. To determine the number of cluster-related degrees SUNY schools are producing, a NAICS-to-Standard Occupational Classification (SOC) crosswalk matched the industries associated with the clusters to job titles common to those industries. For purposes of this analysis, the six manufacturing and materials processing clusters (Food Processing, Forest Products, Materials Processing, Industrial Machinery, Transportation and Equipment, and Miscellaneous Manufacturing) were combined into one. After matching cluster-related NAICS codes to related occupational (SOC) codes, the resulting list of job titles was filtered for those requiring a college degree and accounting for at least 5 percent of that industry's employment, thereby isolating degree-requiring jobs that are somewhat unique to the industry versus all jobs present in an industry.

A SOC-to-CIP (Classification of Instructional Programs) crosswalk then matched degree-requiring job titles by cluster to fields of study and degree programs. This was used to calculate a baseline number of degrees produced by cluster by both SUNY schools and all colleges and universities across the state, and for each of the 10 regions in 2008-09. For several clusters (Distribution, Travel & Tourism, Fashion and a combined Manufacturing & Materials Processing), this crosswalk methodology was expanded to incorporate fields of study and degrees squarely related to one of the clusters but not picked up by the crosswalk methodology. A regional cluster industry specialization was calculated as being present if SUNY produced a percentage of degrees for a cluster that was greater than SUNY's 30 percent overall percentage of total degrees produced across all of higher education in New York State.

Defining SUNY

For purposes of this study, SUNY is defined as the operations and employment associated with the 64-campus SUNY system and its administrative offices. Operations and employment by the SUNY Research Foundation are also included. The economic impact analyses additionally include off-campus spending by students, faculty and staff and overnight visitors.

Not captured in the economic impact numbers are the impacts associated with university-related foundations and associations other than the SUNY Research Foundation. University-related organizations that have been omitted include faculty associations, student associations, alumni associations and university-related foundations that generate revenues for the university and support the regional and statewide economies through their spending. The study also excludes university business partners such as research partners, business incubators and start-up businesses, including those spurred by SUNY's major university centers (University at Albany, University at Buffalo, Stony Brook University and Binghamton University). University alumni and retirees are also not included in the scope of this economic impact analysis.

Financial data for these excluded organizations, businesses and individuals are not available from central sources. Moreover, in the case of university-related foundations and associations, an unknown portion of spending is directed to SUNY and therefore already captured by the impact analysis. Future impact analyses could untangle such financial relationships to accurately capture data from university foundations.

Demographic & Housing Data

With the exception of population counts for which 2009 estimates are available from the U.S. Census Bureau, the analysis used the most recent American Community Survey (ACS) five-year estimates (2005-09) from the U.S. Census Bureau for all demographic and housing data.

Diversity of SUNY Students

Source and Scope. Data on minority and non-traditional students are from the National Center for Education Statistics Integrated Postsecondary Data System (IPEDS), providing counts of all students enrolled during fall 2009 by race, ethnicity and age category. Data on SUNY students from high-poverty communities come from matching students' home residential ZIP codes provided by SUNY Administration to ZIP codes with child poverty rates in excess of 20 percent, as determined from an analysis of 2000 U.S. Census data.

Defining Minority and Non-Traditional Students. In assessing the proportion of SUNY students that represent racial and/or ethnic minorities, only students enrolled during fall 2009 who identified themselves as non-white or Hispanic were included. Students whose race/ethnicity was unknown were counted as white, non-Hispanic students for purposes of calculating the percentage of minority students. The proportion of non-traditional students reflects enrollment of students ages 30 and up during fall 2009.

Regional Calculations. To calculate minority and non-traditional student percentages for each of the 10 regions, enrollment counts by race, ethnicity and age category were used for the SUNY schools located in that region. For Empire State College, the analysis distributed enrollments by race, ethnicity and age category across the 10 regions based on where Empire students live, as determined by an analysis of their residential ZIP codes provided by SUNY Administration.

Minority and non-traditional student enrollment at SUNY's statutory schools at Alfred University and Cornell University were estimated by taking 31 percent and 35 percent, respectively, of total student enrollment at these schools. It was assumed that the demographics of this subset would reflect those of the entire student population at these two schools.

Economic Impact

Economic impacts are calculated using IMPLAN (Impact Analysis for Planning), an input-output modeling system that traces the flow of spending in selected economic sectors across 500+ inter-related industrial sectors until these dollars leak out of a study area. All of this spending and re-spending produces direct, indirect and induced economic impacts:

Direct impacts reflect the initial round of spending and the dollars that are injected into the economy through spending by SUNY, faculty, staff, students and visitors. Only purchases made within a given study area count as direct impacts when economic impacts are assessed.

Indirect impacts reflect successive rounds of spending caused by businesses buying goods and services from one another due to changes in demand for their products and services. For instance, SUNY's direct expenditures on printing create business for local printers and office suppliers selling copiers and related services. Because of this demand, these companies purchase everything they need to meet SUNY's printing demand, from paper to printing machines to ink.

This generates demand for other supporting local businesses, and the cycle continues. Indirect impacts reflect the activity associated with these second, third and further rounds of spending by interconnected companies.

Induced impacts represent the recirculation of labor income associated with impacts on employment. For instance, continuing with the example above, the printing and office supply companies that SUNY purchases from pay wages to their employees, who, in turn, spend these dollars on homes in the area, meals out, clothes, books, furniture and more. This employee purchasing creates demand in supporting industries with employees of their own, thereby adding to these labor income-related impacts. Induced impacts reflect the demand for goods and services created by the employees in all industries that directly or indirectly support SUNY.

Total economic output and employment impacts reflect the sum of direct, indirect and induced impacts associated with SUNY's payroll and non-wage purchasing as well as off-campus spending of students and visitors.

Economic output figures are in 2009 dollars. Employment impacts represent the total number of full- and part-time jobs supported by this level of economic activity, given wages across the various industries within a study area.

Regional Calculations. In calculating SUNY's economic impact for the 10 regions, only spending by the schools, faculty, staff, students and visitors within that region are counted as direct impacts and modeled using IMPLAN. Out-of-region spending is therefore lost in the regional impact analyses but captured by the statewide impact analyses, assuming it was spending that stayed within the state. For this reason, SUNY's total statewide impact is somewhat larger than its impact across the 10 regions.

Return on Investment. Return on investment was calculated by dividing the total statewide economic output associated with SUNY-related spending by the state's total support of SUNY via appropriations, grants and contracts.

Employee Location Data

ZIP code-level data of where SUNY employees reside come from SUNY Administration and the SUNY Research Foundation for both state and Research Foundation employees working at a SUNY institution.

Community college data reflect counts from 2009, except for Clinton, Nassau, Orange, Suffolk and Westchester, where the most current data were from 2006. State employment ZIP code data for all remaining schools are from 2010. ZIP code data for SUNY Research Foundation employees reflect fall 2009 employment.

Employment by SUNY

Source and Scope. Employee counts by campus and for SUNY Administration are from the National Center for Education Statistic's Integrated Postsecondary Education System (IPEDS) providing employment counts for both full- and part-time employees as well as employment by position type (such as instruction/research, administrative, professional and non-professional). Employment counts associated with SUNY's contract schools at Alfred University and Cornell University were provided by SUNY Administration in the form of ZIP codes for these employees.

SUNY Research Foundation. Employment of SUNY-based faculty and staff employed by the SUNY Research Foundation are not reported by IPEDS and were provided separately by campus by SUNY RF for fall 2009. This dataset included the residential ZIP codes for all foundation employees and their full- or part-time status. Total employment counts reflect full- and part-time state SUNY employees as well as those employed by SUNY RF during fall 2009.

Regional Calculations. Employment counts by region were calculated by totaling employment for SUNY schools located in the region. For Empire State College, total employment counts were distributed across the 10 regions based on where these employees live, as determined by an analysis of their residential ZIP codes provided by SUNY Administration.

Employment Locations in New York State

Locations of jobs in New York State are from the U.S. Census Bureau "On the Map" program which provides employee workplace locations based on 2008 Unemployment Insurance Wage Records reported by employers. Workplace location data were accessed for all of New York State and analyzed using Geographic Information Systems software to determine the number of jobs in geographic proximity to SUNY campuses.

Occupational Openings in New York State

Annual job openings in New York State are from the Occupational Employment Statistics Survey as published by the New York State Department of Labor. Based on projections generated for the 10-year period covering 2008-18, annual openings were aggregated for jobs requiring vocational training or an associate's degree or higher (as defined by the Bureau of Labor Statistics). For consistency purposes, analyses used the same general degree-occupational typology employed in this report's alumni workforce capacity analysis.

Data on annual degrees granted by SUNY are from the National Center for Education Statistic's Integrated Postsecondary Education System (IPEDS) and reflect degrees granted in 2008-09. Degrees were categorized based on their relative application to categories established in the occupational analysis.

This study's match of job openings to SUNY degree types excludes liberal arts degrees because such degrees are too broad to be matched with a specific occupational field. It should be noted, however, that liberal arts degrees qualify graduates for many jobs in which specific occupational training is not as important as broader intellectual skills, and SUNY liberal arts graduates fill many such jobs every year.

Revenues and Spending of SUNY Institutions

Source and Scope. Data on the revenues and expenditures of SUNY schools and SUNY Administration come primarily from the National Center for Education Statistic's Integrated Postsecondary Education System (IPEDS), providing both revenues and other additions by source and expenses and other deductions by category for fiscal year ending in 2009.

Revenues and expenditures by region were calculated by totaling those associated with all SUNY colleges and universities located in that region. Because wages and salaries account for over half of SUNY spending, revenues and expenses for Empire State College were distributed across the 10 regions based on the percentage of Empire State employees living in the region.

SUNY Contract Schools. Revenue and expenses associated with SUNY's contract schools at Cornell University were estimated to be 35 percent of Cornell University's totals. This represents the midpoint of a 30 percent to 40 percent range provided by the senior vice provost at Cornell. SUNY's contract school at Alfred University was estimated to contribute to 31 percent of total university expenses, based on the fact that these students represent 31 percent of total students enrolled at the university. Revenues generated by Alfred Ceramics were estimated to include the $10,005,000 state appropriation the school received in 2008-09, along with 21 percent of the tuition and other revenue sources. This percentage reflects the tuition generated by Alfred Ceramics students who pay tuition and fees roughly 60 percent of what other Alfred University students pay.

SUNY Research Foundation. The percentages of SUNY revenues and expenditures associated with the SUNY Research Foundation were calculated by dividing total revenue and spending figures provided by SUNY RF for each campus by total revenues and expenditures obtained through the National Center for Education Statistics, which included revenues and expenses of the SUNY RF. This figure reflects the revenues generated by the foundation in 2009. As the largest university-associated research foundation in the country, SUNY RF exists to support research across SUNY campuses. Because not all funding for research is sponsored by SUNY RF, this represents a subset of all research funding generated by SUNY.

Total Research Revenues. The $1.3 billion in total research revenues generated by SUNY for 2008-09 were estimated by totaling all categories of grants and contracts awarded to SUNY institutions that support specific research projects and/or other types of programs. As classified and defined by IPEDS, these include federal operating grants and contracts, New York State operating grants and contracts, and local and private grants and contracts. The proportion of this total contributed by the SUNY Research Foundation was determined by dividing SUNY Research Revenues for 2009 by this calculated total.

Out-of-State Revenues. Out-of-state revenues were estimated by totaling those from the federal government, out-of-state private funders, and tuition and fees from out-of-state students. Student origins, including the number from outside New York State, are based on an analysis of ZIP codes for students' home residences, as provided by SUNY Administration. The percentage of private grants and gifts a school receives from out-of-state sources is from a survey of SUNY schools completed in early 2011.

Expenditure Exclusions. Total institutional expenses reported by IPEDS include depreciation or the allocation of the cost of a prior capital investment or asset purchase over the useful life of the asset. On average, depreciation represents about 5 percent of SUNY spending. Because it reflects incurred expenses without cash outlays being infused into an economy, unlike other expenses, depreciation amounts were subtracted from university spending for purposes of calculating economic impacts.

In-State and In-Region Spending. SUNY spending inside New York State was calculated by adding estimated wages paid to SUNY employees living in New York State to the estimated non-wage spending of each SUNY campus in New York. The latter was estimated using the results of a survey where each SUNY campus was asked to estimate the percentage of non-wage expenses paid to vendors, consultants and other in New York State as well as in the counties where most of their employees live. The former was estimated based on an analysis of the residential ZIP codes of SUNY employees.

SUNY spending within each of the 10 regions was similarly determined by totaling both wage and non-wage spending within the region where each SUNY was located. In calculating "in-region" spending, only spending of the SUNYs located in that region was captured. Thus, spending by SUNYs outside a host region but inside New York State is captured in statewide spending totals but in none of the regional spending totals.

Student Location Data

Source and Scope. Overall student enrollment counts for each region are from National Center for Education Statistics Integrated Postsecondary Data System (IPEDS). The proportion of students migrating into New York State to attend a SUNY school, from both other states in the United States and nations abroad, is based on IPEDS data of origins of first-year students and applied to total enrollment figures. Location of where students originate from within New York State is from a database provided by SUNY Administration that includes the ZIP code of each student's permanent home address. In addition, counts by school and country of origin were provided for international students and were used to determine the top countries feeding students into SUNY institutions.

The number of students attending a SUNY program at Cornell University or Alfred University was generated from the data provided by SUNY Administration and applied to enrollment counts. Assuming most students from Empire State attend an Empire campus in the region in which they live, enrollment figures for Empire students were distributed across the regions based on student residential location.

Student Spending

Source and Scope. Student spending comes primarily from CollegeBoard, a nonprofit organization providing a range of detailed information, including annual cost of attendance, on most colleges and universities in the United States. In addition to tuition and fees, the costs of room and board, books and supplies, personal expenses and transportation are provided on a per-student basis for students living on campus, living at home and living off campus but not at home. These figures are collected by CollegeBoard from colleges through an annual survey. These data were supplemented as necessary with student cost data reported by SUNY.

Off-Campus Spending Calculations. To avoid double counting spending and spending impacts, only off-campus spending on room, board, books, supplies, transportation and personal items are included in the student spending totals. (On-campus spending by students is already captured in the spending and impacts associated with SUNY schools.) Part-time student spending was estimated to be half of that for full-time students, and only their spending on books, supplies and transportation was assumed to be associated with their student status. Because most if not all college bookstores operate independently from the colleges they support, spending on books was treated as "off-campus" even though these bookstores are generally located on campus.

Student spending on off-campus room and board reflects a variety of factors, including maximum dorm capacity at each school, the number of "out-of-region" students and the number of students under the age of 25. Specifically, it was assumed that where on-campus housing is available, it would be filled to its maximum capacity, first with full-time students from outside the region and then by full-time students from the local area. Dorm capacity and counts of students by age category for each campus were obtained from the National

Center for Education Statistics' Integrated Postsecondary Education System (IPEDS), while the percentage of students from outside each of the 10 regions is based on an analysis of their residential ZIP codes provided by SUNY Administration.

"Out-of-region" students unable to find housing on campus were assumed to live in the region and therefore not at home. Where there wasn't sufficient dorm capacity for local students, it was estimated that three-quarters of those students under 25 years old would live with their parents and that the remainder would pay for off-campus housing. Older students ages 25 and up are presumed to live off-campus and not with their parents.

Regional Calculations. Total spending counts by school were calculated by multiplying student enrollment counts for fall 2009 by per-student spending across the various spending categories described above. It was assumed that all off-campus spending by students occurs in the region where the students' school is located. Spending associated with students enrolled at SUNY Empire State was distributed across the 10 regions based on the location of these students, as determined from an analysis of their permanent residential ZIP codes provided by SUNY Administration.

Survey of SUNY Campuses

A survey of SUNY campuses collected economic impact information available only at the campus level, including estimates of annual visitors to campus, the proportion of visitors staying overnight, in-state and in-region institutional purchases and the percentage of private gifts and grants from out-of-state sources.

Questionnaires were distributed by e-mail in late November to the director of institutional analysis at each campus. Directors submitted their responses via an online survey. In total, 50 campuses responded to the survey, which was completed by mid-February 2011 after several attempts in December 2010 and January 2011 to follow-up with all non-responding campuses. Results for campuses that did not complete a survey were estimated using the responses for those that did.

Tax Impacts

The following state and local tax impacts were estimated on the income and spending associated with SUNY faculty, staff, students and visitors:

Property Taxes. Impacts were estimated using residential property tax data from the New York State Office of Real Property Tax Services Municipal Profiles, reporting average county-wide residential tax bills by county based on 2009 assessment rolls. Figures per parcel include county, city/town and school property taxes. Because data were not available for New York City and Nassau County, property taxes associated with residential homeowners in these areas are from an earlier study conducted by the New York State Comptroller, "Property Taxes in New York State," April 2006.

Property tax impacts reflect those generated by home-owning SUNY employees. Estimates for the number of SUNY employee homeowners were calculated by multiplying full-time employment counts by county of residence by county-level rates of home ownership among higher income households ($50,000 and up) and the average residential property tax burden for that county. Home ownership rates were calculated using housing tenure estimates from the

2005-09 American Community Survey. SUNY employee counts by county were determined from an analysis of employee ZIP codes provided by SUNY Administration.

In calculating property tax impacts by region, only full-time employees working at a SUNY school within that region are counted. Therefore, home-owning SUNY employees living outside the region where they work but within New York State are captured by the statewide property tax impact value reported by this study but not in any of the regional property tax impact values.

Income Taxes. New York State income taxes paid by SUNY employees were estimated using data from the New York State Department of Taxation and Finance, providing average net tax liability per person by income class for 2008. Net taxes factored in tax deductions and exemptions.

Income tax impacts were calculated separately for full- and part-time employees, multiplying the number of employees in each category by the average tax burden per person in the wage category capturing the average wage per SUNY worker in the region or across New York State. Average employee wages were calculated by dividing total SUNY wages and salaries, as gathered from the National Center for Education Statistic's Integrated Postsecondary Education System (IPEDS). Annual wage per part-time SUNY worker was estimated to be half of that for a full-time employee.

New York State income tax impacts at the regional level reflect those generated by all SUNY employees employed at the SUNYs located in that region, including employees who live outside the region.

Sales Taxes. Sales tax impacts on spending by SUNY employees, students and visitors were estimated using sales tax rates by county from the New York State Department of Taxation and Finance. Rates reflect those that took effect or remained effective as of August 1, 2009.

An Annual Report on New York State Tax Expenditures prepared by the New York State Department of Taxation and Finance and the Division of the Budget provided an estimate for 2009 for the percentage of personal income New Yorkers spend on goods and services subject to the sales tax. This percentage, which is 28 percent, was used to estimate the percentage of faculty and staff disposable income (net of federal and state income taxes which account for roughly 20 percent of income) spent on taxable goods and services.

The sales tax impacts associated with taxable employee spending were calculated by applying the sales tax rate of the county where the employee lives, assuming most taxable purchases would be made close to home. In calculating sales tax impacts by region, only SUNY employees living in the region where they work are counted. Hence, employees living outside the region where they work but within New York State are captured in statewide sales tax impacts but not in the regional sales tax impacts.

For students, 100 percent of their spending on transportation was treated as taxable along with 75 percent of their personal item spending (reflecting entertainment, clothes, restaurants, drinks, etc.) and 10 percent of their spending on books and supplies (as text books are exempt from the sales tax).

For overnight visitors, it was assumed that all spending on hotel stays, prepared food at restaurants and coffee shops, and transportation would be taxable. It was assumed that all taxable spending of SUNY students and overnight visitors would occur in the county where the related school was located.

Visitor Spending

Source and Scope. Visitor counts are from a survey of SUNY institutions conducted during late 2010 and completed in early 2011. Institutions provided estimates for the annual number of visitors attracted to their campus for special events, conferences, athletics, special lectures, tours of prospective students and more. Institutions also provided an estimate for the percentage of total visitors from outside New York State or traveling distances great enough to require an overnight stay. Visitor estimates also included two overnight guests each year for every full-time student enrolled at a school from outside the region where the school is located, and one overnight guest per faculty member. The number of hotel nights associated with overnight visitors was calculated assuming that half of special event visitors would travel in groups of two and share a single hotel room.

Spending Calculations. Visitor spending on hotels was estimated by multiplying the number of hotel nights associated with overnight visitors by average hotel prices, as provided in The Hotel Price Index for the second quarter of 2009. These are based on a survey of hotel prices in major cities across the United States and reflect the price that customers actually pay. For SUNY schools in regions where no major city is located and an average price wasn't reported, the average price across all hotels in major cities in upstate New York was applied. Food and transportation during overnight visitors' stay was estimated to be about 30 percent of the per-night hotel costs. Spending of day-only visitors was not included in visitor impacts, assuming that their related spending would have occurred with or without SUNY (assuming, for instance, that if they did not go to the SUNY-related sports game, they would have stayed in the region for some other form of entertainment). It was assumed that all visitor spending accounted for by this study would occur in the region where the SUNY attracting the visitor is located.

Walk Scores

Source and Scope. Data are from Walk Score (WalkScore.com) providing a score or a measure of "walk-ability" of any address or location to nearby amenities such as restaurants, groceries, shopping, entertainment and parks. According to Walk Score, a score between 90 and 100 represents a "walker's paradise" where daily errands would not require a car and could be conducted on foot. At the other end of the spectrum is a score of 0-24 indicating that almost all everyday destinations require a car. Walk scores falling between these two extremes represent varying degrees of walk-ability, with higher scores indicating more nearby amenities and less reliance on a car.

To measure the vitality and amenities available by foot in SUNY communities versus communities without a SUNY, the walk score was run for the "center of town" of each of the nine selected SUNY impact communities as well as the "center of town" of every other town or city in the county in which those nine communities are located. By default, when a town name is entered into Walk Score, it positions its point of analysis to the center of town (i.e. its Main Street); however, in instances when the center of town was not matched automatically, this was done manually via the online interface.

To compare SUNY communities to other communities in their respective counties, the aggregate Walk Scores of SUNY communities were averaged and compared to the average of the scores of the remainder of towns and cities in these nine counties.

How SUNY Matters

Economic Impacts of the State University of New York

This report is a joint effort of the Nelson A. Rockefeller Institute of Government of the University at Albany and the University at Buffalo Regional Institute. Commissioned by the State University of New York, the report presents a detailed analysis of the economic impact and economic development role of the entire SUNY system in New York State and establishes a benchmark for moving forward.

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