



# NJIT

New Jersey Institute  
of Technology

## **Powering New Jersey's Economy**

Economic Impact  
Analysis Study  
2016

**\$35.1**  
**\$635.7**  
**\$1.74**  
**\$293.7**  
**\$2.5**  
**\$44.3**  
**\$226.9**  
**\$941.8**  
**\$724.0**



**N**ew Jersey Institute of Technology (NJIT), the science and technology university of New Jersey, is a world-class STEM-based research university producing an estimated economic impact of approximately \$1.74 billion on the state of New Jersey each year. This figure represents the university's direct output over a range of economic activities related to its five strategic priorities—students, learning, research, community, and investments—as well as their spillover effects, also known as indirect and induced output.

The total economic value generated by the university supports roughly 11,353 jobs in the state of New Jersey, and contributes an additional \$35.1 million to the state's tax revenues. At the same time, NJIT's economic impact on the city of Newark is estimated at \$635.7 million on an annual basis, supporting roughly 4,583 jobs, and increasing the city's tax revenues by \$2.5 million each year.

NJIT's total output at a statewide level breaks down approximately as follows across the university's strategic priorities: \$293.7 million in student-related economic activity; \$226.9 million in learning-related economic activity; \$941.8 million in research-related activity; \$44.3 million in community-related activity; and \$229.6 million in investments-related activity.

Taken as a whole, the university's operational expenditures of \$402.6 million in 2015 were the largest contributor to the overall economic impact, generating total output of an estimated \$724.0 million for the state of New Jersey, of which \$347.9 million was attributable to the impact on the economy of the city of Newark. NJIT's economic development activities contributed a further \$494.9 million to total economic output at the statewide level.

These activities include extension and technical assistance programs, such as the New Jersey Manufacturers Extension Program (NJMEP) and the New Jersey Health Information Technology Extension Center (NJ-HITEC), which are part of the relatively new New Jersey Innovation Institute (NJII).

Another economic development initiative, the Enterprise Development Center, which provides business incubation services to more than 90 technology ventures, generates \$145.0 million in total output for the state, supporting roughly 910 jobs and creating \$3.4 million in tax revenues for New Jersey.

Student-related spending is estimated to generate about \$150.9 million in total output at a statewide level, of which roughly \$78.2 million benefits the local economy of Newark. Likewise, NJIT's program of capital investments is responsible for an estimated impact of \$116.4 million of total output for New Jersey, of which about \$69.9 million is attributed to Newark.

The final category of economic impact relates to the wage premium earned by NJIT graduates over their peers from other colleges and universities. This figure is estimated to generate total economic output of \$105.1 million at the statewide level, supporting about 683 jobs and adding \$31.5 million to New Jersey's total employment income each year.

NJIT also makes significant contributions to the community through initiatives such as its \$1 billion Campus Gateway neighborhood redevelopment plan, which is helping to revitalize a 22-acre area adjacent to the university's campus, as well as its annual Day of Service, Alternative Spring Break, and numerous other community engagement service offerings that benefit the city of Newark, and the state of New Jersey as a whole.

## INTRODUCTION

**A**s New Jersey's science and technology university, **New Jersey Institute of Technology (NJIT)** has earned a solid reputation as one of the nation's preeminent STEM-based educational and research institutions. The university is consistently ranked among the highest in the country in return-on-investment (ROI) for its graduates, and is fifth among all U.S. polytechnic universities in terms of research expenditures. NJIT is a driving force behind a large number of technology- and innovation-based enterprises, as well as a wide range of business and industry public-private partnerships, which have a significant impact on the economies of the state and the region.

With six colleges, 50 undergraduate-degree programs, nearly 60 graduate-degree programs (including 19 programs leading to a Ph.D. degree in a professional discipline), and 40 specialized laboratories and research centers, NJIT is home to more than 11,300 students and nearly 500 full-time and adjunct faculty members. In addition, more than one-quarter of all engineers working in the state of New Jersey hold an NJIT degree.

The school's colorful history, dating back to 1881 and steeped in the industrial growth of New Jersey, is part of a long tradition of technological and business innovation. But far from resting on the achievements of the last 135 years, NJIT remains a dynamic and growing STEM university focused on transformative change. We have a strong strategic commitment to areas that are critical to economic development, growth, and quality of life, such as the nexus of engineering and the life sciences, data science and information technology, and sustainable systems. We are enriching our campus environment and our community with state-of-the-art facilities and far-reaching neighborhood development and community engagement initiatives. And we are further strengthening and expanding our faculty, curriculum, and multidisciplinary academic and research programs in order to attract, empower and graduate even greater numbers of high-achieving students. As one of the first academic institutions in the nation to adopt economic development as a core objective, and firmly

committed to the economic well-being of Newark and the state of New Jersey, NJIT is implementing its 2020 Vision strategic plan that focuses on five strategic priorities:

—Our **students**, who will be ready upon graduating for leadership roles in their professions and for advanced studies. To this end, we are actively growing undergraduate and graduate enrollment, while increasing retention and graduation rates. We are refining the admission process to increase acceptance of students who will be successful academically. And we are working to ensure that, once enrolled, our students receive the highest level of academic and social support, enabling them to persist through a rigorous curriculum that fosters not only expertise in their fields of study but also creative thinking and problem solving;

—**Learning**, through a challenging and relevant curriculum grounded in science, technology and the other disciplines that make the NJIT experience a distinctive foundation for fulfilling, successful careers, and that is delivered by highly skilled and engaging instructors. The courses of study that we offer our students are being continually assessed to ensure that they meet current professional standards, are delivered by enthusiastic faculty using innovative and effective teaching methods, and provide the comprehensive education needed to produce highly qualified leaders. And in parallel with formal instruction, we are working to ensure our curriculum also encourages learning outside the classroom through milestone experiences that include undergraduate research, social service, professional internships, co-op employment, study abroad, and a wide range of extracurricular activities;

—**Scholarly research** that continues to raise NJIT's profile as a national and international leader in basic and applied research. To achieve this, we continue to recruit new and replacement faculty, who will also engage our students in the excitement of scientific discovery and technological innovation, and whom we will support in pursuing creative, leading-edge investigation in an increasing range of disciplines and multidisciplinary collaboration. We encourage work that has entrepreneurial and translational economic value, and we are supporting these efforts, as well as the personal and

professional development of each faculty member, with all the necessary administrative and material resources;

—**Community** engagement by our faculty, staff, students and alumni, which promotes respect and civility among all NJIT stakeholders, and integrates them into university governance in a meaningful manner. We believe that we are strengthened by the diversity that is reflective of our home city of Newark, the state of New Jersey, our nation and, increasingly, the world at large, and we will ensure that our faculty, administration and student body continue to be richly diverse. This includes underscoring the importance of increasing the representation of women at U.S. polytechnic universities, which is for NJIT a key goal; and

—Appropriate, prudent **investments** in a complete spectrum of critical resources, including human capital and physical infrastructure. We continue to hire new faculty, as well as to develop facilities for education, research, athletics and recreation, in order to ensure that our faculty work in the best laboratories with the highest-quality equipment, even as they continue to grow in number and in prestige. In addition, we are working to ensure that our classrooms accommodate a variety of approaches to instruction supported by state-of-the-art technology.

These ongoing efforts are producing tangible results in a wide variety of ways. Perhaps none of these is more directly measurable than the more than \$1.7 billion of economic value that NJIT creates for the state of New Jersey. In the report that follows, we examine the components of that economic impact, as well as many of the other contributions New Jersey's science and technology university makes in both our community and our state. In presenting the results, we draw on a variety of sources, including analysis

from economic consulting firm Econsult Solutions Inc., whose assistance in evaluating NJIT's economic impact we gratefully acknowledge.

### ORGANIZATION OF THE REPORT

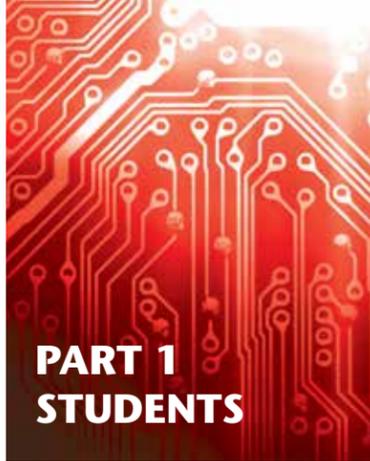
In keeping with NJIT's 2020 Vision strategy, this report is organized into five sections highlighting the contribution of each strategic priority to the university's impact across the components that traditionally comprise university economic-impact studies. These typically include ongoing **operational expenditures, capital spending, student-related spending** and a so-called college **wage premium**, which represents a graduate's incremental career earnings as a result of having attended the university.

At the same time, recognizing the value-additive nature of NJIT's unique portfolio of teaching, research, investment and tech-oriented enterprise development programs, in some cases we also examine the university's contribution with respect to **technology- and innovation-related activities** specific to its role as a catalyst for business and industry public-private partnerships.

In the sixth and final section, we describe the methodology used to estimate NJIT's economic impact, and consolidate and summarize the results which have been quantified throughout the balance of the report.

This report represents one phase of an ongoing investigation into the manifold aspects of NJIT's contributions—including educational, intellectual, social, and economic—to the rich heritage of the state of New Jersey and the city of Newark. We thank you for engaging with us.





**N**JIT is increasingly recognized as a world-class research university that prepares students to become leaders in the technology-dependent economy of the 21st century. It is no coincidence, then, that our number-one priority is our diverse population of more than 11,300 undergraduate and graduate students. A critical part of our mission is to ensure that we are student focused. We carry that mission out by not only providing our students with a high-quality education at an affordable price, but by also providing them with the technological proficiency, business acumen, and leadership skills that are a foundation for fulfilling, successful careers.

As a result, NJIT students are in high demand in an increasingly competitive marketplace for STEM-related internships and jobs after graduation. Our graduates also benefit from one of the highest returns on their investment (ROI) in terms of career earnings versus the cost of their NJIT education. According to a widely-used measure of college value, NJIT was once again recently ranked in the top 1 percent of all public research universities in the United States for ROI, or mid-career earnings for graduates with a bachelor's degree, and first among all public colleges in New Jersey, by PayScale.com. The university was also ranked among the top 10 colleges and universities in the nation for high value-added in terms of occupational earning power by the Brookings Institution, and was ranked 46th out of more than 1,400 colleges and universities nationally in terms of graduates' median income 10 years after enrollment, according to Georgetown University's Center on Education and the Workforce.

The fact that NJIT graduates earn higher wages on average than their peers from many other universities is also because our students are high achievers. We recently welcomed the largest entering undergraduate class in NJIT's history, with record-high average SAT scores. The average composite SAT score for fall 2015 freshmen was within the top 25 percent of the nation, while for Albert Dorman Honors College freshmen, the average composite score was in the top 10 percent nationally. As a recent Middle States Commission on Higher Education report noted, NJIT's

students are "excellent, well-trained, and graduates are highly successful after leaving the university. NJIT's success in providing a first-class education and college experience to a diverse student body is enviable."

NJIT's commitment to our students goes far beyond increasing the number of high-achieving students. It also entails ensuring that they have a full spectrum of the highest-quality educational, social and infrastructural resources necessary to be successful, both in and outside of the classroom. For this reason, the university continues to deliver on its program of faculty renewal and capital investment aimed at meeting the needs of our growing student population, and at giving students the edge they need in today's demanding high-tech marketplace.

In addition to construction of our new parking deck and our new, state-of-the-art Wellness and Events Center, the Central King Building is being transformed into a state-of-the-art STEM teaching and learning hub, and renovations continue in Tiernan Hall, Faculty Memorial Hall, and the Mechanical Engineering Center to ensure that our students have the appropriate space and technology to be successful. A renovated Makerspace, where students and businesses can prototype innovative ideas, is in the works. The second floor of Fenster Hall is being renovated as well, to house Academic Advising, Academic Support and Student Affairs, and NJIT's Career Development Services (CDS).

CDS, as both an invaluable resource for our students and an outstanding source of technological talent for New Jersey employers, is another example of the university's focus on our students, and on promoting technology-based economic development in New Jersey. In the past year, more than 550 firms visited NJIT's campus to interview some 4,850 students and recent graduates for employment opportunities. In addition, nearly 3,000 companies posted more than 26,400 technology job listings to the CDS electronic bulletin board, and the service referred almost 62,000 student and alumni resumes to potential employers. During 2015 as well, more than 600 NJIT students worked in formal internship and co-op programs for New Jersey companies, earning more than \$4.2 million in aggregate.

Because graduates of these programs enter the workforce with a level of skills that allows them to be immediately more productive to their employers, they are highly sought after. In fact, some 60 percent of the students involved in these programs will be hired by the firms that hosted them, once they graduate from NJIT.

### **ECONOMIC IMPACT**

Many of the factors mentioned above in relation to our students as a strategic priority also contribute either directly or indirectly to NJIT's measurable economic impact at the state and local levels. These include the significant proportion of the university's annual operating budget that is dedicated to the administration, support and expansion of our high-quality academic programs; the portion of the university's annualized capital expenditures that relates to the maintenance, renovation, and construction of educational and other student-services facilities; student-related off-campus spending; and the wage premium attributed to holding an NJIT degree.

Due to a significant degree of overlap in the economic activity related to students and that of NJIT's other strategic priorities, isolating and precisely quantifying the economic impact due to students is a complex undertaking. This is particularly true where accounts such as academic support, instruction and capital investments are concerned. Student-focused academic programs also constitute a core element of the learning strategic priority, and much of the university's physical infrastructure, including that related to students, is utilized for a variety of other purposes such as research, community engagement and other programs. Nevertheless, we can offer some indicative examples from categories such as operating expenditures, student-related spending and the wage premium to illustrate the significance of this student-related contribution.

### **STUDENT IMPACT ON THE UNIVERSITY'S OPERATING EXPENDITURES**

Of the university's fiscal year 2015 operating expenditures of \$402.6 million, roughly \$137.1 million, or 34 percent, was funded from student-related sources, such as revenue from tuition, fees and auxiliary services, net of student awards. This figure represents total economic output of approximately \$246.5 million, supporting roughly 1,438 jobs and employment income of about \$79.1 million for the state of New Jersey; and total economic output of approximately \$118.5 million, supporting some 816 jobs and employment income of \$48.7 million for the city of Newark.

The figures referenced above represent sources of revenue that help to fund the university's operating budget, and are therefore ultimately not additive to NJIT's overall economic impact. However, it is important to note that an estimated \$40.2 million of tuition and fee revenue is derived from out-of-state students, representing net new economic value

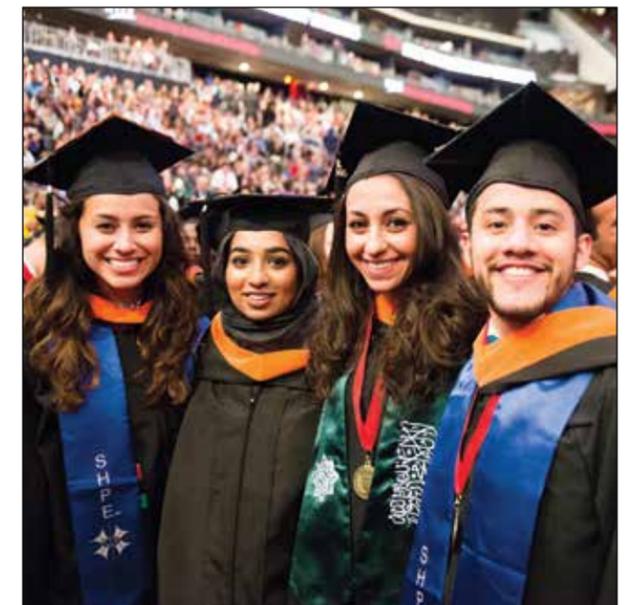
to the state of approximately \$72.3 million in total output (including \$34.7 million for the city of Newark) as a result of their matriculation at NJIT.

### **STUDENT SERVICES**

A more direct measure of the economic impact of the student-related component of university operational expenditures is represented by budget items such as student services. In this regard, NJIT spent roughly \$20.9 million on student services in 2015, representing total output of \$37.6 million for the state, of which \$18.1 million can be attributed to the city of Newark. This level of economic activity supported an estimated 219 jobs in the state, with additional employment income of \$12.0 million, including 124 jobs in Newark, representing labor income of \$7.4 million.

### **STUDENT-RELATED SPENDING**

The student-related contribution to NJIT's economic impact is much clearer as it relates to student and visitor spending, and the so-called wage premium. Using 2014 student enrollment figures, economic consulting firm Econsult Solutions Inc. (ESI) calculates approximately \$105.6 million in total student spending, of which roughly \$93.3 million is estimated to have occurred in New Jersey, and \$51.7 million to have occurred within Newark. Updating the enrollment figures for 2015, and using ESI's methodology, we estimate total student spending of approximately \$112.4 million, of which roughly \$99.3 million is attributed to New Jersey, and \$55.0 million to Newark. This level of student spending is estimated to produce total economic output of about \$145.6 million, supporting some 1,429 jobs and employment income of approximately \$40.7 million for New Jersey; and total



output of approximately \$76.8 million, supporting roughly 718 jobs and labor income of some \$19.3 million in Newark. In addition, we estimate that the more than 12,100 NJIT student visitors each year produce total output of about \$3.6 million for the state, and \$2.3 million for Newark.

**WAGE PREMIUM**

Last but not least, we consider the economic impact of the wage premium earned by NJIT graduates. It has been well documented that STEM-related careers command a significant wage premium. With nearly 80 percent of our graduating students earning a degree in a STEM-related discipline, NJIT alumni are the beneficiaries of one of the highest ROIs among all U.S. polytechnic research universities. As such, the wage premium earned by our graduates, which translates to higher household and disposable income, is a significant driver of incremental economic output in the Garden State.

Currently, approximately 36,500 NJIT graduates reside in New Jersey, representing more than 65 percent of the

known 55,700 alumni living in the United States. Based on longitudinal data at the zip-code level, it is possible to model the economic output generated as a result of the wage premium of those alumni who are currently in the workforce. However, not all of this wage premium can be assigned to NJIT’s economic impact, since some smaller proportion of the college wage premium would have been earned by those alumni if they had attended another New Jersey college. Using data provided by NJIT, ESI estimates an annual wage premium of approximately \$651 million for 2014 NJIT graduates for the state of New Jersey (\$27 million for the city of Newark), of which about \$130.2 million contributes to NJIT’s economic impact on New Jersey (\$5.4 million for Newark).

Each of the components discussed above also produces a fiscal impact at the state and local levels, due to increased income, sales and other taxes. The effect of these components, which can be isolated and quantified with respect to NJIT student-related economic activity, is summarized in the table below.

<b>NJIT Student-Related* Estimated Economic Impact</b>		
	<b>City of Newark</b>	<b>State of New Jersey</b>
<b>Direct Output (\$M)</b>	<b>70.8</b>	<b>171.4</b>
<b>Indirect and Induced Output (\$M)</b>	<b>29.1</b>	<b>122.3</b>
<b>Total Output (\$M)</b>	<b>99.9</b>	<b>293.7</b>
<b>Employment (# of jobs)</b>	<b>878</b>	<b>2,383</b>
<b>Labor Income (\$M)</b>	<b>28.2</b>	<b>85.7</b>

\*Includes impact from student awards, student services, student-related spending, and wage premium.

The NJIT academic experience offers students a unique blend of liberal and technical education with an emphasis on interdisciplinary learning at the intersections of the STEM-related disciplines with the humanities, social sciences, economics and business management. The university’s six schools and colleges offer 50 undergraduate- and 59 graduate-degree programs, including 19 doctoral-degree programs, and we are constantly developing new educational opportunities to anticipate and meet the needs of a rapidly evolving global marketplace.

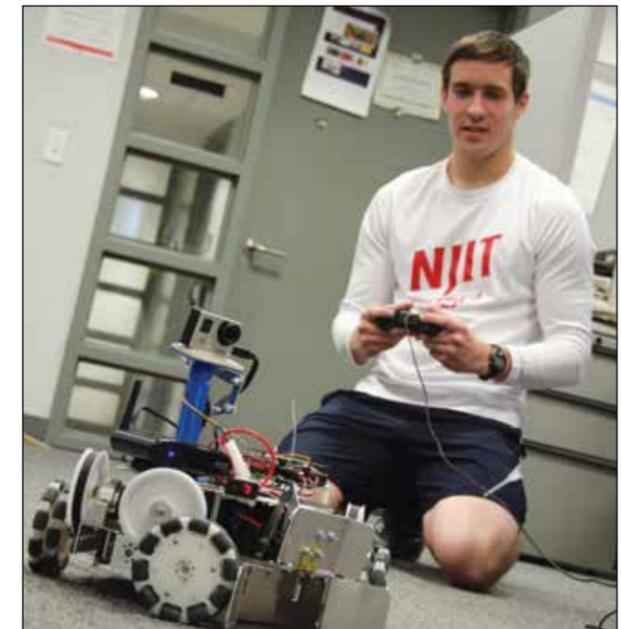
In a recent accreditation evaluation report, the Middle States Commission on Higher Education found that NJIT met or exceeded all 14 of the Commission’s standards outlined in its “Characteristics of Excellence in Higher Education.” Ensuring that NJIT’s students continue to receive the comprehensive, cutting-edge education they need to become highly skilled leaders in today’s technology-driven economy, for the benefit of New Jersey’s high-tech businesses and industry and the quality of life of its citizens, is a strategic priority and part of the core mission of the university. We are delivering on this in a number of ways.

To begin with, NJIT’s technologically-based education and research programs are closely aligned to support the design, computing, engineering and life-sciences clusters identified as priorities in New Jersey’s State Strategic Job Growth Plan. Our faculty, 99 percent of whom hold doctoral degrees, or the highest degrees attainable in their field, reflect critically important interdisciplinary growth areas—such as the nexus between technology and the life sciences, data science and information technology, and sustainable systems—in which employment demand exceeds supply.

Through continuous assessment of our curriculum, the convergence of digital and face-to-face instruction and the provision of professional skills, we are working to ensure that students have more learning opportunities that prepare them to be highly qualified leaders in their chosen professions. NJIT students can take advantage of a wide variety of learning alternatives and milestone experiences,

such as: cooperative education programs, in which they gain real-world experience and academic credit in their major area of study through paid work assignments; internships, in which they spend a semester or summer working in industry to gain experience and valuable contacts; online learning, research projects and study-abroad opportunities; service learning, in which they utilize their skills and gain experience while at the same time assisting community-based organizations; and programs like Undergraduate Research and Innovation, designed to help them develop vision and strategic-planning skills to address current and future global challenges.

Even as we are deeply committed to offering an engaging and inspiring learning experience for our students, NJIT also believes that learning is a strategic priority that is critically important to our wider community, in order to retain and attract high-tech businesses and to support economic development for the benefit of the state of New





Jersey and its residents. The demand for employees in the STEM fields in New Jersey alone are projected to grow to some 269,000 by 2018, and NJIT is engaged in a number of initiatives that will help meet this demand. For example, in addition to opportunities for adult learners to attend non credit courses, or earn graduate certificates, doctoral degrees, or executive MBAs, the university's Continuing Professional Education (CPE) division has provided corporate training and professional development programs for more than 76,500 employees and qualified residents at 665 New Jersey companies since 1990.

CPE was also recently awarded a \$5 million grant by the U.S. Labor Department to create a technical skills training program for the city of Newark, as well as Bergen, Essex, Hudson, Morris and Passaic counties. The program's aim is to provide education, training and job-placement assistance in high-growth fields in which area employers are currently hiring foreign workers through the federal government's H-1B nonimmigrant visa program. Workers trained through this program will bring tangible economic benefits to the state, and to their local communities, through a higher proportion of employment income that is retained within New Jersey, rather than being remitted abroad.

At the opposite end of the spectrum, in order to increase the pipeline of STEM students, NJIT is actively engaged in

supporting K-12 STEM education in New Jersey through its Center for Pre-College Programs (CPCP). Founded in 1978, CPCP annually serves more than 3,000 elementary and secondary students and their teachers, expanding access to scientific and technological fields among traditionally underrepresented populations. The Center also helps improve the teaching of mathematics and science in secondary and elementary schools throughout the state through numerous teacher workshops, and programs such as Research Experiences for Teachers, Leaders of Learners in STEM and Outcomes Assessment and Evaluation.

These educational programs and others like them not only provide NJIT students with the foundation for fulfilling, successful careers but they also help our students and members of our wider community contribute to the productivity, growth and sustainability of New Jersey's innovation economy.

### ECONOMIC IMPACT

As a core element of NJIT's education mission, learning-related activities contribute significantly to the university's economic impact on the state of New Jersey and the city of Newark. As with student-related activities, there is a great deal of overlap between learning as a strategic priority

and the other priorities, particularly in terms of operating expenditures and capital investments. While recognizing that these expenditures and the economic output they generate for the state and the city are not wholly additive, it is nevertheless instructive to review some examples of the impact these activities have.

### ACADEMIC SALARIES

Of the university's fiscal year 2015 operating expenditures of \$402.6 million, an estimated \$137.8 million, or 34 percent, was associated with academic salaries and fringe benefits. This figure represents total economic output of approximately \$249.5 million, supporting roughly 1,455 jobs and employment income of about \$79.8 million for the state of New Jersey; and total economic output of approximately \$159.0 million, supporting some 1,096 jobs and employment income of \$64.5 million for the city of Newark.

While it is not possible to attribute the full amount of the economic impact from academic salaries and benefits

to learning as a strategic priority, since many faculty and staff members have significant responsibilities in areas such as research, university administration, and community engagement, these figures nevertheless underscore the importance of the university's strategic hiring program as a contributing factor to its overall economic impact.

### INSTRUCTION AND ACADEMIC SUPPORT

A more direct, if incomplete, measure of economic impact in regard to learning as a strategic priority is NJIT's overall operational spending on instruction and academic support, which amounted to a combined \$126.2 million in 2015. In this regard, NJIT generated roughly \$226.9 million of total output for the state (\$109.0 million for Newark), supporting 1,323 jobs (751 of which are attributable to Newark) and employment income of about \$72.6 million (\$44.8 million in Newark).

NJIT's estimated economic impact with respect to the quantifiable components of learning-related activities is summarized in the table below.

### NJIT Learning-Related\* Estimated Economic Impact

	City of Newark	State of New Jersey
Direct Output (\$M)	94.5	125.3
Indirect and Induced Output (\$M)	14.5	101.6
Total Output (\$M)	109.0	226.9
Employment (# of jobs)	1,848	2,778
Labor Income (\$M)	110.2	152.4

\*Includes impact from instruction and academic support.

## PART 3 RESEARCH

**A**s a dynamic, world-class science and technology research university, one of NJIT's cornerstones is research. The university had more than \$110 million of research expenditures in 2015, placing it fifth among all U.S. public polytechnic research universities, and in the top 10 nationally among all universities whose research is principally in engineering. And our research interests are more than just academic.

With an emphasis on a complementary balance between basic and applied research, we are strategically committed to promoting economic development through translational scientific and technological research that brings cutting-edge solutions to bear on real-world problems through intensive business and industry collaborations, innovation, entrepreneurship and business incubation. A key focus of that commitment is on multi- and transdisciplinary research in three areas of critical importance to the wellbeing of the global community, as well as that of our state and local economies—the nexus of technology, engineering and the life sciences; data science and information technology, including the “internet of things”; and sustainability.

In recent years, NJIT has been recognized as a leader in fostering industry partnerships and developing patentable inventions. With more than 200 patents issued, many of which have been licensed to third parties, and more than 75 patents pending, NJIT places within the top 20 universities nationally for industrial contract dollars per federal research dollar granted, and we are fourth in the country for disclosures per dollar of federally sponsored research. NJIT is currently home to the largest technology and life-sciences incubator in the state—and one of the largest in the nation—guiding the commercialization of research through 95 startup companies that employ more than 800 people. And in 2015 the university received the prestigious designation of “Innovative & Economic Prosperity University” by the Association of Public Land-Grant Universities—one of fewer than 1 percent of U.S. universities to hold this title—acknowledging NJIT's work with public- and private-sector partners in New Jersey and the region in support of economic development

through a range of activities that includes innovation, entrepreneurship and technology transfer, as well as talent, workforce and community development.

While our research, innovation, entrepreneurship and business incubation programs are too numerous to recount in detail within the scope of the present report, a few key examples of strategic initiatives shed light on the meaningful impact research at NJIT is having on the state's economy and innovation ecosystem.

In June 2014, NJIT incorporated its New Jersey Innovation Institute (NJII) to serve as the focal point for the university's technology and economic development initiatives. Organized around i-Labs, NJII's mission is to serve the state's key industrial sectors, including health care systems, biotechnology and pharmaceutical production, defense and homeland security, civil infrastructure, and financial services, through the formation of business partnerships and the application of NJIT's research in product and process innovation, and technology development. NJII brings together roughly \$63 million in activities annually, in areas such as technology extension,



health care information systems implementation, defense industry cross-fertilization, transportation planning, small-business acceleration and others, while at the same time enabling opportunities for faculty engagement and student employment with industrial partners.

Through NJIT's New Jersey Health Information Technology Extension Center (NJ-HITEC), NJII is transforming primary health care delivery in the state. The federally funded center is the national leader in the number of primary-care physicians achieving compliance with the new federal requirements for “meaningful use” of electronic health care record systems. While assisting specialist physicians in the same area, NJ-HITEC is also working with New Jersey's leading hospital systems to provide hospital service interconnectivity for primary-care physicians, and to help them adopt accountable-care processes. These and the center's other activities result in annual cost savings to New Jersey health practitioners and businesses of roughly \$345 million, along with increased sales of as much as \$4.6 million.

In October 2015, NJII was awarded a nearly \$50 million grant from the U.S. Department of Health and Human Services to spend the next four years working with thousands of medical practices in New Jersey to improve the quality and efficiency of the care they provide, while lowering costs. Once concluded, the grant work will affect nearly every state resident.

NJII also has several knowledge- and technology-transfer initiatives in place to help small and mid-size New Jersey manufacturers become more productive and more competitive. The New Jersey Manufacturing Extension Program provides field agents with manufacturing experience in every county of the state, helping companies improve their operations, producing nearly \$200 million in cost savings and retaining as many as 3,000 overall jobs—half of those within the past five years. As a result of their participation in the program, companies have retained roughly \$139 million of annual sales that might otherwise have been lost, and have added \$47 million in new sales and 448 jobs over the last five years.

Likewise, NJII's Microelectronics Fabrication Center provides participating companies with access to a fully functional Class-10 micro-electronics and micro-electromechanical systems pilot production center, enabling them—with technical assistance from the center's staff—to translate design concepts into prototype devices scalable to industrial production. Together with NJII's Medical Device Concept Lab, the center uses clean-room technology to help industry partners and businesses create innovative medical devices for a range of biotechnological and industrial applications.

The Procurement Technical Assistance Center (PTAC), another NJII initiative, helps small, minority- and women-owned businesses procure government contracts, in many cases bringing net new federal funding dollars into the state and local economies. Since 1986, PTAC has helped New

Jersey businesses win more than \$2.6 billion in government prime and subcontract awards, translating into nearly 78,600 jobs that have been created or saved. Likewise, NJII affiliate, the Polymer Processing Institute, Inc., has helped save jobs and assisted New Jersey companies develop high-performance materials and products, including new manufacturing techniques for the production of nanoparticle pharmaceutical formulations, by providing them with expertise in polymer processing, and advanced mixing, compounding and blending technologies.

The Enterprise Development Center (EDC) is another important contributor to the university's economic impact on New Jersey, and on the city of Newark. The state's oldest and largest technology business incubator, EDC provides start-up and expansion-phase companies with office and laboratory space, access to scientific and technological equipment, financial guidance and technical and coaching advisory services, helping them to commercialize their innovative ideas and grow. Ultimately, EDC creates businesses that generate job growth and strengthen New Jersey's innovation economy, with an average of 95 companies per month that provide more than 800 jobs locally, including employment for as many as 335 NJIT students per year. Companies in the EDC have attracted more than \$80 million in third-party funding since 1988, and in 2014 generated revenues in excess of \$79 million.

Finally, transportation systems and infrastructure is another area of critical importance to the state and the region, in which NJIT's research programs make an inestimable economic contribution. By hosting and staffing organizations such as the North Jersey Transportation Planning Authority (NJTPA), the federally authorized Metropolitan Planning Organization (MPO) for the 13-county northern New Jersey region—the country's fifth most populous MPO region—which oversees more than \$2 billion annually in transportation improvement projects, and the New Jersey Department of Transportation's Intelligent Transportation System Resource Center, NJIT plays a leading role in shaping the state's transportation infrastructure to yield the largest benefits in terms of cost savings, reductions in congestion and improved traffic safety. The university is also working to apply outcomes of its research on high-speed rail technology platforms, developed through its Laboratory for Rail System Network and Information Technologies, to the modernization of U.S. rail systems.

The economic and fiscal impacts derived from the NJTPA are not included in the total, since it is likely that a significant portion of the agency's federal funds would have been spent even in the absence of NJIT's management role. Nevertheless, NJIT's contribution to the cost efficiency and planning and operational efficiency of the agency's activities are significant. For that reason, indicative figures are shown in the table below, in order to provide a sense of the scale and importance of the economic impact on the state of an entity largely administered by NJIT.

### NJTPA Estimated Economic Impact (Indicative Only)\*

	NJPA	Infrastructure Construction
Direct Output (\$M)	48.0	2,380.0
Indirect and Induced Output (\$M)	47.0	2,130.0
Total Output (\$M)	95.0	4,510.0
Employment (# of jobs)	480	32,300
Labor Income (\$M)	25.0	1,810.0

\*Sources: NJIT (2015), IMPLAN (2014), State of New Jersey (2013), Econsult Solutions (2015)

### ECONOMIC IMPACT

In addition to research components embedded in its operating budget, NJIT reported \$110 million on research expenditures in 2015. Due to the highly distributive nature of many of the translational scientific and technological research programs in which the university is engaged, whose benefits are often realized through industry partners, small and medium-sized businesses and public entities, estimating the economic impact of NJIT's research in its entirety is a highly complex undertaking. For example, while the university has generated more than \$3.4 million in revenue from patent-licensing fees over the past decade, the commercial activity made possible by these patents represents an enormous economic benefit for the New Jersey economy as a whole. Likewise, NJIT's stewardship of the North Jersey Transport Planning Authority has incalculable benefits for the state and the region. There are, however, certain economic activities associated with the university's research programs and innovation, entrepreneurship and business incubation initiatives, whose impact can be estimated somewhat more directly.

### SPONSORED PROGRAMS AND RESEARCH

Within the scope of its 2015 operating budget, NJIT spent approximately \$55.9 million on sponsored programs and research. According to ESI, 99 percent of nonpersonnel-related operating expenditures can be modeled for the state

of New Jersey, and 55 percent can be modeled for Essex County and the city of Newark. These figures translate to total output of roughly \$100.5 million for New Jersey, and \$48.3 million for Newark. Furthermore, the annualized economic activity produced by these research expenditures supports an estimated 586 jobs throughout the state (333 in Newark), with incremental employment income of about \$32.2 million generated in the Garden State, \$19.9 million of which is attributable to the city of Newark.

### EXTENSION AND PUBLIC SERVICE

NJIT's expenditures for various extension programs and public services amounted to almost \$2.0 million in 2015, generating total output of approximately \$3.5 million for the state, including \$1.7 million for Newark. This economic activity supported roughly 20 jobs in the state (11 in Newark), and provided incremental labor income of about \$1.1 million in the state (\$0.7 million in Newark).

### NEW JERSEY HEALTH INFORMATION TECHNOLOGY EXTENSION CENTER (NJ-HITEC)

ESI estimates that, through a combination of enterprise cost savings and new business activity it helps generate in the state's health care sector, NJIT's NJ-HITEC center produced total output of about \$408.9 million, supporting a total of

2,560 jobs and generating additional employment income of \$125.1 million within the state of New Jersey. Moreover, this impact does not include the economic benefits which may accrue for New Jersey residents throughout the state through the avoidance of unnecessary hospitalizations or other medical procedures, due to improved efficiency and compliance within the primary care physician system.

### NEW JERSEY MANUFACTURERS EXTENSION PROGRAM (NJMEP)

The incremental economic activity generated by this NJII program in terms of participants' increased annualized sales is responsible for direct, indirect and induced output of approximately \$86.0 million per year. This level of output supports roughly 670 jobs throughout the state, and creates additional labor income of about \$32.0 million. These figures do not include economic activity retained, which otherwise might have been lost, as a result of the knowledge and technical expertise NJIT transfers to businesses through this vital program.

### ENTERPRISE DEVELOPMENT CENTER (EDC)

The successful startup and development of businesses incubated by the university's EDC are another tangible source of economic activity and net positive impact for both the state and the city of Newark. EDC firms generated

approximately \$145.0 million of total output within New Jersey, supporting roughly 910 jobs and \$56.0 million of employment income. For Newark, the corresponding figures are \$136.0 million of total output, supporting some 860 jobs and employment income of \$53.0 million.

### RESTRICTED PROGRAMS

As noted by ESI, a landmark 2002 study by BJK Associates for the United States Small Business Administration found that university research and development expenditures within local economies are highly correlated with new business establishments in the same labor-market area, and suggested that the consequent spillover effects resulted in the generation of about 39 jobs for each \$1 million of research expenditure by a university. By this measure, NJIT's annual research spending of more than \$110 million is a powerful job-creation engine for both the state and local economies. Specifically, the university's restricted programs, which included research grants, contracts and restricted student awards, generated roughly \$197.8 million of total output for the state of New Jersey (\$95.1 million for the city of Newark), supporting an estimated 1,153 jobs statewide (655 citywide), and \$63.3 million of additional employment income within the state (\$39.1 million in Newark).

NJIT's estimated economic impact with respect to the quantifiable components of learning-related activities is summarized in the table below.

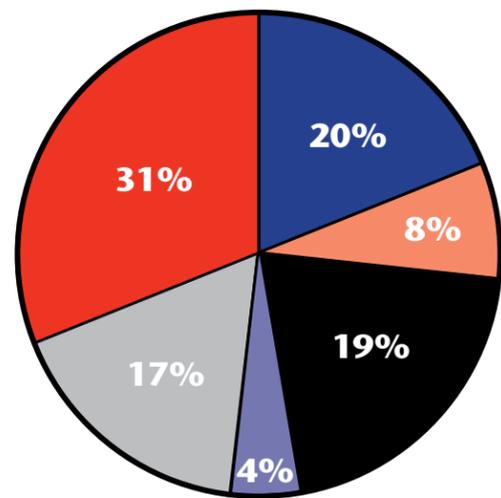
### NJIT Research-Related\* Estimated Economic Impact

	City of Newark	State of New Jersey
Direct Output (\$M)	204.7	297.4
Indirect and Induced Output (\$M)	76.3	644.4
Total Output (\$M)	281.1	941.8
Employment (# of jobs)	1,859	5,899
Labor Income (\$M)	112.6	309.7

\*Includes impact from sponsored programs and research, extension and public service, NJ-HITEC, NJMEP, EDC, and restricted programs.



**N**JIT is committed to being an inclusive community that promotes engagement, respect and civility among all of its stakeholders, and seeks to integrate them into university governance in a meaningful way. We are also a highly diverse community. With students from all over the United States and from more than 100 countries, NJIT represents a multitude of cultures, ethnicities, and ways of life, reflective of the community in which we live and of the world at large.



● Asian ● Hispanic ● Other\*  
 ● Black ● International ● White

\* Includes American Indian & Alaskan Native, Hawaiian Native & Pacific Islander, Multirace, and Unknown

Increasing the number of women on campus is a strategic priority of the university, and we have made significant progress in that regard. In the last decade alone, the percentage of undergraduate and graduate women enrolled in the university's six colleges has nearly doubled, almost

80 percent of those gains having been made in the last five years. Moreover, we have made these strides while at the same time growing our total student population by more than 40 percent in the last decade, and by almost 27 percent in the last five years alone.

We have also increased the number of women among our faculty. In the past seven years, the proportion of women as a percentage of total faculty has increased by 25 percent. Women now represent more than 15 percent of tenured faculty, and nearly 20 percent of total faculty.

Because diversity and inclusivity also mean ensuring that an NJIT education is affordable for students of all socio-economic backgrounds, student awards are an important part of NJIT's annual operating budget, representing roughly 15 percent of total tuition and fee revenues, and more than 6 percent of the university's total operating budget. Moreover, about 8 percent of the undergraduate student body is comprised of Educational Opportunity Program enrollments, which educates and graduates more than 100 minority engineers annually, with completion rates at NJIT for underrepresented students in the STEM disciplines exceeding the national average.

Beyond diversity and inclusion on campus, and in keeping with its service mission, NJIT is a major contributor to the local community. This contribution is expressed through a variety of initiatives, including neighborhood redevelopment, educational and mentoring programs (some of which have been described in Part II) and a wide range of community service and engagement activities.

#### ECONOMIC IMPACT

The economic impact of the community-related activities presented in this section is inherently difficult to isolate and quantify, due in part to overlap with other strategic priorities and in part to the highly distributive nature of some of the activities. Nevertheless, it is possible to estimate the impact of student awards, and to qualitatively describe a few of the university's initiatives in order to provide further context to NJIT's community-engagement efforts.

#### STUDENT AWARDS

In 2015, NJIT expended approximately \$24.7 million on student awards as part of its regular operating budget. This amount represents an estimated total output of \$44.3 million for the state (including \$21.3 million for the city of Newark), and supports an estimated 258 jobs statewide (146 in Newark), while creating roughly \$14.2 million of additional employment income in New Jersey (\$8.8 million in Newark).

#### CAMPUS GATEWAY PLAN

NJIT has partnered with the city of Newark to lead the \$1 billion redevelopment of a 22-acre area adjacent to the university's campus, which will include the 18-acre Campus Gateway Project Phase 2. This unique arrangement will provide more than 100 residential units, as well as 60,000 square feet of commercial space, and will contribute to the vital urban center taking shape in the heart of Newark's University Heights section. The project includes a 1,200-space parking garage, with 500 spaces for NJIT students, faculty, staff and visitors, as well as space for the adjacent community needs, and residents from the new development and the wider neighborhood. Mixed-use development of ground-floor retail space, shops, restaurants and neighborhood businesses is also included in the plan, which will create a number of well-paying construction jobs and help revitalize the community around University Heights.

#### DAY OF SERVICE

Each year, NJIT's incoming freshmen, as well as staff and student leaders, become active community volunteers and engage in service projects throughout Newark on the university's Day of Service. In 2015, more than 3,000 students completed in excess of 45,000 hours of service at 260 nonprofit organizations, for the benefit of our local community and its residents.

#### ALTERNATIVE SPRING BREAK

In 2015, NJIT organized and coordinated the participation of its students, as well as those from 22 other colleges in and around New Jersey, in an effort to contribute more than 1,000 man-days of work to the revitalization of the Jersey Shore, the City of Newark and other cities and towns affected by Hurricane Sandy. More than 340 students and staff participated in the week-long program, which provided opportunities to protect the environment and to build new communities capable of withstanding flooding and other natural disasters using innovative techniques.

NJIT's estimated economic impact with respect to the quantifiable components of community-related activities is summarized in the table below.

NJIT Community-Related* Estimated Economic Impact		
	City of Newark	State of New Jersey
Direct Output (\$M)	18.5	24.5
Indirect and Induced Output (\$M)	2.8	19.8
Total Output (\$M)	21.3	44.3
Employment (# of jobs)	146	258
Labor Income (\$M)	8.8	14.2

\*Includes impact from student awards.

**PART 5  
INVESTMENTS**

In order to carry out NJIT's fourfold mission of education, research, service and economic development, the university must first ensure that it has the human, physical and technological resources commensurate with its status as a dynamic and growing science and technology research university. Investments—in education, faculty, research and infrastructure—are therefore a strategic priority, on which we are delivering in a number of ways.

We are growing our faculty both in numbers and in renown. NJIT has been strategically renewing and expanding faculty through a hiring plan that has attracted 68 new tenured or tenure-track faculty from across the country over the last four years. At our current count of 281 tenured or tenure-track faculty, we are on track to achieve our goal of a total of 345 by 2020. These additions are being made with a focus on reinforcing the university's expertise in three emerging thematic areas of education and research: sustainability and sustainable systems; data science and information technology, particularly as it relates to the theme of "information everywhere," or the "internet of things;" and the convergence of engineering and technology with the life sciences.

The enthusiastic delivery of a high-quality, affordable education, using innovative and effective teaching methods, is a hallmark of the NJIT experience. We are therefore also investing in education by improving academic

support, including the creation of spaces for student study and interaction in proximity to large lecture halls and classrooms, by promoting teaching excellence and by refining the way we measure, compensate and incentivize our academic staff's success. For example, in recent years we have introduced a performance-based faculty compensation system, which is proving its effectiveness and which has also now been expanded to include non-tenure track university lecturers.

We are also investing in our technology and facilities infrastructure for a wide range of uses that cut across every aspect of the university's mission, from education and research to community service and economic development. Over the past few decades, NJIT's physical plant has nearly quadrupled from 800,000 square feet to more than 3 million square feet, and now we are investing more than \$300 million in transformative capital projects in realization of our 2020 Vision.

Our capital improvement and facilities expansion plans include projects such as the \$128-million transformation of the former Central High School's King building into a state-of-the-art STEM teaching and learning hub; the construction of a \$102-million, multipurpose Wellness and Event Center; the \$20-million construction of our state-of-the-art Life Sciences and Engineering Building; the construction of a new Science & Technology Park "green" parking facility; and the recently completed Warren Street Village, providing housing, dining facilities and other amenities for residents of our Honors College and Greek societies.

**ECONOMIC IMPACT**

Along with our annual physical-plant maintenance and support-services expenditures, and institutional support, the capital investments highlighted above are an important driver of NJIT's economic impact through job creation and the ripple effects generated by the revitalization of our local community. The estimated contributions to that impact of those components that can be estimated directly are outlined next.



**PHYSICAL PLANT AND SUPPORT SERVICES**

In 2015, NJIT's expenditures for facilities maintenance and other physical-plant and support services exceeded \$19.5 million. This activity generated total economic output of roughly \$35.2 million for the state of New Jersey, including \$16.9 million of total output for the city of Newark. As a result, 205 jobs were supported in the state (116 in Newark), creating incremental employment income of an estimated \$11.3 million (\$7.0 million in Newark).

**INSTITUTIONAL SUPPORT**

In 2015, NJIT's expenditures for institutional support reached nearly \$43.4 million, generating total economic output of an estimated \$100.5 million for the state, of which \$48.3 million can be attributed to Newark. This economic activity supported roughly 586 jobs and incremental employment income of \$32.2 million within the state (333 jobs in Newark, with employment income of \$19.9 million).

**CAPITAL INVESTMENTS**

Based on recently completed or planned infrastructure projects, including building improvements and upgrades, and new construction, NJIT's estimated capital spending for the six-year period through its 2018 fiscal year amounts to approximately \$382.8 million. Adjusting for land acquisitions and purchases outside of New Jersey, roughly \$62.0 million of this \$63.7 million in annualized capital investments can be modeled, resulting in an annualized impact of some \$116.4 million in total output for the state, and \$69.9 million of total output for Newark. These levels of economic activity support an estimated 830 jobs in the state, of which 575 are attributed to Newark, with attendant employment income of \$42.0 million for New Jersey and \$30.7 million for Newark.

The impacts mentioned above are summarized as follows:

<b>NJIT Investments-Related* Estimated Economic Impact</b>		
	<b>City of Newark</b>	<b>State of New Jersey</b>
<b>Direct Output (\$M)</b>	118.5	137.0
<b>Indirect and Induced Output (\$M)</b>	16.6	115.2
<b>Total Output (\$M)</b>	135.1	252.1
<b>Employment (# of jobs)</b>	1,024	1,621
<b>Labor Income (\$M)</b>	57.5	85.4

\*Includes impact from physical plant and support services, institutional support, and capital investments.

## PART 6 ECONOMIC IMPACT

Impact Category	Direct Output (\$M)		Indirect and Induced Output (\$M)		Total Output (\$M)		Employment (# of jobs)		Labor Income (\$M)	
	Newark/Essex	New Jersey	Newark/Essex	New Jersey	Newark/Essex	New Jersey	Newark/Essex	New Jersey	Newark/Essex	New Jersey
<b>Student-Related:</b>										
<i>Student Services</i>	15.7	20.8	2.4	16.8	18.1	37.6	124	219	7.4	12.0
<i>Student-related spending</i>	53.2	92.6	25.0	58.3	78.2	150.9	731	1,481	19.7	42.2
<i>Wage Premiums</i>	2.0	58.1	1.6	47.0	3.6	105.2	23	683	1.1	31.5
<b>Sub-total Student-Related</b>	<b>70.8</b>	<b>171.4</b>	<b>29.1</b>	<b>122.1</b>	<b>99.9</b>	<b>293.7</b>	<b>878</b>	<b>2,383</b>	<b>28.2</b>	<b>85.7</b>
<b>Learning Related:</b>										
<i>Instruction</i>	74.7	99.1	11.5	80.3	86.2	179.3	594	1046	35.4	57.4
<i>Academic Support</i>	19.8	26.3	3.1	21.3	22.9	47.6	157	277	9.4	15.2
<b>Sub-total Learning-Related</b>	<b>94.5</b>	<b>125.3</b>	<b>14.5</b>	<b>101.6</b>	<b>109.0</b>	<b>226.9</b>	<b>751</b>	<b>1323</b>	<b>44.8</b>	<b>72.6</b>
<b>Research Related:</b>										
<i>Sponsored programs and research</i>	41.9	55.5	6.4	45.0	48.3	100.5	333	586	19.9	32.2
<i>Extension and public service</i>	1.5	1.9	0.2	1.6	1.7	3.5	11	20	0.7	1.1
<i>NJ-HITEC</i>	0.0	4.6	0.0	404.2	0.0	408.9	-	2,560	0.0	125.1
<i>NJMEP</i>	0.0	47.0	0.0	39.0	0.0	86.0	-	670	0.0	32.0
<i>EDC</i>	79.0	79.0	57.0	66.0	136.0	145.0	860	910	53.0	56.0
<i>Restricted programs</i>	82.4	109.3	12.7	88.6	95.1	197.8	655	1,153	39.1	63.3
<b>Sub-total Research-Related</b>	<b>204.7</b>	<b>297.4</b>	<b>76.3</b>	<b>644.4</b>	<b>281.1</b>	<b>941.8</b>	<b>1,859</b>	<b>5,899</b>	<b>112.6</b>	<b>309.7</b>
<b>Community- Related:</b>										
<i>Student awards</i>	18.5	24.5	2.8	19.8	21.3	44.3	146	258	8.8	14.2
<b>Sub-total Community-Related</b>	<b>18.5</b>	<b>24.5</b>	<b>2.8</b>	<b>19.8</b>	<b>21.3</b>	<b>44.3</b>	<b>146</b>	<b>258</b>	<b>8.8</b>	<b>14.2</b>
<b>Investments-Related:</b>										
<i>Physical plant and support services</i>	14.7	19.5	2.3	15.8	16.9	35.2	116	205	7.0	11.3
<i>Institutional Support</i>	32.5	43.1	5.0	34.9	37.5	78.0	258	455	15.4	25.0
<i>Capital investments</i>	62.0	62.0	7.9	54.4	69.9	116.4	575	830	30.7	42.0
<b>Sub-total Investments-Related</b>	<b>109.2</b>	<b>124.5</b>	<b>15.2</b>	<b>105.1</b>	<b>124.3</b>	<b>229.6</b>	<b>949</b>	<b>1,490</b>	<b>53.1</b>	<b>78.2</b>
<b>Total Economic Impact</b>	<b>\$497.7</b>	<b>\$743.2</b>	<b>\$137.9</b>	<b>\$993.0</b>	<b>\$635.7</b>	<b>\$1,736.3</b>	<b>\$4,583</b>	<b>\$11,353</b>	<b>\$247.5</b>	<b>\$560.4</b>
<i>...from Operating Expenditures</i>	301.5	399.9	46.4	324.1	347.9	724.0	2,394	4,219	143.0	231.6
<i>...from Capital Investments</i>	62.0	62.0	7.9	54.4	69.9	116.4	575	830	30.7	42.0
<i>...from Ancillary Student Spending</i>	53.2	92.6	25.0	58.3	78.2	150.9	731	1,481	19.7	42.2
<i>...from Wage Premium</i>	2.0	58.1	1.6	47.0	3.6	105.1	23	683	1.1	31.5
<i>...from Innovation/Economic Development</i>	7.9	130.7	5.7	509.2	136.0	639.9	860	4,140	53.0	213.1
<b>Total Economic Impact</b>	<b>497.7</b>	<b>743.2</b>	<b>137.9</b>	<b>993.0</b>	<b>635.7</b>	<b>1,736.3</b>	<b>458.3</b>	<b>11,353</b>	<b>247.5</b>	<b>560.4</b>

As has been shown in previous sections of this report, in keeping with its economic development mission, NJIT's impact on both the state and local economies is significant. While many of the elements of the university's economic activity are overlapping and cut across one or more strategic priorities, we have identified a number of components that can be estimated more directly. Our analysis shows that New Jersey Institute of Technology produces more than \$1.7 billion of economic value for the state of New Jersey, and more than \$635 million of value for the city of Newark. These levels of total economic output support an estimated 11,353 jobs statewide, and 4,583 jobs within Newark, adding employment income of about \$560.4 million to the state, of which an estimated \$247.5 million is earned in Newark.

In addition to the economic impact the university has on the state and local economies, the economic output stimulated by NJIT's economic activities also has a fiscal impact through the generation of incremental income, sales and other taxes. These effects, representing additional estimated tax revenues of \$35.1 million for the state of New Jersey, and \$2.5 million for the city of Newark, are summarized in the table to the right.

### UNDERSTANDING THE ECONOMIC AND FISCAL IMPACTS

As the science and technology university of New Jersey with the fourfold mission of education, research, service and economic development, NJIT obtains the resources it needs to operate, and to fund its investment in human and physical capital, from a variety of sources. These include student tuition and fees, appropriations from the state, alumni giving and various public and private grants, among other sources. In return, the university provides a high-quality, affordable education to its students, preparing them to be leaders of the innovation economy in the state and the region; groundbreaking basic and applied research that helps create jobs and fuels the innovation ecosystem of our state and local economies; and a variety of services that help strengthen and enrich the diverse community in which we live. We are extremely proud of our record of achievement in this regard.

One of the ways in which universities attempt to quantify the economic value they provide to society is through economic-impact analyses, which use standard economic input-output models to determine the value of the economic output they produce as a result of their own activity, and the "spillover" or "ripple" effects caused by that activity. According to input-output theory, for each dollar an economic actor spends—the direct output—there are two basic spillover impacts.

First, a portion of those expenditures on goods and services purchased from suppliers and vendors is recirculated back into the economy when those suppliers

Impact Category	Tax Revenues (\$M)	
	Newark/Essex	New Jersey
<b>Student-Related:</b>		
<i>Student Services</i>	0.1	0.6
<i>Student-related spending</i>	0.2	3.3
<i>Wage Premiums</i>	0.0	2.7
<b>Sub-total Student-Related</b>	<b>0.3</b>	<b>6.6</b>
<b>Learning Related:</b>		
<i>Instruction</i>	0.1	2.9
<i>Academic Support</i>	0.2	0.8
<b>Sub-total Learning-Related</b>	<b>0.5</b>	<b>3.6</b>
<b>Research Related:</b>		
<i>Sponsored programs and research</i>	0.2	1.6
<i>Extension and public service</i>	0.0	0.1
<i>NJ-HITEC</i>	0.0	9.3
<i>NJMEP</i>	0.0	2.1
<i>EDC</i>	0.5	3.4
<i>Restricted programs</i>	0.4	3.2
<b>Sub-total Research-Related</b>	<b>1.1</b>	<b>19.6</b>
<b>Community- Related:</b>		
<i>Student awards</i>	0.1	0.7
<b>Sub-total Community-Related</b>	<b>0.1</b>	<b>0.7</b>
<b>Investments-Related:</b>		
<i>Physical plant and support services</i>	0.1	0.6
<i>Institutional Support</i>	0.2	1.3
<i>Capital investments</i>	0.3	2.7
<b>Sub-total Investments-Related</b>	<b>0.5</b>	<b>4.5</b>
<b>Total Fiscal Impact</b>	<b>\$2.5</b>	<b>\$35.1</b>
<i>...from Operating Expenditures</i>	1.5	11.6
<i>...from Capital Investments</i>	0.3	2.7
<i>...from Ancillary Student Spending</i>	0.2	3.3
<i>...from Wage Premium</i>	0.0	2.7
<i>...from Innovation/Economic Development</i>	0.5	14.8
<b>Total Fiscal Impact</b>	<b>2.5</b>	<b>35.1</b>

and vendors make their own purchases of materials, goods and services. This represents the so-called indirect effect, or indirect output. Second, a portion of the economic actor's expenditures on labor (salaries and wages) is recirculated back into the economy when employees spend part of their earnings on various goods and services. This represents the so-called induced effect, or induced output.

Economists use input-output models, most often supported by empirical longitudinal data, to represent the interaction between and across various industries and to estimate the size and the composition of indirect and induced outputs generated by a given amount of direct output. The sum of these three types of output is what is known as the economic impact. Similar models are used to estimate the size and composition of tax effects that result from the economic actor's fiscal impact. The present

analysis is based in large part on the customized input-output and fiscal models developed by Econsult Solutions Inc. of Philadelphia, Pennsylvania, using the IMPLAN input/output modeling system and longitudinal database.

Thus, the total output figures discussed in connection with each section of the report are based on a combination of direct, indirect and induced outputs. Likewise, the employment, labor income, and tax revenue effects represent the results of NJIT's direct economic activity and the ripple effects generated by that activity. For example, the employment- and labor-income numbers presented in the analysis do not represent actual numbers of NJIT employees, or their aggregate salaries, but the total number of employees in the state and local economies—and the income they earn—who are estimated to be supported

by a given level of total economic output generated by the university's direct expenditures, along with the indirect and induced output they stimulate.

Finally, while every effort has been made to ensure the accuracy of the numbers used in the analysis, it is important to note that input-output analysis is as much of an art as it is a science. It is based on the typical linkages and economic interactions that have been modeled across industries and geographic regions, and many of the expenditures on which it is based are estimates derived using annualized figures and key assumptions. There are, in fact, a number of direct outputs which have not been included in the analysis, simply because the highly distributive nature of the particular economic activity involved renders modeling those outputs extremely cumbersome. Thus, the economic-

and fiscal-impact numbers published in this report—as with every such economic-impact analysis—represent methodically produced estimates, and in many cases, conservative ones at that.

In compiling this report, we have relied upon a variety of information sources, including NJIT state-budget submissions, board of trustees budget presentations, other NJIT and public data sources and analysis from independent consultants, including in particular that of ESI. Some of the key assumptions used in the analysis involve the annualizing of certain operating or capital expenditures, the rates and patterns of student and visitor spending, the portion of the so-called wage premium attributable to NJIT and other factors. While all care has been taken to ensure the accuracy of the data and the reasonableness of the assumptions, two things should be noted.

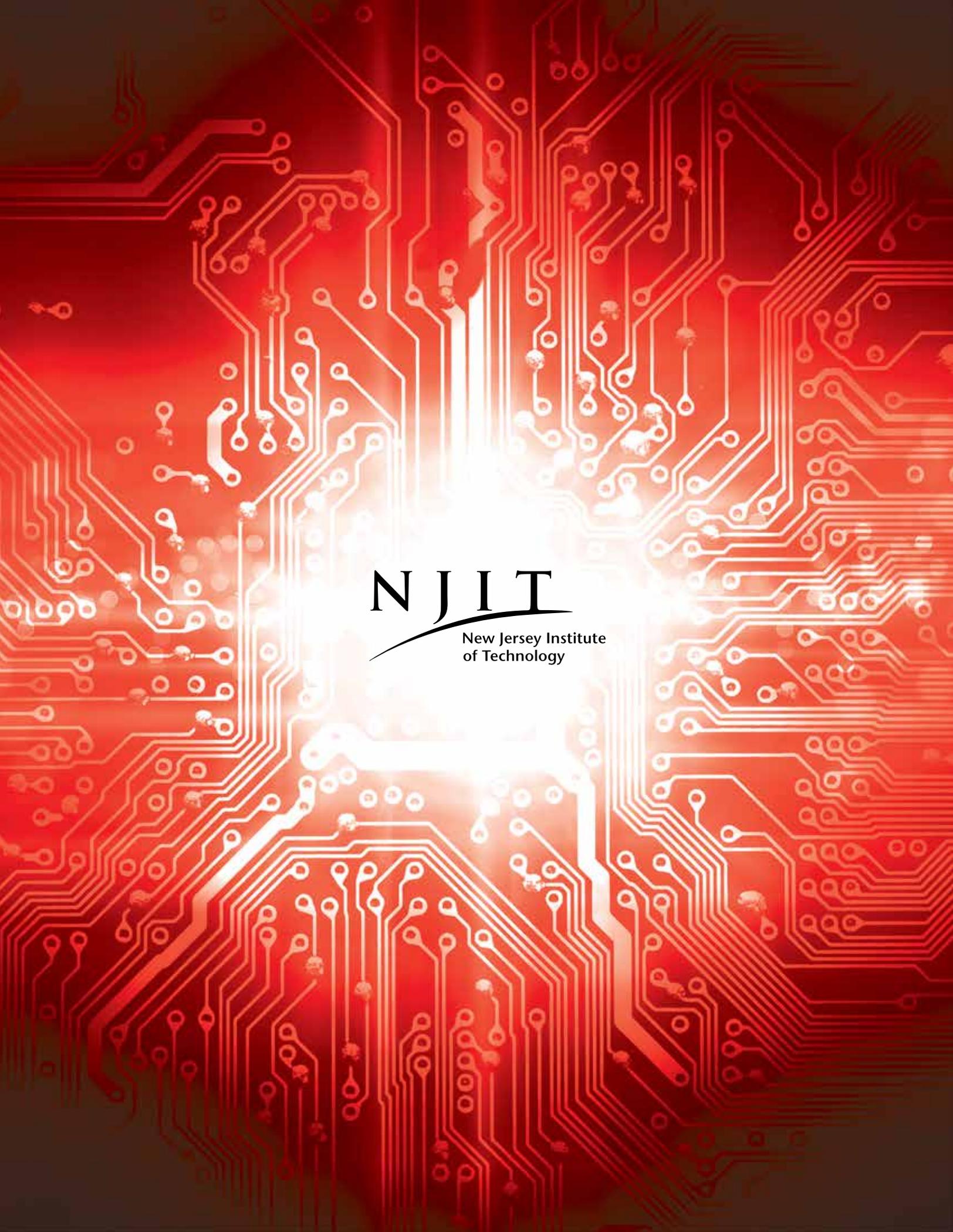
First, even small changes in certain key assumptions can have a relatively large impact on the overall economic-impact results. For example, in estimating the wage premium generated by NJIT graduates, calculations are based on several key assumptions, which include among others: an employment rate of 75 percent, which is the current national labor force participation rate for college graduates reported by the Bureau of Labor Statistics; longitudinal employer-household dynamics (LEHD) data from the U.S. Census, which provides information on commuting patterns of employees, which attributes an 83.6 percent in-state employment rate for New Jersey's working population; a distribution of careers that mirrors the degree distribution of the university's undergraduate Class of 2014; and a discount factor of 80 percent, thereby attributing only 20 percent of the total wage premium derived to NJIT. Using these assumptions, it is estimated that there are some 22,889 NJIT alumni employed in New Jersey, generating an estimated wage premium of roughly \$651 million annually, of which approximately \$130 million per year is attributed to NJIT. The resultant total output generated from the NJIT wage premium derived from this set of assumptions amounts to about \$105 million for New Jersey.

If, however, we were to make some reasonable, fairly minor adjustments to those assumptions, the economic impact from NJIT's wage premium increases or decreases by a significant amount. For instance, assuming a 10 percent higher rate of NJIT-alumni employment due to a relatively younger cohort of alumni and a higher demand for STEM graduates, and at the same time increasing the percentage of New Jersey-resident NJIT alumni working in-state to 92 percent (versus the LEHD average of 83.6 percent) due to the relatively higher proportion of local STEM jobs, the estimated total wage premium increases to \$786 million, with the portion attributed to NJIT increasing by \$27 million to \$157 million for New Jersey. Likewise, simply utilizing the degree distribution of NJIT's Class of 2013 instead of that of the Class of 2014, all other things being equal, reduces the estimated total wage premium to \$634 million, with a corresponding decrease in the amount

attributed to NJIT to \$127 million for New Jersey.

Second, the findings of our analysis represent a snapshot, and potentially an incomplete one at that, of NJIT's economic impact on the state and local economies at a point in time. Growth in enrollment, changing operating expenditure priorities and resource availability, changes in the timelines of capital projects, or any number of other factors could all have a profound influence on the university's annualized spending patterns, and could have material effects on NJIT's overall economic impact on the state of New Jersey and/or the city of Newark. The analysis contained in this report should therefore be considered in that context.

Assumption	Effect on Calculation	Adjustment	Adjusted Effect on Calculation
Assumption Effect on Calculation Adjustment Adjusted Effect on Calculation	Approximately 27,379 NJIT alumni residing in NJ active in labor force	NJIT alumni employment rate of 82.5% (due to relatively younger cohort of alumni, and higher-demand for STEM grads)	Approximately 30,117 NJIT alumni residing in NJ active in labor force. <b>Estimated total wage premium for NJ increases to \$715 million, of which \$143 million is attributed to NJIT</b>
83.6% of actively employed NJIT alumni working in-state	Approximately 22,889 NJIT alumni working in New Jersey	92% of employed NJIT alumni working in-state (due to higher percentage of STEM-related industries in New Jersey)	Approximately 25,188 NJIT alumni working in New Jersey. <b>Estimated total wage premium for NJ increases to \$715 million, of which \$143 million is attributed to NJIT</b>
Same as above two assumptions	Same as above two assumptions	Both adjustments above	Approximately 27,702 NJIT alumni working in New Jersey. <b>Estimated total wage premium for NJ increases to \$786 million, of which \$157 million is attributed to NJIT</b>
NJIT alumni career distribution mirrors degree distribution of Class of 2014	Estimated total wage premium for New Jersey equals \$651 million, of which \$130 million attributed to NJIT.	NJIT alumni career distribution mirrors degree distribution of Class of 2013	Estimated total wage premium for NJ decreases to \$634 million, of which \$127 million is attributed to NJIT

The background of the image is a complex, glowing red and white circuit board pattern. The lines of the circuit are intricate and form a dense, interconnected network. A bright, white light source is positioned behind the text, creating a lens flare effect that illuminates the surrounding circuitry. The overall color palette is dominated by deep reds and bright whites, giving it a high-tech, digital feel.

**NJIT**

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