

An aerial photograph of New York City, featuring the dense skyline of Manhattan in the background with the Empire State Building as a prominent landmark. In the foreground, the campus of Stevens Institute of Technology is visible, including a large green soccer field with a red 'S' logo, several academic buildings, and a parking lot. The Hudson River is on the right side of the image.

THE INNOVATION UNIVERSITY:

The Economic Impact of
Stevens Institute of Technology

APRIL 2015



This report was prepared by Appleseed, a New York City-based consulting firm, founded in 1993, that provides economic research and analysis and economic development planning services to government, non-profit and corporate clients.

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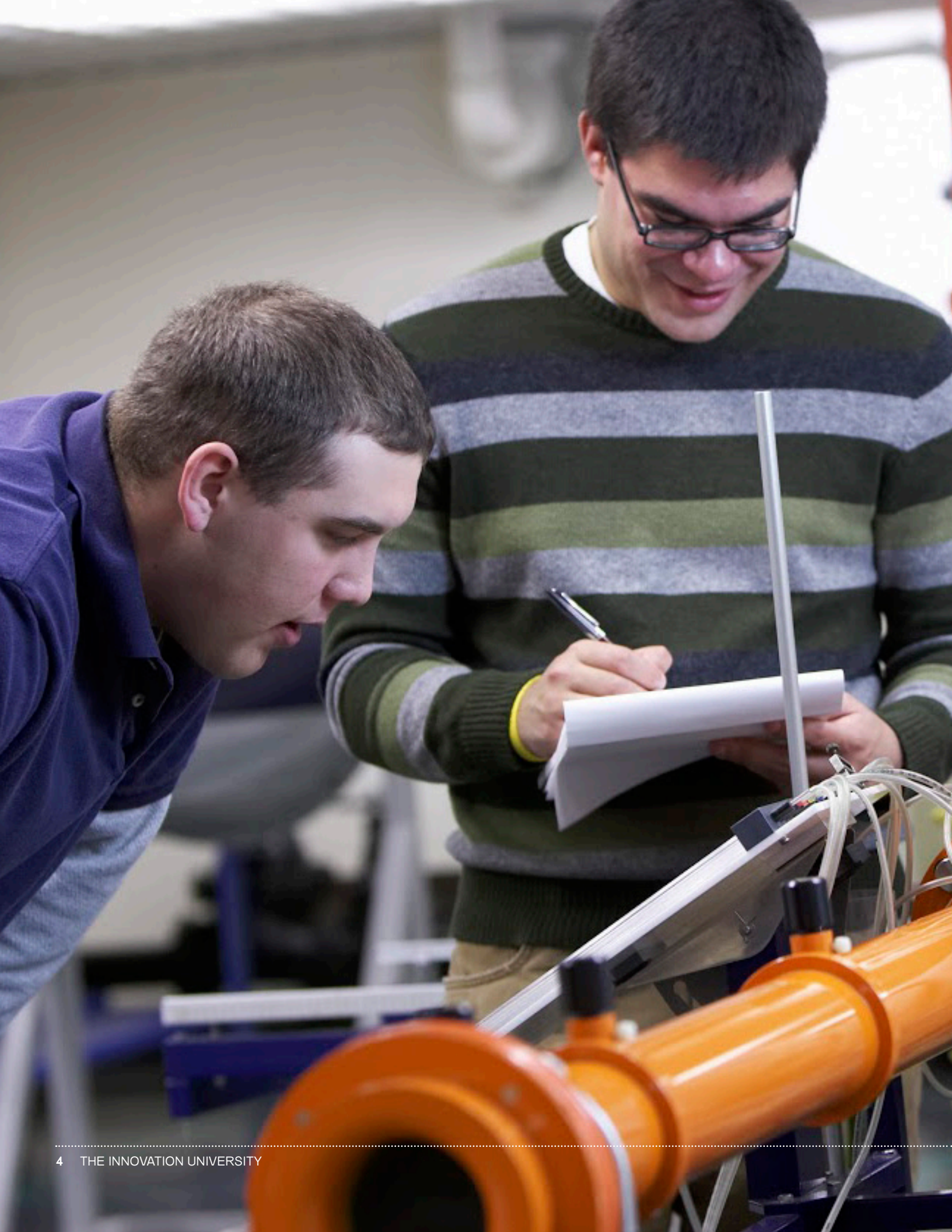


TABLE OF CONTENTS

7	Executive Summary
15	Introduction & Overview
17	Part One / Stevens as an Enterprise
29	Part Two / Developing Human Capital
39	Part Three / The Impact of Stevens Research
45	Part Four / Technological Innovation and Business Development at Stevens
53	Part Five / Community Engagement at Stevens
59	Part Six / A Growing Impact



EXECUTIVE SUMMARY

Stevens Institute of Technology – one of the nation’s premier technology universities, a leading educator of undergraduate and graduate engineers and a long-time source of technological innovation – is a major contributor to the economic vitality of the City of Hoboken, Hudson County and the State of New Jersey. This report assesses Stevens’ economic impact, both locally and at the state level.

Stevens as an enterprise

Stevens is a significant enterprise in its own right – a major local employer, a buyer of goods and services and a sponsor of campus construction projects.

- With 1,046 full- and part-time employees (excluding students) as of the fall of 2013, Stevens is the fourth-largest employer in the City of Hoboken.
- During fiscal year 2014, spending by Stevens on purchases of goods and services and construction directly supported 78 full-time-equivalent (FTE) jobs in Hoboken; 101 FTE jobs in Hudson County (including Hoboken); and 276 jobs throughout New Jersey (including Hudson County).
- Taking into account both the direct and indirect and induced (or “multiplier”) effects of university spending on payroll, purchasing and construction, we estimate that that in fiscal year 2014, Stevens accounted for:
 - » 1,176 FTE jobs in Hoboken;
 - » \$95.3 million in wages and salaries; and
 - » \$107.4 million in city-wide economic output.

In Hudson County (including Hoboken), university spending directly and indirectly accounted for:

- » 1,339 jobs in Hudson County;
- » \$105.2 million in wages and salaries; and
- » \$132.8 million in county-wide economic output.

At the state level (including Hudson County), university spending directly and indirectly accounted for:

- » 1,849 jobs in New Jersey;
- » Nearly \$137.7 million in wages and salaries; and
- » \$222.0 million in statewide economic output.

- Off-campus spending by Stevens students and by visitors to the university also contributes to the local economy. We estimate that in fiscal year 2014, off-campus spending by students and visitors directly and indirectly accounted for:
 - » 109 FTE jobs in Hoboken;
 - » \$3.9 million in wages and salaries; and
 - » \$9.7 million in city-wide economic output.

In Hudson County (including Hoboken), off-campus spending by students and visitors directly and indirectly accounted for:

- » 326 FTE jobs in Hudson County;
- » \$11.9 million in wages and salaries; and
- » \$32.2 million in county-wide economic output.

- Taking into account the impact of university spending on payroll, purchasing and construction, along with off-campus spending by students and visitors, we estimate that in fiscal year 2014, Stevens directly and indirectly accounted for:

- » 1,285 FTE jobs in Hoboken;
- » Nearly \$99.3 million in wages and salaries; and
- » Nearly \$117.2 million in city-wide economic output.

In Hudson County (including Hoboken), spending by the university, students and visitors directly and indirectly accounted for:

- » 1,665 FTE jobs in Hudson County;
- » Nearly \$117.2 million in wages and salaries; and
- » Nearly \$165.1 million in county-wide economic output.

At the state level, spending by the university, students and visitors directly and indirectly accounted for:

- » 2,316 FTE jobs in New Jersey;
- » Nearly \$154.0 in wages and salaries; and
- » \$272.5 million in statewide economic output.

The impacts of university, student and visitor spending in Hoboken, in Hudson County and in New Jersey are summarized in the tables below.

Stevens Institute of Technology's direct, indirect and induced impact in Hoboken, FY 2014 (*jobs in FTE, wages and output in \$000s*)

	Jobs	Wages	Output
Impact of university spending			
Direct	1,124	\$92,583.9	\$99,592.5
Indirect/induced	52	\$2,743.0	\$7,492.4
<i>Total, university spending</i>	<i>1,176</i>	<i>\$95,326.9</i>	<i>\$107,445.0</i>
Impact of student spending			
Direct	80	\$2,651.9	\$6,698.2
Indirect/induced	12	\$681.5	\$1,780.6
<i>Total, student spending</i>	<i>92</i>	<i>\$3,333.4</i>	<i>\$8,478.8</i>
Impact of visitor spending			
Direct	15	\$492.4	\$949.6
Indirect/induced	2	\$115.5	\$301.5
<i>Total, visitor spending</i>	<i>17</i>	<i>\$607.9</i>	<i>\$1,251.1</i>
TOTAL ECONOMIC IMPACT	1,285	\$99,268.2	\$117,174.8

Stevens Institute of Technology's direct, indirect and induced impact in Hudson County, FY 2014 (jobs in FTE, wages and output in \$000s)

	Jobs	Wages	Output
Impact of university spending			
Direct	1,147	\$94,127.3	\$103,094.9
Indirect/induced	192	\$11,104.3	\$29,751.5
<i>Total, university spending</i>	<i>1,339</i>	<i>\$105,231.6</i>	<i>\$132,846.4</i>
Impact of student spending			
Direct	226	\$6,554.4	\$18,821.5
Indirect/induced	63	\$3,868.9	\$10,144.8
<i>Total, student spending</i>	<i>289</i>	<i>\$10,423.3</i>	<i>\$28,966.3</i>
Impact of visitor spending			
Direct	29	\$984.8	\$1,899.2
Indirect/induced	8	\$526.1	\$1,359.2
<i>Total, visitor spending</i>	<i>37</i>	<i>\$1,510.9</i>	<i>\$3,258.4</i>
TOTAL ECONOMIC IMPACT	1,665	\$117,165.9	\$165,071.1

Stevens Institute of Technology's direct, indirect and induced impact in New Jersey, FY 2014 (jobs in FTE, wages and output in \$000s)

	Jobs	Wages	Output
Impact of university spending			
Direct	1,322	\$107,290.0	\$133,295.3
Indirect/induced	527	\$30,368.8	\$88,707.7
<i>Total, university spending</i>	<i>1,849</i>	<i>\$137,658.8</i>	<i>\$222,003.0</i>
Impact of student spending			
Direct	338	\$9,189.2	\$31,264.9
Indirect/induced	92	\$5,601.9	\$16,006.9
<i>Total, student spending</i>	<i>430</i>	<i>\$14,791.1</i>	<i>\$47,271.7</i>
Impact of visitor spending			
Direct	29	\$984.8	\$1,899.2
Indirect/induced	8	\$526.1	\$1,359.2
<i>Total, visitor spending</i>	<i>37</i>	<i>\$1,510.9</i>	<i>\$3,258.4</i>
TOTAL ECONOMIC IMPACT	2,316	\$153,960.9	\$272,533.2

Developing human capital

In an increasingly knowledge-driven economy, human capital – the totality of knowledge, skills and experience accumulated over time by a community's or a region's workforce – plays a central role in determining whether cities and states flourish or falter economically. Stevens has long been a major contributor to the development of New Jersey's human capital, especially in science, engineering and technology.

- In the fall of 2014, Stevens enrolled:
 - » 2,892 full- and part-undergraduate students, of whom 65.9 percent were New Jersey residents; and
 - » 3,233 full- and part-time graduate students, of whom 11.4 percent were New Jersey residents.
- Stevens is notable for the extent to which on-campus learning is combined with opportunities to gain practical experience.
 - » In the fall of 2014, 926 undergraduate and graduate students participated in the university's cooperative education program. The majority of co-op students worked for companies in the tri-state metropolitan area.
 - » In the summer of 2014, 341 Stevens students worked as interns – nearly half of them with New Jersey companies.
- Stevens is a major source of engineering and other technical talent for New Jersey. In 2012-2013, Stevens ranked:
 - » Third among all New Jersey colleges and universities in the number bachelor's degrees awarded in engineering; and
 - » First in the number of engineering graduate degrees awarded.
- In 2012-2013, Stevens accounted for 35.4 percent (504 of 1,423) of all graduate and professional degrees in engineering awarded in New Jersey.
- The Office of Career Development reports that 48 percent of all those who graduated from Stevens in 2014 took jobs or are continuing their education in New Jersey.
- As of the summer of 2014, 53.7 percent of all Stevens alumni whose addresses are known – more than 16,600 Stevens graduates – lived in New Jersey.
- According to PayScale's annual report on the earnings of college graduates of more than 1,000 U.S. colleges and universities, in 2014-15 Stevens:
 - » Ranked 3rd in the U.S. when measured by students' return on investment, with an average net return after thirty years (after taking financial aid into account) of \$841,000;
 - » Ranked 10th out of more than 1,000 colleges and universities in the U.S., measured by the average starting salary of its graduates (\$65,300); and
 - » Ranked 12th in the U.S. when measured by the average salary of its graduates at mid-career (\$118,700).

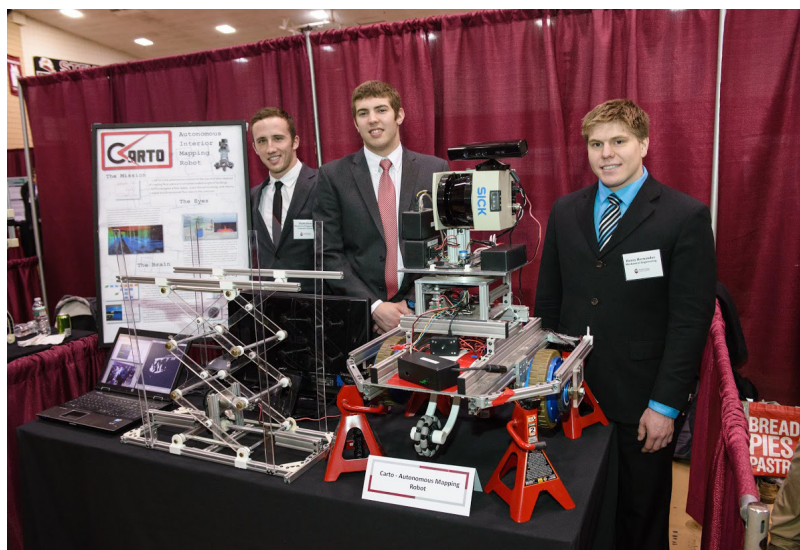
Stevens is one of only five institutions in the U.S. (along with Harvey Mudd College, the California Institute of Technology, MIT and Stanford) that rank among the top twelve on all three of these measures.

Research, technology transfer and business development

Since the mid-twentieth century, university research has been an important source of economic growth in the United States. Stevens is one of New Jersey's leading research universities – and just as important, a leader in translating the results of university research into new products, processes and services, new businesses and new jobs.

- During fiscal year 2014, research spending at Stevens totaled \$28.2 million, 86.5 percent of which was funded by federal agencies. State and local governments accounted for 6.6 percent; corporate partners and foundations accounted for 6.0 percent.
- The university's research enterprise is especially strong in several areas that are of particular importance to the New Jersey economy and to New Jersey communities, including:
 - » The security and resilience of maritime commerce;
 - » Marine and coastal engineering;
 - » Health systems analysis and health information technology;
 - » Information security; and
 - » Environmental sustainability and resilience.
- In recent years Stevens has significantly increased the rate at which the results of university research are made available for commercial use, providing a basis for development of new products, new businesses and new jobs.
 - » The number of invention disclosures filed by researchers at Stevens rose from 18 in fiscal year 2008 to 40 in fiscal year 2014;
 - » The number of new patent applications filed rose from 13 in fiscal year 2008 to 20 in fiscal year 2014; and

- » The number of new ventures started for the purpose of further developing and bringing to market technologies first developed at Stevens rose from 2 in fiscal year 2008 to 5 in fiscal year 2014.



Serving the community

- Since 1988, the university's Center for Innovation in Engineering and Science Education (CIESE) has secured grants totaling \$50 million to support programs aimed at improving science, math and engineering education, both in New Jersey and elsewhere.

Since its founding, CIESE's professional development programs have served 30,000 teachers throughout New Jersey (and more than 250 in Hoboken alone), in 22 other states and in a dozen foreign countries. CIESE has worked with school districts, school administrators and teachers in every county in New Jersey.

- Stevens periodically makes its facilities available for a variety of community uses, including municipal, civic and non-profit organization events, small business innovation programming, graduation and school programs, and others.
- Stevens and the City of Hoboken are collaborating on a three-year project called Smart City that will use information and communications technology to more effectively address a wide range of infrastructure, sustainability, and resiliency challenges facing the city and its residents.
- Stevens is deeply involved in efforts to help New York and New Jersey shore communities recover from the effects of Hurricane Sandy and to better equip them against future extreme weather events.
 - » In the aftermath of Hurricane Sandy, 300 Stevens students performed more than 2,000 hours of volunteer work in Hoboken and other affected communities.

- » The Stevens Center for Maritime Systems is working alongside several state and national agencies to help develop new solutions and technology to mitigate the effects of future extreme weather events on coastal urban infrastructure.
- » The SURE HOUSE, Stevens' U.S. Department of Energy Solar Decathlon 2015 entry, is a sustainable and resilient home designed for areas at greatest risk due to rising sea-levels and more damaging storms. The SURE HOUSE uses state of the art building science, the latest renewable energy technologies, and fiber-composite materials repurposed from the boat building industry for a design that armors against extreme weather, uses 90% less energy than conventional shore homes, is fully solar powered, and becomes a hub for emergency power in the aftermath of a storm.



A growing impact

During the next five to ten years, the university's economic impact is likely to be greater than it is today. This increased impact will result from:

- A projected increase in undergraduate enrollment from 2,548 in 2012-2013 to approximately 4,000 in 2022-23 (an increase of approximately 36 percent over 10 years) and graduate student enrollment of 2,958 to approximately 3,600 over the same time period, an increase of approximately 20 percent over 10 years);¹
- Projected growth in research spending, from \$28.2 million in fiscal year 2014 to \$80 million annually;
- A heightened emphasis on teaching innovation and entrepreneurship; and
- A projected investment of as much as \$300 million in campus facilities during the next five years.

These factors combined will help ensure that Stevens Institute of Technology continues to be a major contributor to the economic vitality of the City of Hoboken, the State of New Jersey and the New York-New Jersey region.

1. Total enrollment growth (undergraduate plus graduate) between 2012-13 and 2022-23 is estimated at 38 percent, or 5,506 students in 2012-13 vs. 7,600 in 2022-23.





INTRODUCTION & OVERVIEW

Stevens Institute of Technology is an independent, not-for-profit research university located in Hoboken, New Jersey. Founded in 1870, Stevens was the first college in the U.S. dedicated to mechanical engineering, and one of the nation's oldest universities specializing in engineering and technological innovation.

Stevens offers bachelor's, master's and doctoral degrees through three schools and one college:

- The Charles V. Schaefer Jr. School of Engineering and Science;
- The Wesley J. Howe School of Technology Management;
- The School of Systems and Enterprises; and
- The College of Arts and Letters.

The university's academic programs include nationally-ranked programs in areas as diverse as marine engineering, financial technology and music and technology; and it was recently ranked third among U.S. colleges and universities when measured by the return its students get on their investment in higher education. The research enterprise at Stevens includes four national centers of excellence – in maritime security and resilience, systems engineering, information security and innovative ship design – and Stevens research in the next decade will focus on areas of societal need: healthcare and medicine; energy; financial systems; and defense and security.

As one of the nation's premier technology universities, a leading educator of undergraduate and graduate engineers and a long-time source of technological innovation, Stevens Institute of Technology has been a major contributor to the economic vitality of the City of Hoboken, Hudson County and the State of New Jersey. To better understand and explain the nature and extent of that contribution, Stevens asked Appleseed – a

consulting firm with extensive experience working with colleges and universities – to assess the university's economic impact. This report presents the results of Appleseed's analysis.

Organization of the report

Part One of the report discusses the university's impact as an enterprise – as a major local employer, a buyer of goods and services and a sponsor of construction projects – as well as the impact of off-campus spending by students. Part Two examines the university's contribution to the development of New Jersey's human capital – the accumulation of skills, knowledge and experience so essential to the continued growth of the state's economy.

Part Three of the report describes Stevens Institute's research enterprise, and discusses how research at Stevens contributes to the vitality of the region's economy; and Part Four highlights the university's role in technological innovation, entrepreneurship and new business development. Part Five describes the university's involvement in efforts to improve elementary and secondary education and to expand educational opportunity, especially in science, technology, engineering and mathematics.

Part Six concludes the report with some brief observations on why Stevens is likely to have an even greater impact on the city's, the region's and the state's economy than it does today.



PART ONE

Stevens as an Enterprise

Stevens Institute of Technology is a significant enterprise in its own right – one of the largest private employers in Hudson County, a buyer of goods and services from companies in Hoboken, Hudson County and elsewhere in New Jersey, and a sponsor of construction projects. This part of the report assesses the university's impact as an enterprise, as well as the impact of off-campus spending by its students and by visitors to Stevens.

Stevens as an employer

In the fall of 2013, Stevens employed a total of 1,046 people, 73.3 percent of whom held full-time positions. In addition to these regular employees, the university also employed 1,051 students in a variety of part-time, on-campus jobs.

As shown in Table 1, Stevens is the fourth-largest employer in Hoboken.

Table 1: Largest employers in Hoboken, by number of local employees

Employer	Number of local employees
John Wiley & Sons	1,519
Marsh U.S.A.	1,500
Hoboken University Medical Center	1,300
Stevens Institute of Technology	1,046
New Jersey Transit	700
Guy Carpenter & Company	250
Academy Bus Tours	250
Mindlance Inc.	225
Starwood Hotels & Resorts	180
Sumitomo Trust & Banking	156

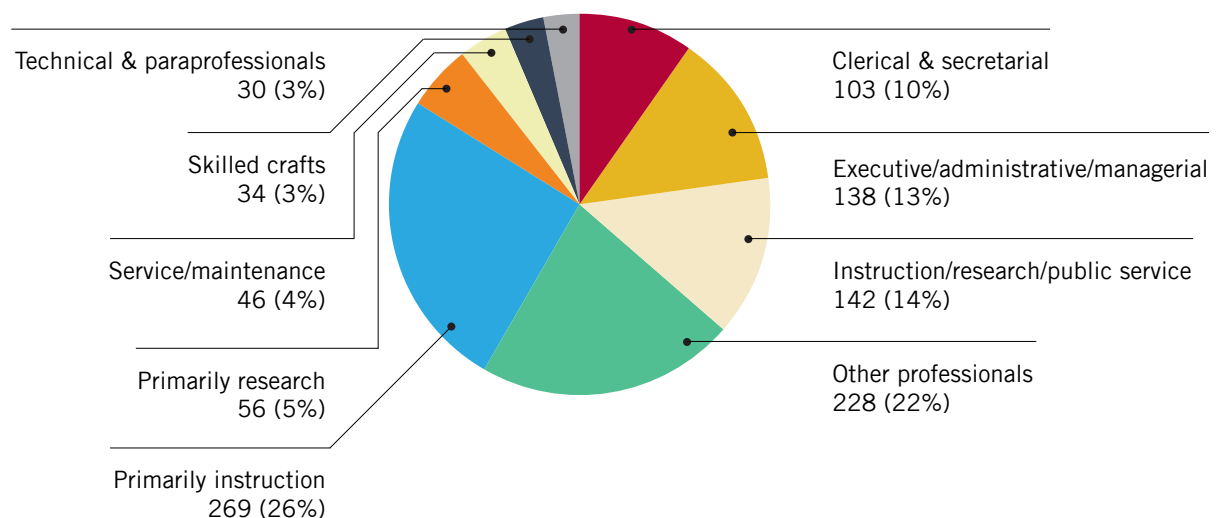
Source: *Hudson County Economic Development Corporation*

Stevens provides employment opportunities across a wide range of occupations. As shown in Figure 1, instructional or research faculty account for approximately 44.6 percent of the university's total non-student employment; other professionals for 21.8 percent; executive and administrative staff for 13.2 percent; clerical and secretarial staff for 9.8 percent; and other technical and support staff for 10.5 percent.

In fiscal year 2014, the university's payroll (gross wages and salaries, including wages paid to part-time student employees) totaled \$87.4 million.



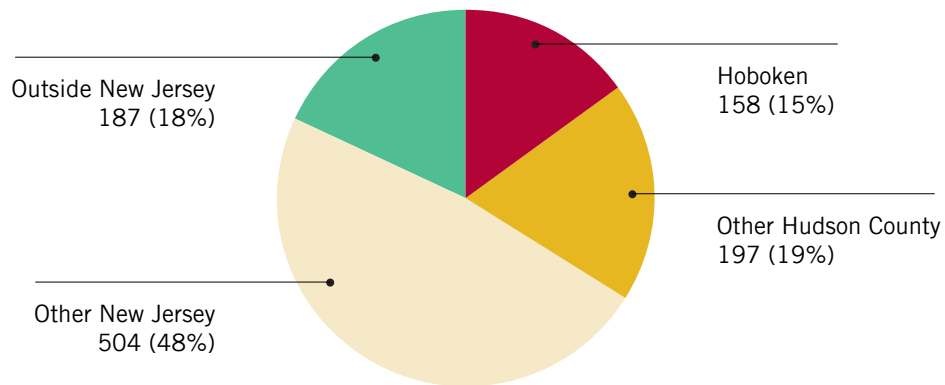
Figure 1: Composition of employment at Stevens by occupational category, fall 2013



Where Stevens employees live

As shown in Figure 2, in the fall of 2013, 158 Stevens employees (excluding students) – 15.1 percent of all non-student employees – lived in Hoboken. An additional 197 (18.8 percent of all non-student employees) lived elsewhere in Hudson County; and 504 (48.2 percent of all non-student employees) lived elsewhere in New Jersey.

Figure 2: Stevens employees by place of residence, fall 2013



The impact of purchasing and construction

In addition to the people it employs directly, Stevens helps to create jobs in Hoboken and elsewhere in the region through its purchases of goods and services from local businesses, and through its investment in campus facilities.

Purchasing

In fiscal year 2014, Stevens spent nearly \$83.2 million on the purchases of goods and services. Of this total (as shown in Figure 3), nearly \$12.8 million (15.4 percent of the total) was spent on goods and services provided by businesses in Hoboken, an additional \$2.9 million was spent on goods and services provided by businesses located elsewhere in Hudson County, and nearly \$29.3 million (35.2 percent) was spent on goods and services provided by businesses located elsewhere in New Jersey.

Leading categories of goods and services that the university purchased from companies located in New Jersey include employee health insurance, professional services, utilities, building maintenance, information technology services, and legal services.

Using the IMPLAN input-output modeling system – a tool for economic modeling commonly used in economic impact analyses – we estimate that in fiscal year 2014, university spending on purchases of goods and services directly supported:

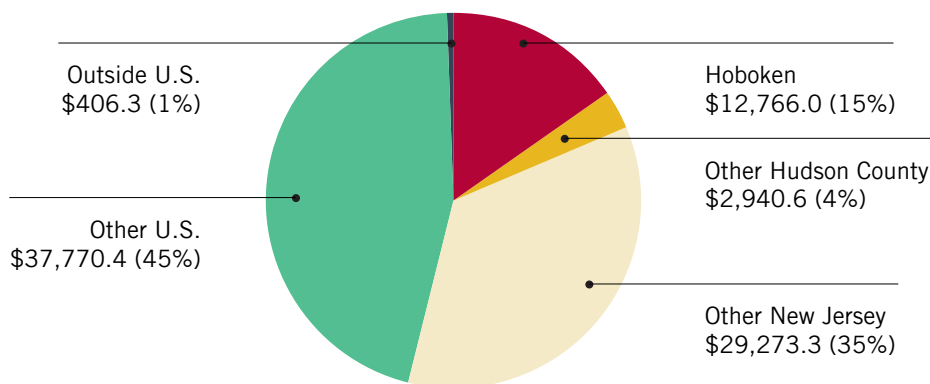
- 78 full-time-equivalent (FTE) jobs in Hoboken;
- 100 FTE jobs in Hudson County (including Hoboken); and
- 261 FTE jobs throughout New Jersey (including Hudson County).

Construction

In addition to its spending on the purchase of goods and services, in fiscal year 2014, Stevens spent \$2.6 million in campus construction and renovation, of which nearly \$2.4 million was paid to contractors located in New Jersey (including more than \$346,500 paid to Hoboken contractors).

Using IMPLAN, we estimate that in fiscal year 2014, university spending on construction directly supported 15 FTE jobs with New Jersey contractors.

Figure 3: Geographic distribution of Stevens spending on goods and services, FY 2014 (in \$000s)



Direct, indirect and induced effects

The economic impact of Stevens Institute goes beyond the direct impact of its spending on payroll, purchasing and construction. It also includes “indirect and induced” or “multiplier” effects. New Jersey companies from which the university buys goods and services use some of the money paid to them by Stevens to buy goods and services from other in-state businesses; and those businesses in turn buy some of what they need from still other New Jersey companies. Similarly, Stevens employees (and the employees of the university’s local suppliers) spend part of their take-home pay within the state – for housing, utilities, food, child care, entertainment and other routine household needs.

Using IMPLAN, we can measure the direct and indirect effects of university spending. Taking into account the university’s direct employment and payroll, jobs with companies directly supported by university purchases of goods, services and construction from those companies, and the indirect and induced effects of university spending on payroll, purchasing and construction, we estimate that in Hoboken, university spending in fiscal year 2014 directly and indirectly accounted for:

- 1,176 FTE jobs in Hoboken;

- \$95.3 million in wages and salaries; and
- \$107.4 million in city-wide economic output.

In Hudson County (including Hoboken), university spending directly and indirectly accounted for:

- 1,339 FTE jobs in Hudson County;
- \$105.2 million in wages and salaries; and
- \$132.8 million in county-wide economic output.

At the state level (including Hudson County), university spending directly and indirectly accounted for:

- 1,849 FTE jobs in New Jersey;
- Nearly \$137.7 million in wages and salaries; and
- More than \$222.0 million in statewide economic output.

Table 2, Table 3 and Table 4 summarize the direct, indirect and induced economic impact of the university’s spending on payroll, purchasing and construction in Hoboken, Hudson County (including Hoboken) and New Jersey (including Hudson County).

Table 2: Direct, indirect and induced impact of Stevens spending in Hoboken, FY 2014 (jobs in FTE, wages and output in \$000s)

	Jobs	Wages	Output
Direct spending impact			
Payroll	1,046	\$87,426.7	\$87,426.7
Purchasing/construction	78	\$5,157.1	\$12,525.8
<i>Subtotal, direct impact</i>	<i>1,124</i>	<i>\$92,583.9</i>	<i>\$99,952.5</i>
Indirect and induced impact			
Employee spending	30	\$1,472.8	\$4,213.7
Contractor and vendor spending	22	\$1,270.2	\$3,278.7
<i>Subtotal, indirect/induced impact</i>	<i>52</i>	<i>\$2,743.0</i>	<i>\$7,492.4</i>
TOTAL IMPACT	1,176	\$95,326.9	\$107,445.0

Table 3: Direct, indirect and induced impact of Stevens spending in Hudson County, FY 2014 (jobs in FTE, wages and output in \$000s)

	Jobs	Wages	Output
Direct spending impact			
Payroll	1,046	\$87,426.7	\$87,426.7
Purchasing/construction	101	\$6,700.6	\$15,668.1
<i>Subtotal, direct impact</i>	<i>1,147</i>	<i>\$94,127.3</i>	<i>\$103,094.9</i>
Indirect and induced impact			
Employee spending	131	\$7,321.5	\$20,099.3
Contractor and vendor spending	61	\$3,782.8	\$9,652.2
<i>Subtotal, indirect/induced impact</i>	<i>192</i>	<i>\$11,104.3</i>	<i>\$29,751.5</i>
TOTAL IMPACT	1,339	\$105,231.6	\$132,846.4

Table 4: Direct, indirect and induced impact of Stevens spending in New Jersey, FY 2014 (jobs in FTE, wages and output in \$000s)

	Jobs	Wages	Output
Direct spending impact			
Payroll	1,046	\$87,426.7	\$87,426.7
Purchasing/construction	276	\$19,863.3	\$45,868.6
<i>Subtotal, direct impact</i>	<i>1,322</i>	<i>\$107,290.0</i>	<i>\$133,295.3</i>
Indirect and induced impact			
Employee spending	352	\$19,744.2	\$58,396.7
Contractor and vendor spending	175	\$10,624.6	\$30,311.0
<i>Subtotal, indirect/induced impact</i>	<i>527</i>	<i>\$30,368.8</i>	<i>\$88,707.7</i>
TOTAL IMPACT	1,849	\$137,658.8	\$222,003.0

Contributing to state and local revenues

Despite its not-for-profit status, Stevens contributes in a variety of ways to state and local government finances. As shown below in Table 5, in fiscal year 2014:

- State income taxes withheld from the salaries and wages of Stevens employees totaled nearly \$3.3 million.
- Stevens paid \$269,449 in unemployment insurance payments.
- Fees paid by Stevens to various state agencies totaled \$358,576.

- Stevens paid \$127,168 in real property taxes on non-tax-exempt property owned or leased by the university, and \$166,877 in other payments to the City of Hoboken.
- The university also paid \$518,876 in fees to the North Hudson Sewerage Authority.

Overall, in fiscal year 2014, Stevens directly accounted for nearly \$3.9 million in New Jersey State taxes and fees and more than \$812,900 in local taxes and fees – a total of \$4.7 million in state and local government revenues.

Table 5: State and local government revenues directly attributable to Stevens, FY 2014

Type of revenue	Amount
State revenues	
State income taxes withheld	\$3,260,921
Unemployment insurance payments	\$269,449
Fees paid to New Jersey state agencies	\$358,576
<i>Total state revenues</i>	<i>\$3,888,945</i>
Local government revenues	
Real property taxes	\$127,168
Other payments to the City of Hoboken	\$166,877
North Hudson Sewerage Authority	\$518,876
<i>Total local government revenues</i>	<i>\$812,920</i>
TOTAL STATE AND LOCAL REVENUES	\$4,701,866

The impact of student and visitor spending

In addition to the impact of its spending on payroll, purchasing and construction, Stevens contributes to the economic vitality of Hoboken and elsewhere in New Jersey through off-campus spending by Stevens students and by out-of-town visitors to the university's campus.

The impact of off-campus student spending

Like the university's own spending, off-campus spending by Stevens students also generates economic activity in Hoboken, Hudson County and elsewhere in New Jersey. Based on information obtained from Stevens on students' living arrangements and on student living costs, we estimate that in fiscal year 2014, off-campus spending by full-time undergraduate and graduate students who came to Stevens from outside Hudson County – for housing, food, personal services, transportation, entertainment and other purposes – totaled more than \$19.4 million in Hudson County, including \$7.1 million in Hoboken.

Using IMPLAN, we estimate that in fiscal year 2014, off-campus spending by students from outside Hudson County who reside in Hoboken directly and indirectly accounted for:

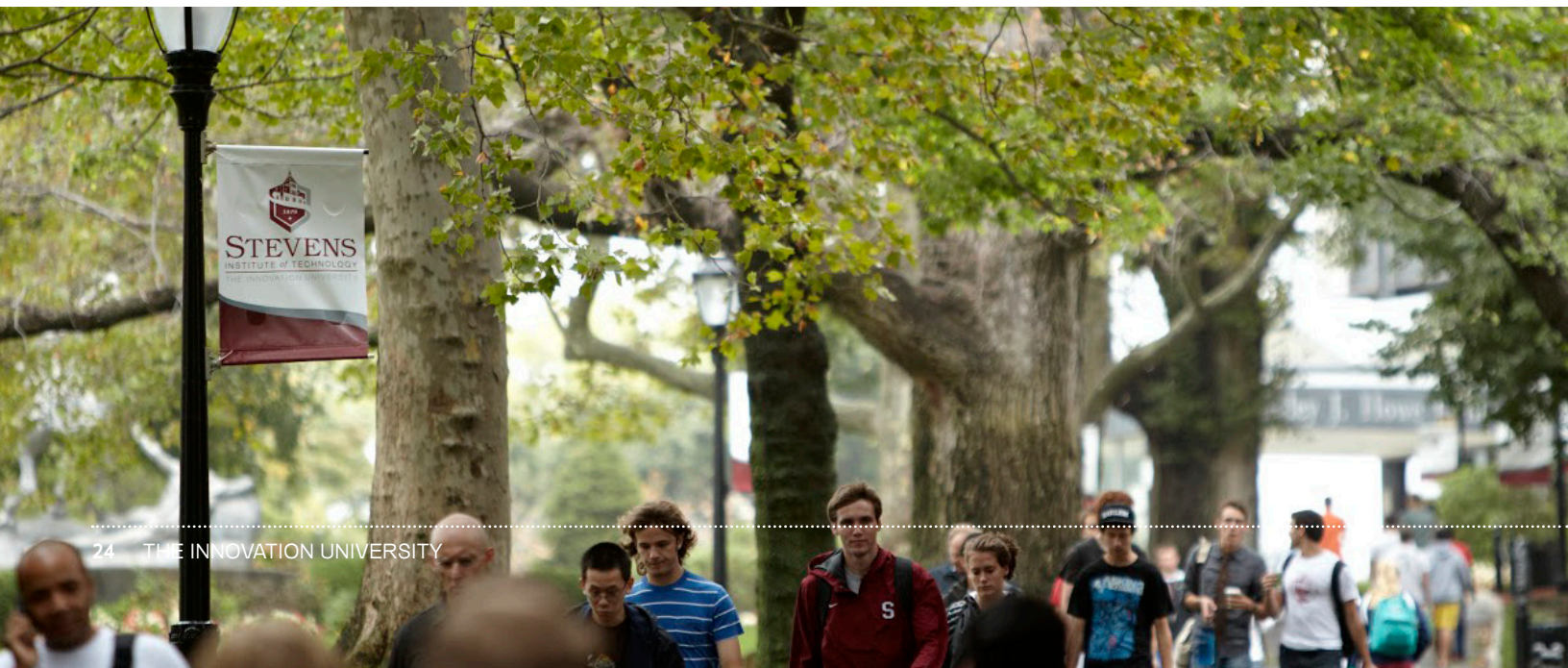
- 92 FTE jobs in Hoboken;
- \$3.3 million in wages and salaries; and
- Nearly \$8.5 million in city-wide economic output.

In Hudson County (including Hoboken), off-campus spending by students from outside Hudson County who reside in the county directly and indirectly accounted for:

- 289 FTE jobs in Hudson County;
- \$10.4 million in wages and salaries; and
- Nearly \$29.0 million in county-wide economic output.

At the state level, off-campus spending by students from outside of New Jersey directly and indirectly accounted for:

- 430 FTE jobs in New Jersey;
- Nearly \$14.8 million in wages and salaries; and
- Nearly \$47.3 million in statewide economic output.



The direct, indirect and induced economic impact of off-campus student spending in Hoboken, Hudson County (including Hoboken) and New Jersey are summarized below in Table 6.

The impact of visitor spending

Spending by visitors to Stevens – high school students and their parents on pre-admission visits to the university, participants in academic conferences, commencement guests, fans of visiting athletic teams and others – also benefits the Hudson County economy. We estimate that in fiscal year 2014, visitors from outside Hudson County spent \$2.1 million in Hudson County, including nearly \$1.1 million in Hoboken.

Using IMPLAN, we estimate that in fiscal year 2014, spending by visitors from outside Hudson County directly and indirectly accounted for:

- 17 FTE jobs in Hoboken;
- More than \$607,900 in wages and salaries; and
- Nearly \$1.3 million in city-wide economic output.

In Hudson County (including Hoboken), spending by visitors from outside Hudson County directly and indirectly accounted for:

- 38 FTE jobs in Hudson County;
- \$1.5 million in wages and salaries; and
- Nearly \$3.3 million in county-wide economic output.

Table 6: Direct, indirect and induced impact of off-campus student spending in Hoboken, Hudson County and New Jersey, FY 2014 (jobs in FTE, wages and output in \$000s)

	Jobs	Wages	Output
Hoboken			
Direct	80	\$2,651.9	\$6,698.2
Indirect/induced	12	\$681.5	\$1,780.6
<i>Total impact in Hoboken</i>	<i>92</i>	<i>\$3,333.4</i>	<i>\$8,478.8</i>
Hudson County			
Direct	226	\$6,554.4	\$18,821.5
Indirect/induced	63	\$3,868.9	\$10,144.8
<i>Total impact in Hudson County</i>	<i>289</i>	<i>\$10,423.3</i>	<i>\$28,966.3</i>
New Jersey			
Direct	338	\$9,189.2	\$31,264.9
Indirect/induced	92	\$5,601.9	\$16,006.9
<i>Total impact in New Jersey</i>	<i>430</i>	<i>\$14,791.1</i>	<i>\$47,271.7</i>

Adding it all up

Combining the impacts of university, student and visitor spending, we estimate that in fiscal year 2014, Stevens directly and indirectly accounted for:

- 1,285 FTE jobs in Hoboken;
- Nearly \$99.3 million in wages and salaries; and
- Nearly \$117.2 million in city-wide economic output.

In Hudson County (including Hoboken), university, student and visitor spending directly and indirectly accounted for:

- 1,666 FTE jobs in Hudson County;
- Nearly \$117.2 million in wages and salaries; and
- Nearly \$165.1 million in county-wide economic output.

At the state level, university, student and visitor spending directly and indirectly accounted for:

- 2,316 FTE jobs in New Jersey;
- Nearly \$154.0 million in wages and salaries; and
- \$272.5 million in statewide economic output.

These combined impacts in Hoboken, Hudson County and New Jersey are summarized below in Tables 7, 8 and 9.

Table 7: Stevens' economic impact in Hoboken, FY 2014 (*jobs in FTE, wages and output in \$000s*)

	Jobs	Wages	Output
Impact of university spending			
Direct	1,124	\$92,583.9	\$99,592.5
Indirect/induced	52	\$2,743.0	\$7,492.4
<i>Total, university spending</i>	<i>1,176</i>	<i>\$95,326.9</i>	<i>\$107,445.0</i>
Impact of student spending			
Direct	80	\$2,651.9	\$6,698.2
Indirect/induced	12	\$681.5	\$1,780.6
<i>Total, student spending</i>	<i>92</i>	<i>\$3,333.4</i>	<i>\$8,478.8</i>
Impact of visitor spending			
Direct	15	\$492.4	\$949.6
Indirect/induced	2	\$115.5	\$301.5
<i>Total, visitor spending</i>	<i>17</i>	<i>\$607.9</i>	<i>\$1,251.1</i>
TOTAL ECONOMIC IMPACT	1,285	\$99,268.2	\$117,174.8

Table 8: Stevens' economic impact in Hudson County, FY 2014 (*jobs in FTE, wages and output in \$000s*)

	Jobs	Wages	Output
Impact of university spending			
Direct	1,147	\$94,127.3	\$103,094.9
Indirect/induced	192	\$11,104.3	\$29,751.5
<i>Total, university spending</i>	<i>1,339</i>	<i>\$105,231.6</i>	<i>\$132,846.4</i>
Impact of student spending			
Direct	226	\$6,554.4	\$18,821.5
Indirect/induced	63	\$3,868.9	\$10,144.8
<i>Total, student spending</i>	<i>289</i>	<i>\$10,423.3</i>	<i>\$28,966.3</i>
Impact of visitor spending			
Direct	29	\$984.8	\$1,899.2
Indirect/induced	8	\$526.1	\$1,359.2
<i>Total, visitor spending</i>	<i>37</i>	<i>\$1,510.9</i>	<i>\$3,258.4</i>
TOTAL ECONOMIC IMPACT	1,665	\$117,165.9	\$165,071.1

Table 9: Stevens' economic impact in New Jersey, FY 2014 (*jobs in FTE, wages and output in \$000s*)

	Jobs	Wages	Output
Impact of university spending			
Direct	1,322	\$107,290.0	\$133,295.3
Indirect/induced	527	\$30,368.8	\$88,707.7
<i>Total, university spending</i>	<i>1,849</i>	<i>\$137,658.8</i>	<i>\$222,003.0</i>
Impact of student spending			
Direct	338	\$9,189.2	\$31,264.9
Indirect/induced	92	\$5,601.9	\$16,006.9
<i>Total, student spending</i>	<i>430</i>	<i>\$14,791.1</i>	<i>\$47,271.7</i>
Impact of visitor spending			
Direct	29	\$984.8	\$1,899.2
Indirect/induced	8	\$526.1	\$1,359.2
<i>Total, visitor spending</i>	<i>37</i>	<i>\$1,510.9</i>	<i>\$3,258.4</i>
TOTAL ECONOMIC IMPACT	2,316	\$153,960.9	\$272,533.2



PART TWO

Developing Human Capital

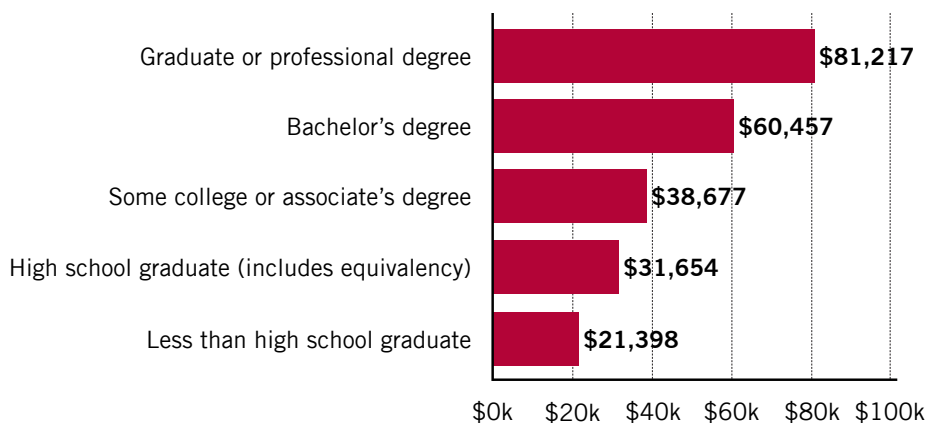
Human capital – the totality of knowledge, skills and experience accumulated over time by a community’s or a region’s workforce – plays a central role in determining whether cities and states flourish or falter economically. Human capital can be especially critical in determining how quickly and how successfully states can adapt to changes in the broader economic environment.

One of the most important measures of human capital is the level of education achieved by a city’s or a state’s residents. At the individual level, workers with college degrees earn significantly more than those with only a high school education (or less). As shown in Figure 4, the median annual earnings of adult New Jersey residents who had completed four-year college degrees were 91.0 percent higher in 2013 than the median earnings of those who had only a high school diploma; and the median earnings of those

with graduate or professional degrees were 156.6 percent higher than the earnings of those with no education beyond high school.

The economic benefits of higher education are not limited to those who earn degrees. A study published by the Milken Institute in 2013 found that in U.S. metropolitan areas, increasing employed workers’ average years of schooling by one year increased regional GDP per capita by 10.5 percent and increased average real wages by 8.4 percent.

Figure 4: Median earnings (in 2013 inflation adjusted dollars) by educational attainment for residents 25 years and older in New Jersey, 2013



Source: 2013 American Community Survey (1-Year Estimates), Social Explorer

Higher education was found to have an even greater impact than education generally: Adding one year of schooling to the educational attainment of workers who already had a high school diploma increased average GDP per capita by 17.4 percent and average real wages by 17.8 percent.²

Non-college educated workers also benefit from these spillover effects. University of California economist Enrico Moretti has shown that “the earnings of a worker with a high school education rise by about 7 percent as the share of college graduates in his [metropolitan area] increases by 10 percent.”³

2. Ross de Vol et al., *A Matter of Degrees: The Effect of Educational Attainment on Regional Economic Prosperity*. The Milken Institute, February 2013, p.1.

3. Enrico Moretti, *The New Geography of Jobs* (Houghton Mifflin Harcourt, 2012), p. 98.

This part of the report:

- Provides some basic information about Stevens students and alumni;
- Highlights the university’s role in engineering education in New Jersey;
- Describes programs and practices that help prepare students for successful careers, and help to make Stevens graduates effective contributors to the success of the companies that employ them; and
- Highlights the impact of a Stevens education on the earnings of the university’s graduates.



Student enrollment at Stevens

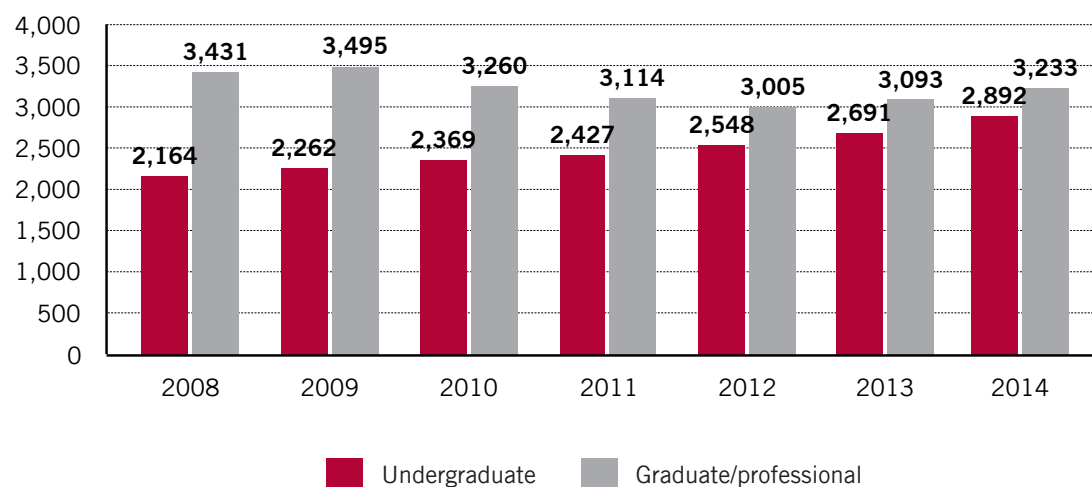
During the fall of 2014, 6,125 students were enrolled at Stevens, including 2,892 undergraduates and 3,233 graduate students. As shown in Table 10, 81.6 percent of all Stevens undergraduates were enrolled in the School of Engineering and Science and 10.8 percent were enrolled in the School of Technology Management. Among graduate students, 50.8 percent were enrolled in the School of Engineering and Science, 27.9 percent in the School of Technology Management and 21.1 percent in the School of Systems and Enterprises.

Between the fall of 2008 and the fall of 2004, total enrollment at Stevens rose by 9.5 percent – an increase of 530 students. However, as Figure 5 shows, this overall increase masked divergent trends, as undergraduate enrollment grew by 33.6 percent (an increase of 728 students), while graduate enrollment fell by 5.8 percent (a decline of 198 students) during that same period.

Table 10: Undergraduate and graduate enrollment at Stevens by school, fall 2014

School/College	Undergraduate	Graduate/ Professional
Schaefer School of Engineering and Science	2,359	1,688
School of Systems and Enterprises	82	832
Howe School of Technology Management	311	909
College of Arts and Letters	90	4
Undecided	50	–
TOTAL	2,892	3,233

Figure 5: Undergraduate and graduate enrollment at Stevens, fall 2008 – fall 2014

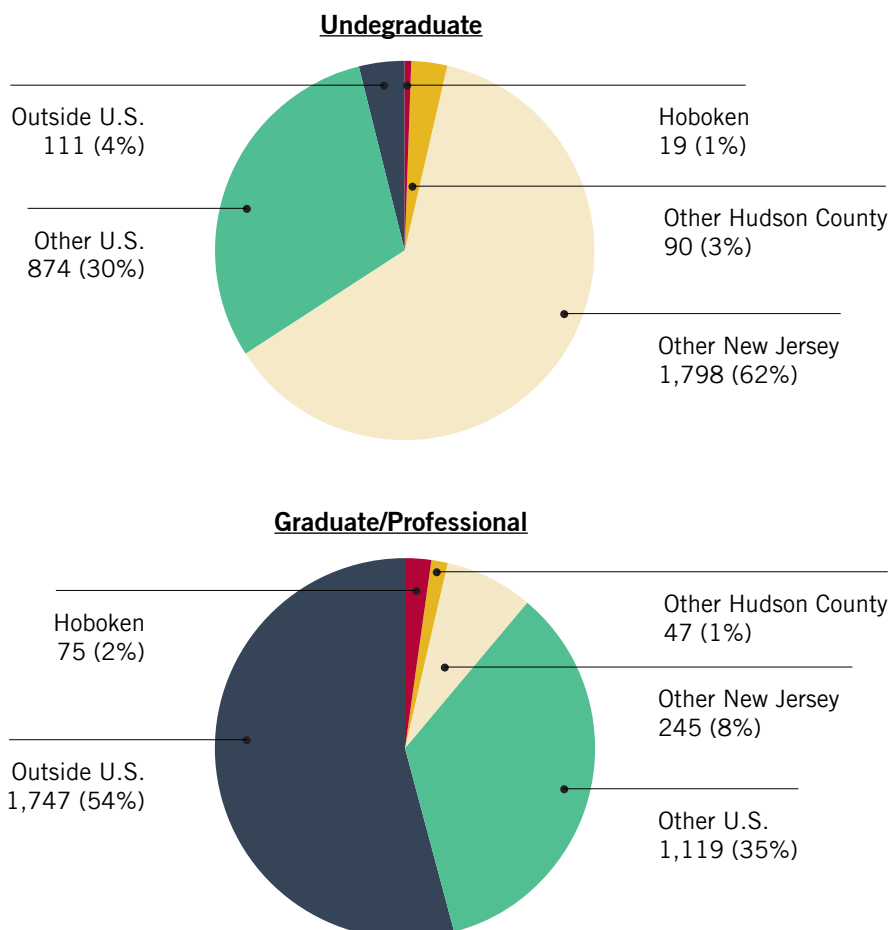


In the fall of 2014, 1,907 Stevens undergraduates – 65.9 percent of total undergraduate enrollment – were residents of New Jersey, and 367 Stevens graduate students – 11.4 percent of total graduate enrollment – were residents of New Jersey. Figure 6 shows the distribution of Stevens undergraduate and graduate/professional students by place of residence.

In 2013-2014, Stevens awarded 555 undergraduate degrees, 1,390 graduate and professional degrees and 506 graduate certificates. About 60.4 percent of all undergraduate degrees and 26.1 percent of all graduate and professional degrees and certificates were awarded to residents of New Jersey.

(Although most students come to Stevens from elsewhere in New Jersey or other states or countries, the majority of them live in the local area while they are enrolled at the university, with approximately 64.4 percent residing either on campus or elsewhere in Hudson County. These students thus contribute substantially, as described in Part One, to the impact of student spending on the local economy.)

Figure 6: Total enrollment by student's permanent place of residence, fall 2014



The role that Stevens plays in the development of New Jersey's human capital –especially in engineering – is evident in statewide statistics. According to data published by the U.S. Department of Education (as shown in Table 11), in 2012-2013, Stevens ranked:

- Third among all New Jersey colleges and universities in the number of bachelor's degrees awarded in engineering; and
- First in the number of engineering graduate degrees awarded.

In 2012-2013, Stevens accounted for 35.4 percent (504 of 1,423) of all graduate and professional degrees in engineering awarded in New Jersey.⁴

4. IPEDS

Financial aid that the university provides from its own resources helps to ensure that New Jersey students can get access to the educational opportunities Stevens offers. In fiscal year 2014, Stevens provided nearly \$44.3 million in financial aid to undergraduate students, including more than \$1.0 million to students from Hoboken and more than \$31.7 million to students from other New Jersey communities.

In addition, in fiscal year 2014, Stevens provided \$5.5 million in financial aid to graduate and professional students, including \$1.1 million to students from Hoboken and more than \$662,300 to students from other New Jersey communities.

Table 11: Undergraduate and graduate degrees in engineering awarded by New Jersey institutions, 2012-13

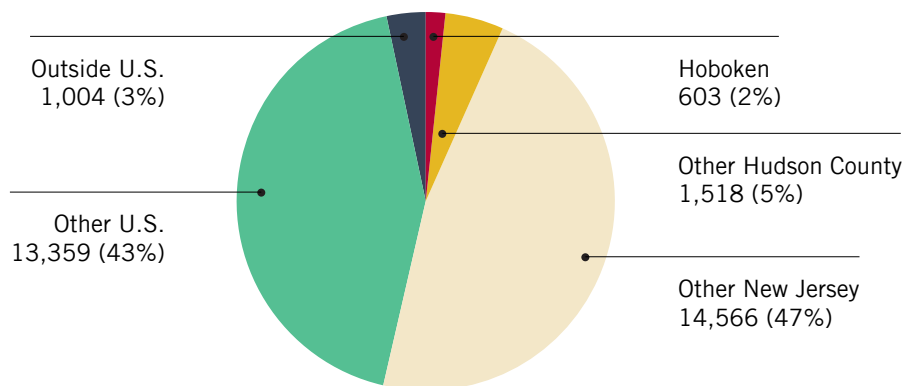
Rank	Undergraduate	Degrees awarded	Rank	Graduate/Professional	Degrees awarded
1	Rutgers University – New Brunswick	659	1	Stevens Institute of Technology	504
2	New Jersey Institute of Technology	411	2	New Jersey Institute of Technology	439
3	Stevens Institute of Technology	330	3	Princeton University	206
4	Princeton University	249	4	Rutgers University – New Brunswick	199
5	Rowan University	134	5	University of Medicine and Dentistry of New Jersey	31
6	The College of New Jersey	108	6	Rowan University	20
7	Monmouth University	11	7	Fairleigh Dickinson University – Metropolitan Campus	13
8	Fairleigh Dickinson University – Metropolitan Campus	4	8	Monmouth University	11
TOTAL		1,906			1,423

Source: *Institute of Education Sciences (IPEDS)*

Where Stevens alumni live

The majority of Stevens students remain in New Jersey after they graduate. As of the summer of 2014, 53.7 percent of all Stevens alumni whose addresses are known – more than 16,600 Stevens graduates – lived in New Jersey. This total included (as shown in Figure 7) 603 Stevens alumni who lived in Hoboken and 1,518 who lived elsewhere in Hudson County.

Figure 7: Stevens alumni by place of residence (for alumni whose addresses are known), as of summer 2014



Preparing students for tomorrow's economy

As one of the nation's leading technological universities, Stevens prepares students to work in professions and industries that are at the core of New Jersey's economy today, and that could play a key role in its development during the next decade. Here we cite just a few examples.

- Combining studies in biology and physiology with fundamentals of engineering, the university's undergraduate degree in **Biomedical Engineering** prepares students to meet the challenge of using the concepts and tools of engineering to solve problems affecting human and other living systems.
- Undergraduate students in mechanical engineering can choose a concentration in **Pharmaceutical Manufacturing**, with courses in topics such as pharmaceutical production systems, and the regulatory framework with which drugs are produced.
- The Stevens undergraduate program in **Cybersecurity** combines studies in mathematics and computer science with more specialized courses on topics such as cryptography, information security and network forensics. Recent incidents in the news such as breaches at Target and Sony have made graduates with cybersecurity degrees extremely marketable.
- The College of Arts and Letters at Stevens offers a bachelor's degree in **Music and Technology** that combines courses in music theory, history and composition and the development of proficiency with specific instruments with the study of sound design, production, the development of music software and the impact of technological innovation on music. In 2013 this program was ranked second among U.S. colleges and universities in The Best Colleges ranking of most innovative college music programs.

The range of programs offered at the graduate level is similarly broad.

- Stevens offers a master's degree in **Maritime Systems**, designed to prepare students for the complex technological, environmental, economic and management challenges facing the maritime transportation industry. The program combines a comprehensive overview of the industry with an opportunity to specialize in areas such as maritime structures, the marine environment and management of maritime transportation.
- While working toward a master's degree in **Game Design and Simulation**, students acquire skills in interactive game design and development, graphics and animation. Graduates of this program can pursue careers in electronic gaming, but also in the use of simulation and visualization techniques in research, education, industry and government.
- Through a collaboration between the Howe School of Technology Management and the School of Systems and Enterprises, Stevens offers an **MBA with a Concentration in Systems Engineering**, combining the technical and quantitative elements of systems engineering with more traditional elements of graduate business education.
- The university's master's degree in **Financial Engineering** responds to a growing demand for graduates who are trained in the use of mathematics and computer technology to address complex problems in finance. In 2009, Stevens also introduced the nation's first PhD program in financial engineering.

Education through experience

Stevens is also notable for the extent to which it offers opportunities for students to combine classroom learning with practical experience. Perhaps the most notable example is the university's Cooperative Education program – a five-year undergraduate degree program, established in 1986, that combines on-campus learning with full-time paid work. Students spend their first two semesters on-campus, then alternate between on-campus studies and full-time employment for three years, and spend their final academic year back on campus.

From 25 students in its first year, the program has grown to include 883 undergraduate students in fall 2014 (more than 30.5 percent of all undergraduate students). The percentage of Stevens undergraduates participating in Cooperative Education compares favorably with those at several other institutions with highly-regarded co-op programs – higher, for example, than the rate of undergraduate student participation at Georgia Tech, the University of Cincinnati and Rensselaer Polytechnic Institute.

The companies that employ co-op students range from technology start-ups to established engineering firms to major global companies such as Nasdaq, Johnson & Johnson and Verizon – most located in the New York-New Jersey metropolitan area. To ensure that students' employment complements their academic work, managers sign a "learning agreement" that specifies the skills and knowledge that students should acquire on the job, and regularly submit reports on their progress to the university's Office of Cooperative Education.

Co-op students' wages in 2013-14 ranged from \$12.16 to \$29.85 per hour, with an average salary of \$17.10. Even more important than their earnings, however, is the practical experience they gain, and the advantage that experience provides when they enter the job market.



The value of a Stevens education

Stevens students also gain practical experience through summer internships. During the summer of 2014 (as shown in Figure 8), 341 students (about 13 percent of enrolled undergraduate students) completed full-time internships. Approximately 47 percent of these internships were with New Jersey companies, 36 percent were in New York and 17 percent were elsewhere. The financial services industry accounted for the largest share of internships (30 percent), followed by manufacturing and pharmaceuticals (16 percent), technology and telecommunications (13 percent) and engineering services (10 percent).

The relatively slow job growth that has characterized America's recovery from the financial crisis and recession of 2008-09 is in part a result of employers having become much more cautious about adding to their payrolls. In this environment, hiring managers are more than ever looking for job candidates who are ready from day one to contribute to their companies' success – giving students who have gained experience in co-op employment or internships a valuable edge.

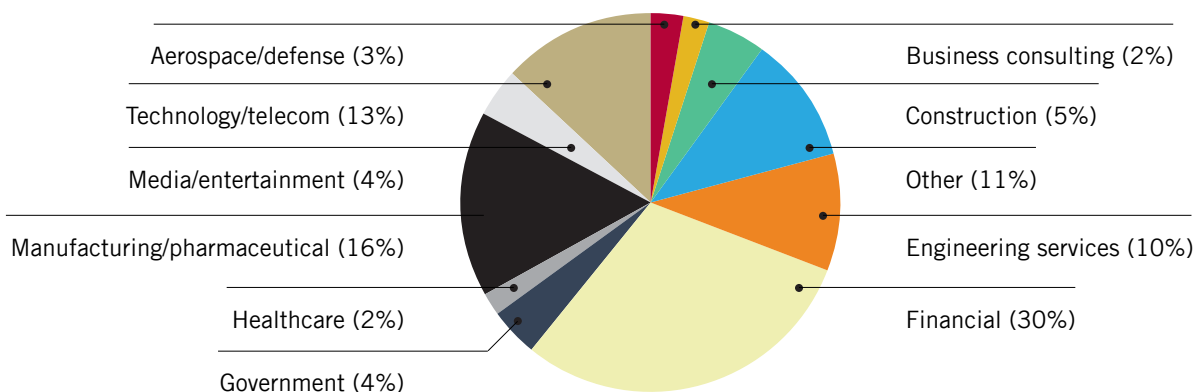
The value of the education that Stevens provides is evident from the earnings of the university's graduates. According to PayScale's annual reports on the earnings of college graduates of more than 1,000 U.S. colleges and universities, Stevens in 2014:

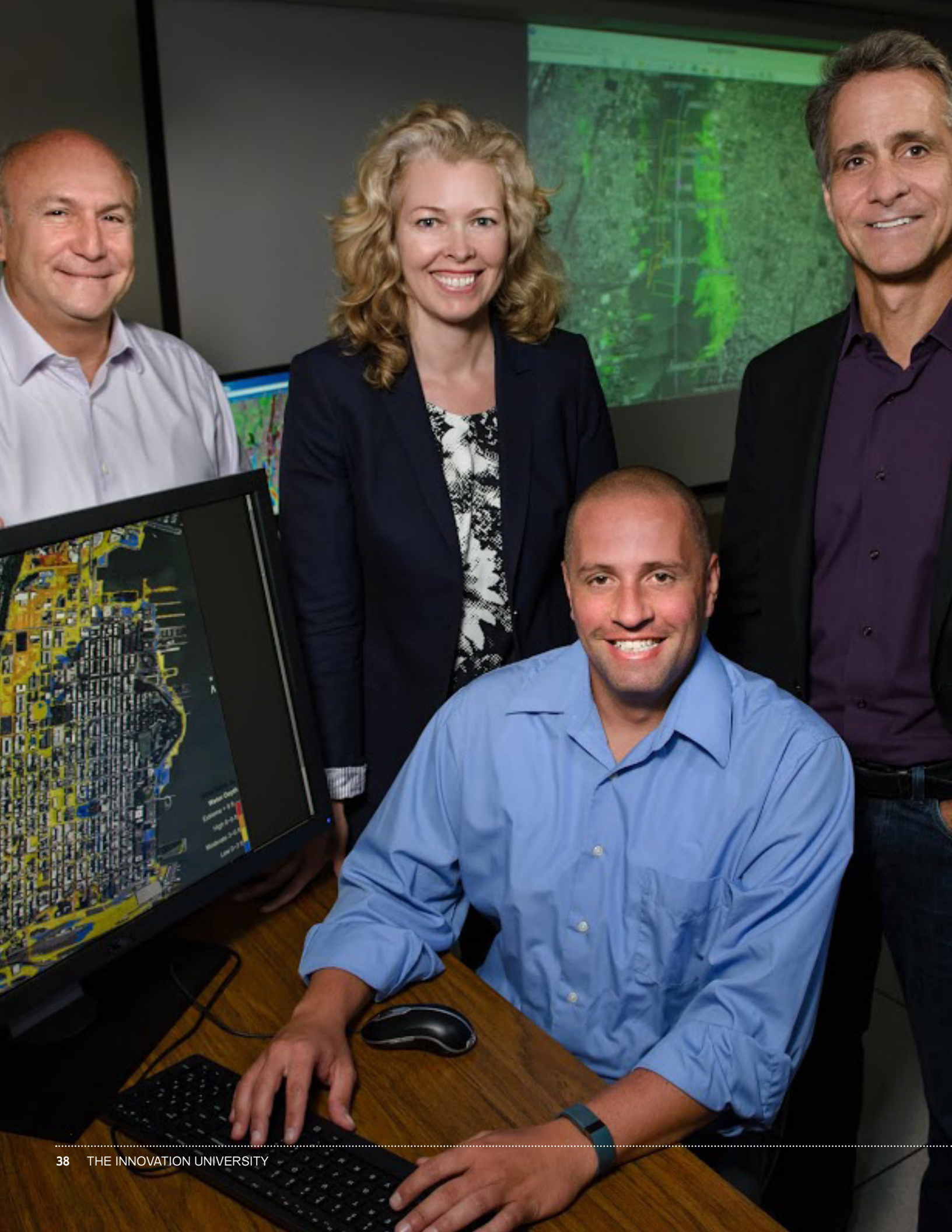
- Ranked 3rd in the U.S. when measured by students' return on investment, with an average net return after twenty years (after taking financial aid into account) of \$841,000⁵;
- Ranked 10th out of more than 1,000 colleges and universities in the U.S., measured by the average starting salary of its graduates (\$65,300); and
- Ranked 12th in the U.S. when measured by the average salary of its graduates at mid-career (\$118,700).

Stevens is one of only five institutions in the U.S. (along with Harvey Mudd College, the California Institute of Technology, MIT and Stanford) that rank among the top twelve on all three of these measures.

5. PayScale, *2014-2015 College Salary Report*; 2015 College ROI Report.

Figure 8: Distribution of undergraduate summer internships by industry, 2014





PART THREE

The Impact of Stevens Research

Since the mid-twentieth century, university research has been an important source of economic growth in the United States. Universities – with strong financial support from the federal government – account for about 55 percent of all spending on basic scientific research in the U.S.⁶

6. The Science Coalition, *Sparking Economic Growth*, April 2010, p. 3.

Scientific discovery, however, does not by itself drive growth. Economic growth occurs only as new knowledge is translated into new technologies, and new products, processes and services – and then into new businesses and new jobs. In the last 30 years, universities have become more actively involved in this part of the process as well.

This part of the report focuses on Stevens Institute's contributions to local economic growth in the first three of these areas, while Part Four focuses on the development of new businesses that are based on the results of university research.

At the local and regional level, university research contributes to the strength of the economy in several ways:

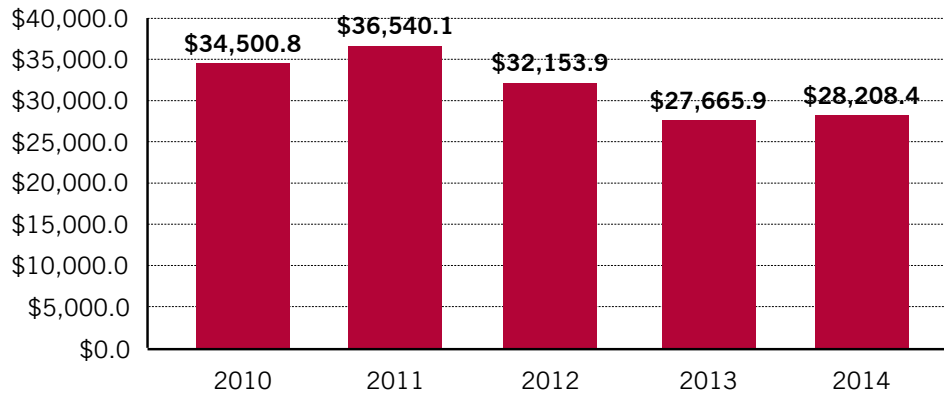
- By attracting millions of dollars each year in external (primarily federal) research funding, most of which is spent within the local area;
- By creating new knowledge in areas that are particularly relevant to local industries or to local communities;
- By providing students with opportunities for hands-on learning; and
- By providing a basis for the development of new technologies, new businesses and new jobs.

Trends in research spending

Between fiscal year 2010 and fiscal year 2014 (as shown in Figure 9), Stevens spent a total of nearly \$159.1 million on research.

In fiscal year 2014, research spending at Stevens totaled \$28.2 million.

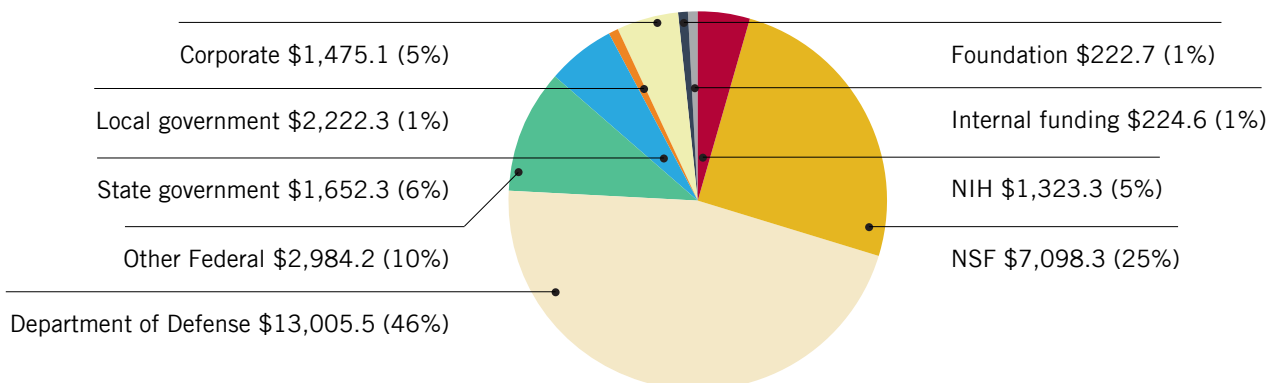
Figure 9: Stevens research spending, FY 2010 – FY 2014 (in \$000s)



As shown in Figure 10, the federal government is by far the university's leading source of research funding, accounting for 86.5 percent (\$24.4 million) of total research expenditures in fiscal year 2014. State and local government accounted for 6.6 percent (nearly \$1.9 million); corporate and foundation funding for 6.0 percent (nearly \$1.7 million); and internal funding for less than 1.0 percent (about \$224,600).

In fiscal year 2014, the Schaefer School of Engineering and Science accounted for 67.2 percent (nearly \$19.0 million) of Stevens' total research expenditures; the School of Systems and Enterprises for 28.8 percent (\$8.1 million); and the Howe School of Technology Management for 3.9 percent (\$1.1 million).

Figure 10: Stevens research spending by source of funding, FY 2014 (in \$000s)



Research at Stevens

Unlike some larger institutions, Stevens has built a world-class research enterprise by focusing its resources on a limited number of fields in which it is particularly strong. Here we describe briefly several areas in which Stevens has long been a national leader, and several areas of emerging strength as well.

- **The National Center for Secure and Resilient Maritime Commerce (CSR)** is a multi-university consortium, headed by Stevens, that focuses on the development of new tools and new technologies for use in securing the nation's coastlines, ports and inland waterways and its maritime transportation systems. Building on the university's historic strengths in several related disciplines, the Center was established in 2008 and designated by the Department of Homeland Security as a center of excellence in port and maritime security. Other consortium partners include MIT, Rutgers, the University of Miami and Monmouth University.

Through CSR, researchers at Stevens have in recent years worked on harbor surveillance systems, vessel detection and tracking, and support for improved decision-making in emergencies such as the landing of Flight 1549 in the Hudson River and the Deepwater Horizon oil spill.

- **The Systems Engineering Research Center (SERC)** is a network of more than 300 researchers at 23 universities (also led by Stevens) and designated by the Department of Defense to focus on the use of systems engineering to support the successful "development, integration, testing and sustainability" of complex defense systems, services and enterprises." The university's principal partner in SERC is the University of Southern California; other participating institutions include U.C. San Diego, Carnegie Mellon, Georgia Tech, Purdue and the University of Maryland.

SERC's charge is to focus not just on basic or even on applied research, but on an integrated approach to moving new technologies as quickly and efficiently as possible from discovery to development to deployment, when and where they're needed. SERC researchers have worked in areas such as optimizing the basing of small, quick-response tactical units, electronic warfare and more effectively countering weapons of mass destruction. In the fall of 2013, Stevens completed an agreement with the U.S. Department of Defense, for a \$60 million, five-year research contract for SERC – the largest single research contract award in the university's history.

- **The Atlantic Center for Innovative Design and Control of Small Ships (ACCESS)** is a university-government-industry partnership, established in 2002 and led by Stevens, that seeks to improve the performance and reduce the cost of small vessels used in coastal warfare by combining innovations across several functional areas, with a particular emphasis on hull design and automated control systems. Other partners include the U.S. Naval Academy, the Naval Post-Graduate School, Webb Institute of Naval Architecture, University College London and Lockheed Martin.
- **The Center for Advancement of Secure Systems and Information Assurance (CASSIA)** is one of 22 university research centers established by the National Security Agency. Its role is to act as a catalyst for research, education and entrepreneurship in cyber-security and information assurance.
- **The Center for Healthcare Innovation (CHI)** is a university-wide center established by Stevens in 2013 that supports faculty and student research on biomedical technology and health care delivery. Examples of research at Stevens conducted under CHI's auspices include:

- » Discovery and preclinical development of cancer drugs in the **Biotechnology and Drug Discovery Laboratory**. The Lab was established with equipment and supplies from Roche and Merck and is staffed by scientists formerly employed in local pharmaceutical companies;
 - » Development of a 3D microfluidic device for growing biopsies from cancer patients – with a focus on personalized drug selection for treating multiple myeloma patients;
 - » Development of new bacteria-resistant biomaterials for use in orthopedic implants, which could reduce the incidence of infection in implant procedures; and
 - » Systems engineering and data analytics to model wards, hospitals and healthcare delivery networks.
- **Davidson Laboratory/Center for Maritime Systems (CMS)** draws on the university's strengths in ocean and coastal engineering, physical oceanography, naval architecture, hydrodynamics and maritime security to address critical concerns in the marine environment. Especially in the aftermath of Hurricane Sandy, the Center's researchers have worked closely with federal, state and local agencies on issues such as hurricane and storm surge risk analyses and protection of coastal cities from flooding. Other topics of CMS research have included the impact of ferry wakes on small vessels, natural shorelines and marine infrastructure in New York harbor and the design and control of marine crafts—from small, high-speed Navy boats to submarines.
 - **The Center for Coastal Resilience and Urban Xcellence (CRUX)**, established in 2014, focuses on how coastal cities can effectively address the challenges of climate change and extreme weather events, while at the same time strengthening communities and improving their overall quality of life. In the fall of 2014, CRUX received a five-year, \$6.6 million grant from the Port Authority of New York and New Jersey to improve observation, forecasting and communication of flood risks associated with significant storm events.
 - **The Center for Innovation in Engineering and Science Education (CIESE)** is a STEM education research center which was founded in 1988 to explore strategies to increase the engagement, persistence, and success of students in technical disciplines and careers. With federal, state, and private funding totaling more than \$50 million over 27 years, CIESE has impacted more than 30,000 K-12 and college educators in 23 states and a dozen countries, and more than a half million students, through direct programs, turnkey training and scale up initiatives, and online curricula and learning resources. More than 250 teachers and thousands of students in Hoboken have directly benefited from CIESE programs, and the Center was recognized by President Obama for excellence in STEM mentoring in 2011.

Student participation in university research

As noted previously, undergraduate education at Stevens is notable for its emphasis on learning through hands-on, practical experience. Along with the university's cooperative education and internship programs, undergraduate participation in research projects is an integral part of experiential learning at Stevens.

Each year, many Stevens faculty members engage undergraduate students in their research work, accompanied either by a stipend or academic credit. The university also offers several more formal programs that support undergraduate research.

- The **Stevens Scholars Program** offers undergraduates the opportunity to undertake special research projects with a faculty mentor that take place during the academic year and a minimum of two summers. This is an “invitation-only” program for which students are selected either during the admissions process or after earning at least a 3.8 GPA during their first semester at Stevens. Each year, about 10 percent of all first-year students are invited to participate in the program.

Research projects are done over the course of one academic year and at least two summers. During the summer, research projects scholars are provided stipends and campus housing.

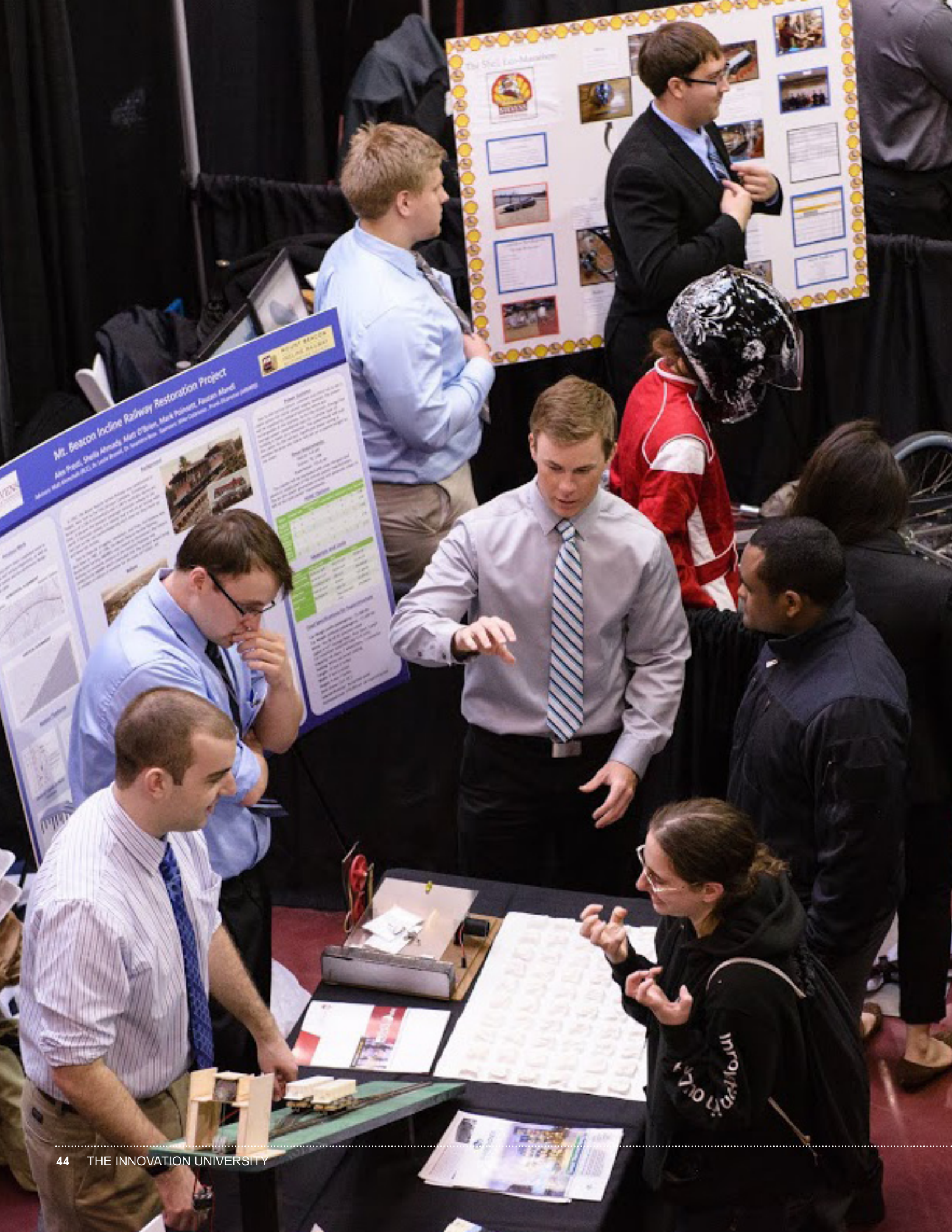
- In the **Innovation and Entrepreneurship (I&E) Summer Scholars Research Program**, undergraduate students work with faculty mentors on research, design, or business projects during a ten-week summer session, and in some cases during the following academic year. Students are selected for the program on the basis of specific project proposals, which are reviewed by the Research Program Committee. Those who are selected (typically about 50 percent of those who submit proposals) are provided with on-campus housing for the summer and a stipend of \$3,500.

Of the more than 400 student projects initiated since the program was launched in 2001, 75-80 percent have continued on to the next level of research in the form of sponsored grants, senior design projects, department-funded programs or other personal endeavors.

- **UPTAM (Undergraduate Projects in Technology Applied to Medicine)** provides summer research opportunities for students interested in the development of technologies that can be used to solve problems in medicine and health care. Approximately two dozen qualified students are selected each year to engage in research with a faculty mentor at Stevens or at a participating medical college.

In addition to special programs such as these, undergraduate engineering students are also required to complete a year-long **Senior Design Project**, in which they get to apply what they've learned during the course of their studies. Students work in teams of two to six on multidisciplinary projects – many of which are sponsored by corporate partners – that range from feasibility studies to design and redesign problems. The program culminates with the Senior Design Exposition during which the projects are displayed for the public and Stevens community.

Hands-on research experience strengthens undergraduate education in several ways. It allows students to explore in greater depth topics that are of particular interest to them. It helps them develop skills in project planning, working through unanticipated problems, time management, teamwork and written and oral communication skills. These lessons are of real value, regardless of whether students pursue careers that involve formal scientific or engineering research.



PART FOUR

Technological Innovation and Business Development at Stevens

With few exceptions, the new knowledge derived from university research does not directly generate economic growth. The new knowledge that university research creates must first be translated into concepts for new products, new processes or new services, which must then be brought to market.

Technological innovation and commercialization are among the most important drivers of economic growth. A report prepared for the National Research Council in 2005 cited research showing that in the half-century following the Second World War, improvements in technology accounted for half of all growth in gross domestic product in the U.S., and about two-thirds of all growth in productivity.⁷ Other analyses suggest that the share of economic growth attributable to technological innovation may be even higher – as much as 85 percent.⁸

The translation of university research into new products, processes and services, new businesses and new jobs can occur in any of several ways:

- Through the licensing of technologies first developed in university labs to companies interested in using these technologies for commercial purposes;
- Through licenses of technologies to start-up companies (often involving university faculty or graduates) created by entrepreneurs specifically for the purpose of commercializing the results of university research; and
- Through other companies started by faculty members, staff, students and alumni that, while not based on licensed technologies, are in some way rooted in their experience at the university.

This part of the report examines the role that Stevens plays in the commercialization of new technologies and the development of new businesses. We focus first on the formal process of technology transfer, including the licensing for commercial use of technologies first developed at Stevens; then on the university's role in educating entrepreneurs; and finally on examples of New Jersey companies founded by Stevens alumni, students, faculty and staff.

7. Committee on prospering in the Global Economy in the 21st Century, *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, National Academy of Sciences, National Academy of Engineering, Institute of Medicine, 2005, p. 205.

8. Ibid p. 1.

Technology transfer

As shown in Table 12:

- The number of invention disclosures filed by researchers at Stevens rose from 18 in fiscal year 2008 to 40 in fiscal year 2014;
- The number of new patent applications filed rose from 13 in fiscal year 2008 to 20 in fiscal year 2014; and
- The number of new ventures started for the purpose of further developing and bringing to market technologies first developed at Stevens rose from 2 in fiscal year 2008 to 5 in fiscal year 2014.

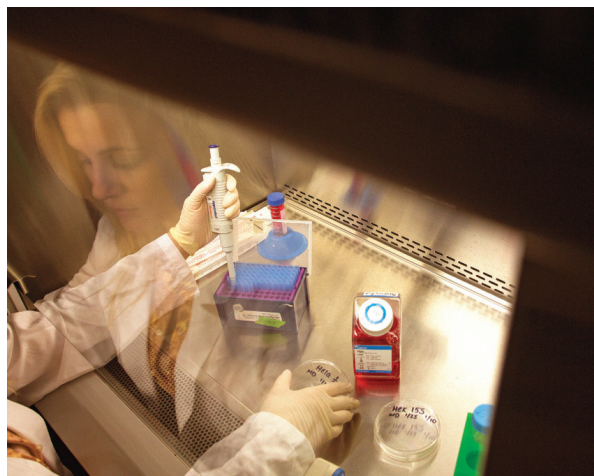


Table 12: Technology transfer activity at Stevens, FY 2008 – FY 2014

	2008	2009	2010	2011	2012	2013	2014
Gross licensing income	\$100,250	–	\$200,000	\$251,000	\$451,000	\$331,668	\$342,000
Invention disclosures	18	40	49	50	47	40	40
New patent applications filed	13	20	24	15	16	20	20
Patents issued	3	5	2	3	12	4	4
Licenses/options executed	6	3	5	2	2	13	2
Start-up companies formed	2	2	0	0	0	6	5



While larger universities may produce higher absolute numbers on these standard measures of technology transfer activity, Stevens is especially noteworthy for the intensity of its tech transfer activity relative to the size of its research enterprise. Table 13 compares ratios of tech transfer activity to research spending at Stevens in fiscal year 2014 with the average ratios in fiscal year 2012 for 194 U.S. and Canadian research universities, research hospitals and other research institutions surveyed by the Association of University Technology Managers (AUTM).

While the scale of the Stevens research enterprise is thus smaller (when measured by research spending) than those of many other leading universities, the rate at which new knowledge is made available for commercial use is much higher at Stevens than at most other research universities, indicating a more efficient path toward technology transfer and commercialization at Stevens than comparable, but larger institutions.

The pace of technology transfer at Stevens is partly a product of its specialization in engineering and applied science. But it also reflects an institutional commitment to research that addresses real-world problems, and to ensuring that the new knowledge the university produces is put to use.

Examples of New Jersey companies that have licensed technologies first developed at Stevens include:

- **Dynamic Spectrum**, a Holmdel-based company started in 2012 by two Stevens faculty members that is developing wireless communications technology that can increase available bandwidth by tapping unused spectrum capacity.
- **Stryker Instruments**, a Michigan-based medical device company with operations in Mahwah that has licensed knee replacement technology from Stevens.
- **Versor**, founded in 2012 by two Stevens students and based in Cranford, has developed a light-weight, non-invasive device for accurately measuring the range of spinal motion in spinal surgery patients without the use of x-rays.
- **Castle Point Learning Systems**, a Hoboken-based educational technology company that is developing “intelligent tutorial software” that helps students increase their competency in high school and collegiate level mathematics.
- **iubble**, a Hoboken-based computer software company founded in 2014 that is developing a social web browser.

Table 13: Ratio of research spending to technology transfer at Stevens and other universities

Indicator	Stevens (FY 2014)	AUTM survey institutions (FY 2012)
Total research spending	\$28.2 million	\$63.7 billion
<i>Research spending:</i>		
Per invention disclosure	\$705,209	\$2.68 million
Per new patent application	\$1.41 million	\$4.48 million
Per U.S. patent awarded	\$7.05 million	\$12.38 million
Per new license or option agreement	\$14.10 million	\$9.99 million
Per start-up	\$5.64 million	\$90.35 million

Source: Appleseed calculations, based on AUTM data

Educating a new generation of entrepreneurs

Along with its research and technology transfer activity, Stevens supports innovation and entrepreneurship by helping its students acquire the knowledge, skills and experience they need as entrepreneurs. The education of fledgling entrepreneurs occurs both through the university's formal curriculum and through a variety of other experiences that are available to students.

- The Howe School of Technology Management offers an **undergraduate business minor in entrepreneurship**, consisting of six courses that focus on areas such as the discovery and commercialization of technical business opportunities, marketing and operations, assessment and financing, and an entrepreneurial business practicum.
- Graduate students who are pursuing an MBA in Technology Management at the Howe School can choose a concentration in **Innovation and Entrepreneurship**, with courses on realizing value from intellectual property, global innovation management and venture capital financing.
- The School of Engineering and Science requires all undergraduate engineering students to take **Introduction to Entrepreneurial Thinking** as “part of a planned ‘innovation spine’ that will round out the rigorous engineering curriculum with a grounding in entrepreneurial thinking and how to speak the language of business.”
- Students can also take advantage of a wide range of individual courses offered at Stevens on topics related to entrepreneurship, such as:
 - » Introduction to entrepreneurship;
 - » Discovering and exploring entrepreneurial opportunities;
 - » Emerging technologies;
 - » Digital entrepreneurship;
 - » New product and service innovation; and
 - » Corporate entrepreneurship.
- When choosing their senior design projects, students are encouraged to consider projects that have potential commercial applications. Those that choose to do so have an opportunity to compete for investment funding for innovative research and business ideas in the annual **Student Elevator Pitch Olympics and Project Plan Olympics**. Participants each have two minutes to pitch their senior design projects to a panel of judges (made up of industry leaders) who then evaluate the project based on the quality of the pitch, the competitive advantage of the proposed business and the viability of the business plan/innovation elements. Winners are awarded cash prizes for first, second and third place.



- A hallmark of the Stevens educational experience is the **Innovation Expo**, an annual showcase of Stevens faculty research and student senior design projects. The day-long program also features lectures from invited industry leaders advancing innovation, and attracts venture capitalists, entrepreneurs, and professionals in the tech industry and beyond. Over 120 student interdisciplinary design projects are presented in areas ranging from green technology, to medical devices, to innovations in transportation, energy, and manufacturing. Often, projects address the real-world interests of corporate sponsors, which simultaneously provide sponsors with opportunities to explore new concepts or solutions and students with practice in developing professionalism and addressing client needs. Many other commercially viable projects are filed for patent in order to be developed following students' completion of the senior capstone design course.
- Students interested in becoming entrepreneurs can also gain relevant experience by working for start-up companies which participate in the university's cooperative education and internship programs.
- Precollege students may also explore their entrepreneurship talents through an immersive, one-week summer camp experience. Students imagine an idea for a new product or service and lead their own start-up company with a group of fellow students. In one week, they experience Entrepreneur Expo, visit a real tech-incubator, learn how to give an effective business pitch and presentation, and pitch their idea to emerging start-ups prior to presenting to the blue-ribbon panel judges.
- The university's **Innovation and Entrepreneurship (I&E) Doctoral Fellowship** provides tuition and stipends for two years to PhD students whose research could potentially result in the development of disruptive innovations or other transformational changes in specific areas, and who aspire to become entrepreneurs. While pursuing their research, I&E fellows also take courses on entrepreneurship and related topics. I&E fellowships can be extended to three or four years in selected cases where the student's research has resulted in the creation of potentially high-value intellectual property and is moving toward licensing or the creation of a new venture.
- In collaboration with Scivantage, a leading financial technology company based in Jersey City, Stevens in 2014 launched the **Scivantage Fintech Incubator**, a twelve-week program for early-stage financial technology start-ups. The program provides space in Scivantage's Jersey City offices, seed funding of up to \$25,000, guidance and mentoring by industry professionals, assistance with design and marketing, and access to investors.



Companies founded by Stevens faculty, staff, students and alumni

Formal technology transfer is not the only means by which the intellectual capital developed at Stevens is translated into new products and services, new businesses and new jobs. The work of university faculty and staff, and the knowledge that students and alumni acquire during their time at the university, can also provide a foundation for technological innovation and entrepreneurial development.

The following are examples of companies started by Stevens faculty, staff, students or alumni.

- **Materials Processing and Research**, founded in 1992, is a Hackensack-based company specializing in computer modeling and the design and manufacturing of dies and equipment for processing highly filled materials.
- **Globecomm Systems**, founded in 1994, is a leading provider of managed network communication solutions. The company's headquarters are on Long Island, and its Maritime division is located in Cedar Knolls.
- **F3 Engineering**, founded in 1999 and based in Paterson, is an aerospace engineering and manufacturing firm specializing in the development and production of motion control systems for both military and civilian use.
- **WB Engineers and Consultants**, a New York City-based company founded in 1999, provides a wide-range of construction-related engineering and consulting services to corporate clients.
- **Hanlon Investment Management**, founded in 1999 and located in Egg Harbor, manages more than \$3 billion in assets.
- **ID8 Systems**, a New York City-based company started in 2009, has developed an online "virtual brainstorming" software platform that helps facilitate collaboration and new ideas within companies and organizations.
- Hoboken-based **Sphere Technology Solutions**, founded in 2010, provides its customers with customized data governance, security and compliance solutions.
- **VectraCor** is a Totowa-based company, founded in 2010, that has developed a new non-invasive, stand-alone monitoring device that can locate in real time small changes in EKG activity that may provide early indicators of a heart attack.
- **Stackpop**, a New York City-based company founded in 2011, has developed a cloud-based platform that helps IT and finance and operations professionals manage their technical infrastructure costs.
- **FunnelFire**, a Hoboken-based firm founded in 2012 by a Stevens alumnus, provides software that supports sales professionals' interactions with customers.
- **Rise Assistive Devices**, started in 2012, is a New York City-based company that designs and manufactures lifting seat devices that can be attached to any chair to assist people in rising from a seated to standing position and vice versa.
- **NickelBus**, founded in 2012 and based in Clifton, is an internet-based travel website company that provides automated routing, price comparison and centralized ticketing for long-distance inter-city bus travel.

- **Enhatch**, started in 2012, provides companies with custom mobile marketing applications and technologies that allow companies to better engage with their consumers. The company is based in New York City.
- Brooklyn-based **Zumic**, founded in 2012, has developed a new music and music industry news site.

Through its strength in research that addresses real-world problems, its increased focus on moving the results of its research from discovery and development to deployment, the entrepreneurial education and hands-on opportunities for innovation it provides to students, and its network of faculty, student and alumni entrepreneurs, Stevens is helping to create the kind of environment – both on and beyond its campus – needed to sustain innovation and economic growth.



Stevens Alumni: Corporate Leaders

While some Stevens alumni have founded and built new companies in New Jersey and elsewhere in the region, others hold (or have held) leadership positions in a wide range of more established businesses. Below we highlight just a few examples:

- Gina Addeo '86 is CEO of Staten Island-based ADCO Electrical; she was the first woman in New York City to earn a master electrician's license.
- Edward Amoroso '86, an expert in cybersecurity, is senior vice president and chief security officer at AT&T.
- Lawrence Babbio '66, a former chairman of the university's board of Trustees, is also former president of Verizon.
- Mark Biamonte '01 is chief systems engineer for Totowa-based UTC Aerospace Systems.
- Carmine Lizza '85 is CIO and head of global technology at Lazard, a leading global investment firm.
- Virginia Ruesterholz '83, current chair of the university's Board of Trustees, is a former executive vice president of Verizon.
- Frank Semcer '65 is chairman of MICRO, a Somerset-based contract manufacturer of medical devices, and one of New Jersey's largest privately-held firms.
- Cristina Vieira Martinez '94 is a senior associate at Thornton Thomasetti, a major regional engineering firm.



PART FIVE

Community Engagement at Stevens

Since the 1980s, colleges and universities throughout the United States have acknowledged the importance of being actively engaged in the life of their home communities. These institutions that their effectiveness as centers for learning, research and innovation depends in part on the strength, stability and overall attractiveness of the communities in which they operate.

At the same time, both students and practitioners of urban and regional development recognize that strong, attractive neighborhoods and communities are essential to sustainable economic growth. Constructive engagement with their home communities thus helps colleges and universities fulfill their mission, and at the same time contribute to the overall health of the local economy.

This part of our report examines several aspects of community engagement at Stevens, including:

- The university's engagement in efforts to improve education in science, technology, engineering and mathematics at the elementary and secondary level, both in Hoboken and in other New Jersey communities;
- Making a variety of university resources available to the City of Hoboken, its residents and local community organizations; and
- Drawing on the university's intellectual and human resources to fashion new solutions to some of the community's, the region's and the state's most pressing problems.



Strengthening elementary and secondary education

Through its Center for Innovation in Engineering and Science Education (CIESE), a White House-recognized science, technology, engineering, and mathematics (STEM) education and research center with programs in 23 states and a dozen countries, as well as other programs and units within the university, Stevens has provided in-kind and material support to Hoboken schools and youth, and throughout Hudson County and the State of New Jersey.

This work has included a series of externally funded projects that support local teachers' and students' learning and engagement in STEM programs, as well as a number of pro bono and volunteer efforts that benefit local education systems and youth. Hoboken schools, including public, non-public, and charter schools, have benefited from these projects, which focus on strengthening teacher capabilities, in-class support, provision of classroom materials and hardware, as well as student camps, tutoring, and athletic programs. Overall, more than 250 teachers and administrators from Hoboken, and thousands of Hoboken students have directly benefited from CIESE programs over more than 25 years, with many hundreds of children participating in Stevens STEM and athletic camps.

Some current projects include:

- **SATMax** is a practical workshop designed specifically for high school students who are planning to take or retake the PSAT or SAT. The program runs for two hours per week for five weeks and utilizes Stevens faculty and undergraduates trained as “micro-teaching” tutors to train small groups of high school students in the four basic areas of the test: test taking strategy, mathematical skills, verbal skills, and written composition. In February 2014, the program was launched at Hoboken High School with a cohort of 16 students. Future programs are planned.
- **The Partnership to Improve student Achievement in the Physical Sciences: Integrating STEM Approaches (PISA2)**, an \$11.5 million, five-year program aimed at significantly increasing the number, quality and diversity of physical science teachers in twelve diverse New Jersey school districts.
- **WaterBotics®** aims to increase the number of youth interested in STEM fields of study and careers. As part of the underwater robotics curriculum, middle and high school students have the opportunity to design, build, program and test underwater robots while completing design challenges. Corporate sponsorship has enabled the program to be offered free or at low cost to Hoboken youth over several summers. A camp is planned for summer of 2015.



- Stem-a-thon: A Day of Innovation for Hoboken's 6th Grade Students**, is being planned by and will be hosted at Stevens Institute of Technology. The one-day event is designed to engage 6th grade students from all of Hoboken's public, private, and charter schools in fun STEM learning activities. With the aid of Stevens students and faculty volunteers, 6th graders will be presented with a variety of engineering design activities. Working in small groups, 6th graders will be encouraged to use teamwork, creativity, and collaboration to successfully complete each activity. The event will be held in June 2015.
- Hoboken Scholarships** (full tuition for one student) are awarded each year to the top graduating senior in Hoboken to attend Stevens. Since 2000, more than 60 students have received full or partial scholarships to Stevens valued at more than \$1.5 million.

In addition to these formal programs, a large number of ad hoc programs to benefit precollege students and teachers occur regularly, including scouting field trips to Stevens research laboratories, "First Day of College" events for middle school students, STEM competitions, robotics competition support and equipment donations, fraternity tutoring, athletics clinics, and many more.



A resource for Hoboken and its residents

Stevens also serves in multiple ways as a resource for Hoboken and its residents. For example, the university periodically provides space for community events such as graduation ceremonies, the Mayor's State of the City address, monthly New Jersey Tech Meetup events and in June 2013, the first TEDxHoboken event. A current collaboration with the Hoboken Historical Museum has resulted in an exhibit on The Extraordinary Stevens Family: A New Jersey Legacy, 1776-1911.



The university's value as a resource for the community was particularly evident in the days following Hurricane Sandy, which caused widespread flooding, extensive damage and dislocation of residents throughout Hoboken. Stevens estimates that in the week following the storm, 300 students performed more than 2,000 hours of volunteer work – working with the National Guard to rescue people stranded by the storm, delivering water in high-rise buildings, checking in on elderly residents, working with the Hoboken Volunteer Ambulance Corps, helping prepare meals for people who had taken refuge in city shelters, providing the city with an audio system for public meetings and helping to staff a city command center.

At the city's request, the university's Walker Gymnasium was also used as a triage and emergency service center for the Hoboken Volunteer Ambulance Corps and other emergency medical service teams. The need for such a facility was particularly critical, in that the storm had resulted in the evacuation and closing of Hoboken Medical Center.

A program sponsored jointly by the Stevens and the Hoboken Historical Museum brought more than 200 members of the Stevens and Hoboken communities together to recognize the spirit of collaboration and resiliency surrounding this extreme weather event.

Helping communities prepare for the future

In addition to helping with immediate needs such as those cited above, Stevens has also made its intellectual resources available to help Hoboken and other communities in the region address longer-term priorities.

In February 2013, for example, the city and the university launched a joint three-year project called **Smart City**, in which Stevens faculty and students work with city agencies to use information and communications technology to improve services to city residents. Initial Smart City initiatives include the development of mobile phone applications that will allow residents to check on the availability of parking, monitor energy use and air quality, and quickly receive emergency information.

Stevens is also deeply engaged in efforts to help communities in the New York-New Jersey area recover from the effects of Hurricane Sandy, and to improve protections against flooding and other extreme weather events. Stevens faculty members, for example, have worked closely with several New York City agencies on the development of the city's plans for enhancing the resilience of waterfront communities, business districts and essential infrastructure in the face of increased flood risk and vulnerability to storm damage.

In June 2013, Stevens and Northeastern University sponsored a conference in Hoboken that brought together managers of urban transportation systems, emergency management professionals and other experts to explore how mass transit, port and aviation infrastructure can be made more resilient. The meeting was the first in a series funded by the Alfred P. Sloan Foundation, with subsequent sessions to focus on enhancing the capacity of energy, communications and health care systems to withstand major catastrophes.

University faculty and researchers affiliated with the Center for Maritime Systems and the Davidson Laboratory also provided extensive support to New York City's efforts to enhance the City's ability to withstand extreme weather events. Building on their work over the past decade, the Stevens team modeled the impact of future storm surges on coastal areas in the city under various scenarios, and assessed the relative effectiveness of alternative coastal protection measures. The team's work helped inform the city's plan for increased resiliency (A Stronger, More Resilient New York), completed in 2013.

Through these and other forms of engagement with Hoboken and other nearby communities, Stevens contributes to a "triple bottom line" – directly benefiting the community and its residents, enhancing the university's ability to fulfill its own goals, and strengthening the communal foundation on which economic growth and opportunity depend.





PART SIX

A Growing Impact

As this report documents, Stevens Institute of Technology has a significant economic impact in Hoboken, in Hudson County and throughout New Jersey. Moreover, during the next decade, the university's impact is likely to be even greater than it is today. This is so for several reasons.

Growth in undergraduate enrollment

Over the next 10 years, Stevens is planning to increase undergraduate enrollment from 2,892 in the fall of 2014 to approximately 4,000. This growth will have an immediate impact on the local economy, as it will require significant growth in the number of people employed by the university – both faculty and support staff. Increased enrollment will also bring increased off-campus spending by Stevens students, which will also create new jobs in Hoboken and neighboring communities.

Even more important in the long run, as enrollment increases so will the university's contribution to development of the “human capital” that is so essential to the continued growth of New Jersey's economy. Increased enrollment will translate into continued growth in the number of cooperative education students and interns working for New Jersey companies – and over time, continued growth in the number of highly-skilled Stevens graduates living and working in New Jersey.

A growing research enterprise

Stevens has also set ambitious goals for the continued growth of its research enterprise. If it succeeds in meeting these goals, university research spending could nearly triple over the next 10 years, from \$28.8 million to \$80 million. This growth will also translate into increased employment at Stevens, and increased spending on purchases of goods and services from New Jersey businesses.

The growth of its research enterprise will also enhance the university's capacity to address some of the most critical problems that New Jersey industries and communities will confront during the next 10 years and beyond – not only in areas where Stevens has traditionally been strong, such as systems engineering and maritime security, but also in emerging areas such as health care, cybersecurity, energy and the environment.

Investment in new facilities

Growth in enrollment and research will require investment in the development of new facilities. Construction of the university's new Academic Gateway project, for example, is expected to add approximately 90,000 square feet of instructional and research space to the Stevens campus by 2017. Other new facilities are being planned as well. From fiscal year 2015 through fiscal year 2018, the university's investment in construction of new and renovation of existing facilities could total as much as \$300 million.

In the near term, these investments will translate into new business and jobs for New Jersey contractors and construction workers – and in the long term, will greatly enhance the university's ability to carry out its mission.

Innovation and entrepreneurship

Stevens Institute of Technology has long combined a focus on engineering, applied science and technology with an institutional commitment to seeing the results of its research put to good use. During the past few years, the university has done even more to sharpen its focus and reinforce its commitment to innovation and entrepreneurship – strengthening its technology transfer operations, and expanding opportunities for students to acquire the skills, knowledge and experience they need to succeed as entrepreneurs.

During the next five to 10 years, this heightened focus on innovation and entrepreneurship, combined with growth in both enrollment and research spending, is likely to increase significantly the rate at which the university's programs of education and research lead to the development of new products and services and the creation of new businesses and new jobs.



Rooted in history, building the future

For the past 145 years, Stevens Institute of Technology has been a noteworthy contributor to the life of the City of Hoboken, and to New Jersey's economic vitality. The challenges the city and the state face today – jump-starting job growth, coping with the effects of climate change, improving public education and others – differ from those of 1870. But the strengths in science, engineering and technological innovation that have characterized Stevens since its founding may be even more important now than they have been at any time in the university's history. Stevens can thus be an invaluable partner in the process of building Hoboken's future, and New Jersey's.





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