

Economic Impact Report

2019



JOHNS HOPKINS
UNIVERSITY & MEDICINE

COVER:

1. Team Hopkins at the 2019 “Race to Embrace 5k” fundraiser for the Marian House to benefit homeless women.
2. Graduation exercises at the Johns Hopkins University Homewood campus.
3. Days of Taste brings together local chefs and elementary school students in a hands-on program about healthy eating.
4. Johns Hopkins University Gilman Hall on the Homewood campus.
5. Johns Hopkins Hospital nurses on the iconic Billings Dome in Baltimore.
6. Prosthetic limb developed at the Johns Hopkins University Applied Physics Laboratory.



This report was prepared by Appleseed in partnership with the Johns Hopkins Office of Government and Community Affairs. Appleseed is 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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John Hopkins

Executive Summary

Johns Hopkins across Maryland, District of Columbia and Florida

Nearly \$13.9 billion in total economic impact in 2019 (\$12.6 billion in Maryland)

Johns Hopkins is the largest private employer both in Baltimore City and in the State of Maryland. It is also a major purchaser of goods and services, a sponsor of construction projects and a magnet for students and visitors. In keeping with the beliefs of its founder and namesake, Johns Hopkins understands that its health and well-being are inextricably tied to the physical, social and economic well-being of the community.

In fiscal year 2019, Johns Hopkins directly employed 63,844 non-student employees systemwide – in Maryland, the District of Columbia, Florida and elsewhere – and spent more than \$4.2 billion on purchases of goods and services (including construction).

Johns Hopkins' impact in Maryland, the District of Columbia and Florida

- In fiscal year 2019, Johns Hopkins and its affiliates directly and indirectly accounted for more than 102,400 jobs¹ in Maryland, including 54,623 people employed directly by Johns Hopkins at its various Maryland locations with a payroll of nearly \$4.4 billion. More than 85 percent of the 63,844 people directly employed by Johns Hopkins systemwide – in Maryland, the District of Columbia, Florida and elsewhere – worked in Maryland.
- In addition to its 54,623 regular full- and part-time employees, Johns Hopkins employed 9,970 students at its Maryland locations in a variety of part-time jobs.
- In the spring of 2019, 53,310 regular full- and part-time Johns Hopkins employees (about 84 percent of all non-student employees) lived in Maryland.
- In fiscal year 2019, Johns Hopkins spent more than \$1.3 billion on purchases of goods and services (including construction) from companies in Maryland, directly supporting 7,700 jobs in Maryland.

1. This figure excludes student employees.

- We estimate that spending in Maryland by Johns Hopkins students and visitors from out-of-state directly generated \$261.5 million in economic output in Maryland in fiscal year 2019, and 2,246 jobs in Maryland.
- Institutions affiliated with Johns Hopkins directly employed 4,185 people in Maryland in the spring of 2017. Their spending on purchasing and construction directly generated an additional 423 jobs in Maryland in fiscal year 2017.
- Through the “multiplier effect,” spending by Johns Hopkins, its employees, vendors, contractors, students, visitors and affiliated institutions indirectly generated more than \$6.3 billion in economic output in fiscal year 2019 and 33,227 jobs in Maryland.
- A significant share of the money Johns Hopkins spends on purchasing and construction is paid to minority- and women-owned businesses. In fiscal year 2019, Johns Hopkins spent \$107.2 million on goods, services and construction work provided by minority- and women-owned businesses, including nearly \$39.4 million paid to vendors and contractors in Maryland.
- Johns Hopkins withheld nearly \$282.4 million in Maryland State income taxes from the earnings of its employees in fiscal year 2019 and paid nearly \$23.3 million in taxes and fees to local governments in Maryland. This does not include usage fees such as the \$6.6 million in fees paid for water and sewer service.
- Beyond Maryland, in fiscal year 2019:
 - > Johns Hopkins directly employed 3,535 people (excluding students) at its various locations in D.C., with a payroll of \$209.5 million; and through payments of approximately \$88.9 million to D.C. vendors and contractors, directly supported 397 additional jobs in D.C.
 - > Johns Hopkins directly employed 3,610 people at Johns Hopkins All Children’s Hospital and facilities in Florida, with a payroll of nearly \$285.1 million. Through payments of nearly \$94.8 million to Florida vendors and contractors, Johns Hopkins directly supported an additional 695 jobs in Florida.
 - > Approximately \$33.3 million in local spending by Johns Hopkins students enrolled at Johns Hopkins SAIS in Washington, D.C., visitors to patients at Sibley Memorial Hospital and employees who commute into D.C. directly supported 278 jobs in D.C.
 - > Through the multiplier effect, spending by Johns Hopkins, its employees, vendors, contractors, students and visitors indirectly generated 733 jobs and \$159.0 million in economic output in D.C., and 2,527 jobs and \$416.1 million in economic output in Florida.

- Combining all these impacts, we estimate that in fiscal year 2019, spending by Johns Hopkins, its employees, vendors, contractors, students and affiliates in Maryland, D.C. and Florida directly and indirectly accounted for:
 - > 114,179 jobs in Maryland, D.C. and Florida, with wages and salaries totaling \$7.7 billion
 - > Nearly \$13.9 billion in economic output in Maryland, D.C. and Florida

**Impact of Johns Hopkins, students, visitors and affiliates in Maryland, D.C. and Florida,
FY 2019 (earnings and output in \$ millions)**

	Direct spending impact		Indirect/ induced effects	Total impact
	<i>Employment/ Payroll</i>	<i>Purchasing/ Construction</i>		
Maryland				
Jobs	58,808	10,369	33,227	102,404
Wages	\$4,637.2	\$586.5	\$1,759.0	\$6,982.7
Output	\$4,637.2	\$1,663.9	\$6,300.5	\$12,601.7
District of Columbia				
Jobs	3,535	675	733	4,943
Wages	\$209.5	\$53.7	\$57.9	\$321.1
Output	\$209.5	\$122.2	\$159.0	\$490.7
Florida				
Jobs	3,610	695	2,527	6,832
Wages	\$285.1	\$36.3	\$111.6	\$433.0
Output	\$285.1	\$94.8	\$416.1	\$796.0
TOTAL				
Jobs	65,953	11,738	36,488	114,179
Wages	\$5,131.8	\$676.4	\$1,928.5	\$7,736.8
Output	\$5,131.8	\$1,880.9	\$6,875.6	\$13,888.3

Johns Hopkins' impact in Baltimore

- In fiscal year 2019, Johns Hopkins and its affiliates directly and indirectly accounted for 60,710 jobs in Baltimore² – a total equivalent to about one out of every five private sector wage-and-salary jobs in the City. This total included 40,564 people employed directly by Johns Hopkins at its various locations in Baltimore. More than 63 percent of the 63,844 people directly employed by Johns Hopkins systemwide – in Maryland, the District of Columbia, Florida and elsewhere – worked in Baltimore.
- In addition to its 40,564 regular full- and part-time employees in Baltimore, Johns Hopkins employed 9,733 students in a variety of part-time jobs at its Baltimore locations.
- Of the 63,844 non-student employees who worked for Johns Hopkins in the spring of 2019 (both in Baltimore and elsewhere), 17,005 – about 27 percent of all non-student employees – were residents of Baltimore.
- Wages and salaries (excluding wages paid to student employees) paid by Johns Hopkins to Baltimore residents in fiscal year 2019 totaled nearly \$1.2 billion.
- In fiscal year 2019, Johns Hopkins spent \$600.6 million³ on purchases of goods and services (including construction) from companies in Baltimore, directly supporting approximately 3,332 jobs.
- We estimate that spending in Baltimore by Johns Hopkins employees who commute into the City, students and visitors from outside the City directly generated \$391.0 million in economic output in the City in fiscal year 2019, and 3,428 jobs.
- Institutions affiliated with Johns Hopkins directly employed 4,185 people in Baltimore in the spring of 2017. Their spending within the City on purchasing and construction directly generated an additional 257 jobs in Baltimore in fiscal year 2017.
- Through the “multiplier effect,” spending by Johns Hopkins, its affiliates, its employees, vendors and contractors, students and visitors, indirectly generated nearly \$1.8 billion in economic output in fiscal year 2019 and created 8,944 jobs in Baltimore.
- Johns Hopkins paid nearly \$17.2 million in taxes and fees to the City in fiscal year 2019. This does not include usage fees such as the \$6.6 million paid for water and sewer usage.
- In fiscal year 2019, Johns Hopkins withheld nearly \$282.4 million in state and local income taxes from the earnings of its employees. We estimate that the local share of income taxes paid to Baltimore City from the earnings of Johns Hopkins employees living in the City totaled approximately \$20.7 million.
- Under the terms of an agreement that in 2016 was renewed for ten years, Johns Hopkins also makes an annual voluntary contribution to the City. In fiscal year 2019, this voluntary payment totaled \$3.26 million.

2. This figure excludes student employees.

3. This total is much larger than that cited for HopkinsLocal because it covers a much wider range of payments (including, for example, rent payments, utilities and insurance) to entities throughout the City.

**Impact of Johns Hopkins, students, visitors, and affiliates in Baltimore,
FY 2019 (earnings and output in \$ millions)**

	Direct spending impact		Indirect/ induced effects	Total impact
	<i>Employment/ Payroll</i>	<i>Purchasing/ Construction</i>		
Johns Hopkins				
Jobs	40,564	3,332	7,469	51,364
Wages	\$3,102.9	\$205.8	\$427.9	\$3,736.6
Output	\$3,102.9	\$600.6	\$1,515.6	\$5,219.1
Affiliate spending				
Jobs	4,185	257	644	5,087
Wages	\$264.0	\$17.8	\$36.3	\$318.1
Output	\$264.0	\$47.0	\$129.9	\$440.9
Commuter spending				
Jobs	–	746	148	894
Wages	–	\$25.7	\$8.9	\$34.6
Output	–	\$68.9	\$25.2	\$94.1
Student spending				
Jobs	–	1,302	356	1,658
Wages	–	\$36.4	\$21.2	\$57.7
Output	–	\$198.4	\$60.4	\$258.8
Visitor spending				
Jobs	–	1,380	328	1,708
Wages	–	\$55.1	\$19.8	\$74.9
Output	–	\$123.7	\$55.3	\$178.9
TOTAL				
Jobs	44,749	7,017	8,944	60,710
Wages	\$3,366.9	\$340.8	\$514.1	\$4,221.8
Output	\$3,366.9	\$1,038.5	\$1,786.4	\$6,191.9

Educating students and cultivating lifelong learning

During the spring of 2019, 24,782 students were enrolled in for-credit programs at Johns Hopkins, including 5,390 undergraduates and 19,392 graduate and professional students. About 10.4 percent of all undergraduates were residents of Maryland, including 3.2 percent who were residents of Baltimore. About 27.6 percent of all graduate and professional students were Maryland residents, including 11.1 percent who were residents of Baltimore.

- In fiscal year 2019, Johns Hopkins provided more than \$86.5 million in financial aid from University sources to students who identified themselves as Maryland residents, including nearly \$56.9 million provided to students who identified themselves as residents of Baltimore.
 - In 2018-2019, Johns Hopkins awarded 1,389 undergraduate degrees and 7,284 graduate, professional and medical degrees. Approximately 24.0 percent of all undergraduate degrees were awarded to Maryland residents (including 18.2 percent to Baltimore residents), and 35.4 percent of all graduate, professional and medical degrees were awarded to Maryland residents (including 20.6 percent of Baltimore residents). Additionally, 865 certificates were awarded, including 378 (43.7 percent of the total) awarded to Maryland residents.
 - In fiscal year 2019, 80,678 Johns Hopkins graduates (32.9 percent of all living alumni) lived in Maryland, including 18,488 (7.5 percent) who lived in Baltimore.
- During the past few years Johns Hopkins has introduced new undergraduate degree programs in areas that are well-aligned with opportunities for growth in Maryland's economy. Examples include:
 - > A new, interdisciplinary undergraduate major in medicine, science and the humanities
 - > A Peabody Institute bachelor's degree in music for new media
 - > At the Whiting School of Engineering, a concurrent bachelor's/master's degree in security informatics
 - > An MS in bioinformatics, offered jointly by the Krieger School of Arts and Sciences and the Whiting School of Engineering
 - > A new master's degree in health care systems engineering, first offered by the Whiting School in the spring of 2019
 - > The Johns Hopkins-MedImmune Scholars Program, in which PhD students in the Whiting School's biomedical engineering program and in the School of Medicine's graduate education program gain experience in research and drug discovery and development while working at Gaithersburg-based MedImmune, one of Maryland's leading biopharmaceutical companies
 - > A new Doctor of Engineering program, designed for full-time working professionals. The program was developed by Whiting School faculty in collaboration with scientists and engineers at the Applied Physics Lab and several leading Maryland companies
 - > A new track in nurse anesthesiology in the School of Nursing's Doctor of Nursing Practice program

- Part-time graduate programs – such as the Whiting School’s Engineering for Professionals program and the Krieger School of Arts and Sciences Advanced Academic Programs – are particularly important for the continued growth of knowledge-based industries in Maryland. In the spring of 2019, 3,188 Maryland residents, including 795 Baltimore residents – the great majority of them working adults – were enrolled part-time in graduate programs at Johns Hopkins.
- The Baltimore Scholars Program provides scholarships covering the full cost of attendance at Johns Hopkins for graduates of Baltimore City public high schools from families with incomes below \$80,000 who are accepted as full-time undergraduate students at the University. Since the program’s inception in 2005, the Baltimore Scholars Program has awarded (including future-year commitments to currently enrolled students) \$31.6 million in financial assistance to 358 Johns Hopkins undergraduates. In 2018-2019, 58 undergraduates actively participated in the program.
- In 2016 Johns Hopkins joined twelve other independent colleges and universities in Maryland in a commitment to match grants the State provides to low-income students attending these institutions. Through this Maryland Guaranteed Access Partnership, students from Maryland families with incomes below 130 percent of the federal poverty level (\$32,630 as of 2018) who maintain a GPA of at least 2.5 are eligible for up to \$38,200 in combined state and University financial aid annually, for up to four years.
- In November 2018, University President Ron Daniels announced that Johns Hopkins was adopting a policy of “need-blind” admissions, ensuring that an undergraduate education at Johns Hopkins will be within reach of all qualified, high-achieving students regardless of their ability to pay. This new policy – which will substantially increase the amount of financial aid provided by the University and eliminate loans from University financial aid packages – was made possible by a \$1.8 billion gift from alumnus Michael Bloomberg.
- Johns Hopkins is also expanding access to its academic programs by offering an ever-growing array of courses and degree programs online. Graduate programs now available entirely online include:
 - > 21 master’s degree programs in the Krieger School of Arts and Sciences
 - > 19 master’s degrees in the Whiting School of Engineering
 - > Six master’s degrees in the Bloomberg School of Public Health
 - > The Carey Business School’s Flexible MBA program
 - > Three doctoral programs – in Education, Nursing and Public Health
- In 2018-2019, a total of 13,827 students were enrolled in for-credit, online graduate and professional courses. In addition to these for-credit programs, millions of students worldwide have since 2014 participated in “massively open online courses” (MOOCs) offered by the Bloomberg School of Public Health.

Research that drives economic growth

Johns Hopkins consistently ranks first in research spending among all U.S. universities, by a wide margin. During fiscal year 2019, externally-funded spending at Johns Hopkins on research and related programs totaled nearly \$3.4 billion. Research and related spending rose by \$553.4 million between fiscal year 2014 and fiscal year 2019 – an increase of 19.5 percent.

- Almost all of this spending is financed from sources outside Maryland. State and local government funds accounted for 0.6 percent of all research and related spending at Johns Hopkins in fiscal year 2019.
- Johns Hopkins' ability to sustain the continued growth of its research enterprise in an era of federal budgetary constraints is in part a consequence of recent investments by the University in its ability to compete successfully for federal funds.
 - > Discovery Awards, launched in 2015, provide up to \$100,000 to cross-divisional teams of researchers for early-stage work in new areas. Grants of up to \$150,000 are also available for work aimed at preparing specific proposals to federal or other funding sources. Teams must include faculty members and other researchers from at least two Johns Hopkins divisions. From 2015 through 2019, Discovery funds have been awarded to 135 cross-divisional teams.
 - > Catalyst Awards, also launched in 2015, provide grants of up to \$75,000 to early-career faculty to support promising new research or creative work. From 2015 through 2019, 170 young faculty members have received Catalyst Awards.

- > Established in 2015, the President's Frontier Award provides one \$250,000 competitive research grant each year to a Johns Hopkins faculty member whose scholarship shows exceptional potential for important future work.

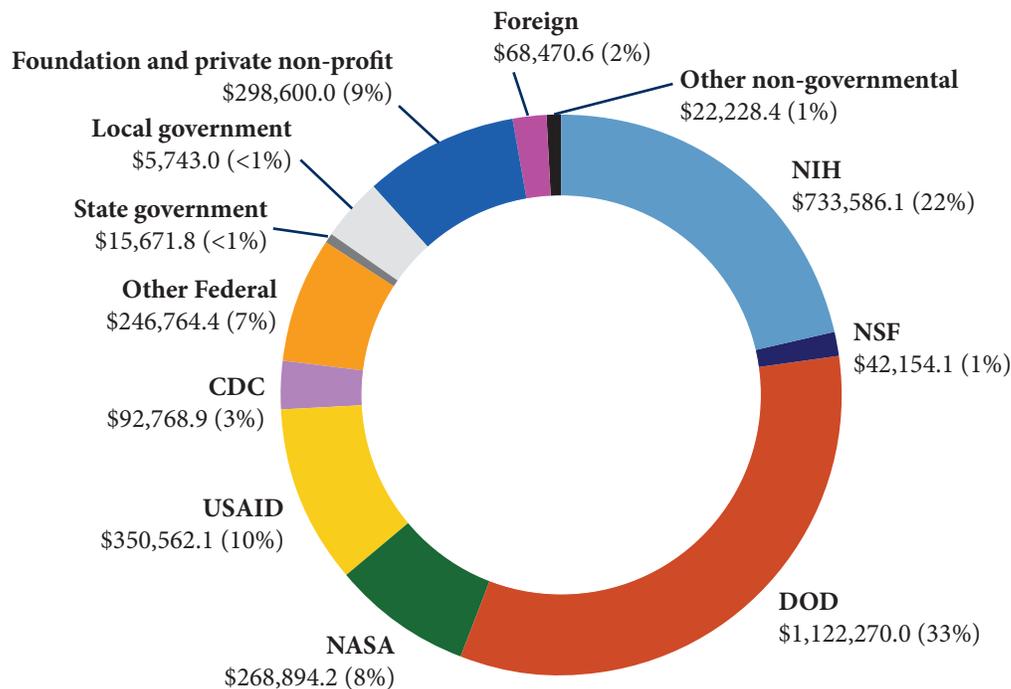
An analysis by Johns Hopkins on the impact of Catalyst and Discovery awards found that through fiscal year 2017 they had generated \$9.16 in increased federal and other external research funding for every dollar of University funds invested – powerful evidence of the impact of carefully targeted investment in early-stage research, and in the work of young investigators. Catalyst Awards, with a return of \$12.10 for every dollar invested, proved to be especially productive.

- The success of Johns Hopkins as a research institution is built in part on its ability to respond quickly to emerging research needs and opportunities across a wide range of areas. The following are just a few recent examples.
 - > The University's 21st Century Cities Initiative, launched in 2013, seeks to understand and solve the economic, social, educational, safety and housing inequities that many cities are struggling to address. Its principal focus is on applied research projects that can yield actionable results in six to 18 months.
 - > Through nine Precision Medicine Centers of Excellence (as of the summer of 2019), the University and the Health System are working to develop new, individualized approaches to the prevention, diagnosis and treatment of a widening array of diseases.

- > In 2016 the Whiting School of Engineering launched the Malone Center for Engineering in Healthcare. A focal point for collaboration among engineers, clinicians and School of Medicine faculty, the Center is “leveraging data analytics in novel ways...pioneering new technologies and applying systems engineering principles to speed the development of research-based innovations that will enhance the efficiency, effectiveness and consistency of health care.”
- > In 2016, Bloomberg Philanthropies marked the 100th anniversary of the Johns Hopkins Bloomberg School of Public Health by committing \$300 million to a new Bloomberg American Health Initiative, an effort to improve the nation’s health by strengthening public health research, education and practice. The Initiative focuses on five key areas: addiction, environmental challenges, obesity and the food system, risks to adolescent health and violence.
- > In 2017, Johns Hopkins – with a commitment of \$150 million from the Stavros Niarchos Foundation – launched the Agora Institute. The new Institute, part of the Krieger School of Arts and Sciences, conducts cross-disciplinary research on the causes and dynamics of social, cultural and political polarization in the U.S. and elsewhere. It is seeking to develop ways to improve public discourse and decision-making, and new approaches to resolving especially divisive policy issues.
- > In 2019 the University announced creation of a new Center for Safe and Healthy Schools, led by the Johns Hopkins School of Education. The Center will conduct research on school health and safety, school security and school-community engagement. It will also offer online courses on these topics, and provide seed grants for innovative projects.
- With contract revenues of more than \$1.5 billion in fiscal year 2018, the Applied Physics Laboratory (APL) in Laurel, Maryland is one of the largest university-affiliated research centers in the United States, and Howard County’s largest private employer. APL’s work encompasses research on national security problems, the development and testing of new defense technologies, information security, the planning and management of major space missions for NASA, and the development of innovative medical devices. Notable developments since 2014 have included:
 - > Creation of APL’s Intelligent Systems Center, drawing on the Lab’s expertise in robotics, machine learning, neuroscience and other fields to accelerate the development and deployment of “autonomous systems.”
 - > Development of a framework for the integration of multiple cybersecurity systems (IACD – Integrated Adaptive Cyber Defense). With several partners, APL is now working on deployment of IACD in the financial services sector.

- > In 2015, the historic flyby of Pluto by NASA's New Horizons space probe, built and managed by APL; and the development and 2018 launch of NASA's Parker Solar Probe, which is flying closer to the sun than any previous spacecraft – also built and managed by APL.
- > Development of portable technologies for low-cost production of vaccines and other therapeutics in remote areas under adverse conditions.
- > A contract from the Centers for Disease Control in 2017 for continued development and maintenance of ESSENCE, a web-based surveillance system that collects and analyzes a wide range of data from diverse non-traditional sources to provide early indicators at the local community level of potential disease outbreaks and other emerging bio-threats.
- Other Johns Hopkins research centers in Maryland (in addition to those in Baltimore) include, for example:
 - > The Bloomberg School of Public Health's Comstock Center for Public Health Research and Prevention, Hagerstown, which since 1921 has been conducting large-scale, long-term studies of cardiovascular risk, cancer and other public health issues among residents of Washington County.
 - > The Whiting School of Engineering's Advanced Engine and Rocket Fuels Lab, Columbia, which for more than 70 years has been providing research on liquid-fuel propulsion systems to federal agencies, industry and academic experts.

Johns Hopkins research and related spending by source of funding, FY 2019 (in \$000s)



- The platform that Johns Hopkins provides within a single, integrated enterprise for collaboration across disciplines and among scientists, engineers, clinicians and other professionals is one of its greatest strengths as a research institution. This strength is exemplified by the University's Bloomberg Distinguished Professorships, 50 new faculty positions established in 2014 with a \$250 million gift from alumnus Michael Bloomberg. As of the spring of 2019, 46 of these positions – which are focused on interdisciplinary research, teaching and service – have been filled, with the rest scheduled to be filled in the next few years. The Bloomberg Professorships have already enhanced the University's ability to attract leading scholars, as well as external research funding.

Computing power for a data-driven economy

The Maryland Advanced Research Computing Center (MARCC, pronounced “MAR-see”) is a shared facility of the Johns Hopkins University and the University of Maryland College Park, located on the Johns Hopkins Bayview Medical Center campus in Baltimore. With \$27.1 million in financing provided by the Maryland Legislature, construction of the new computing center was completed in 2015.

Since its opening, MARCC has provided Johns Hopkins and University of Maryland faculty members, staff, students and post-docs with a level of computing power that had previously not been available within the State. It enables researchers to apply the methods and tools of “big data” to a wide range of problems across a wide range of disciplines; and to do so much more quickly and at lower cost than they ever could before. From its opening through June 2017, MARCC had supported approximately 250 research projects involving 500 university faculty and staff, 1,000 graduate students and 200 undergraduates. Recognizing the role the facility plays in major research projects, the NSF in 2019 awarded MARCC a \$4 million Major Instrumentation Grant.

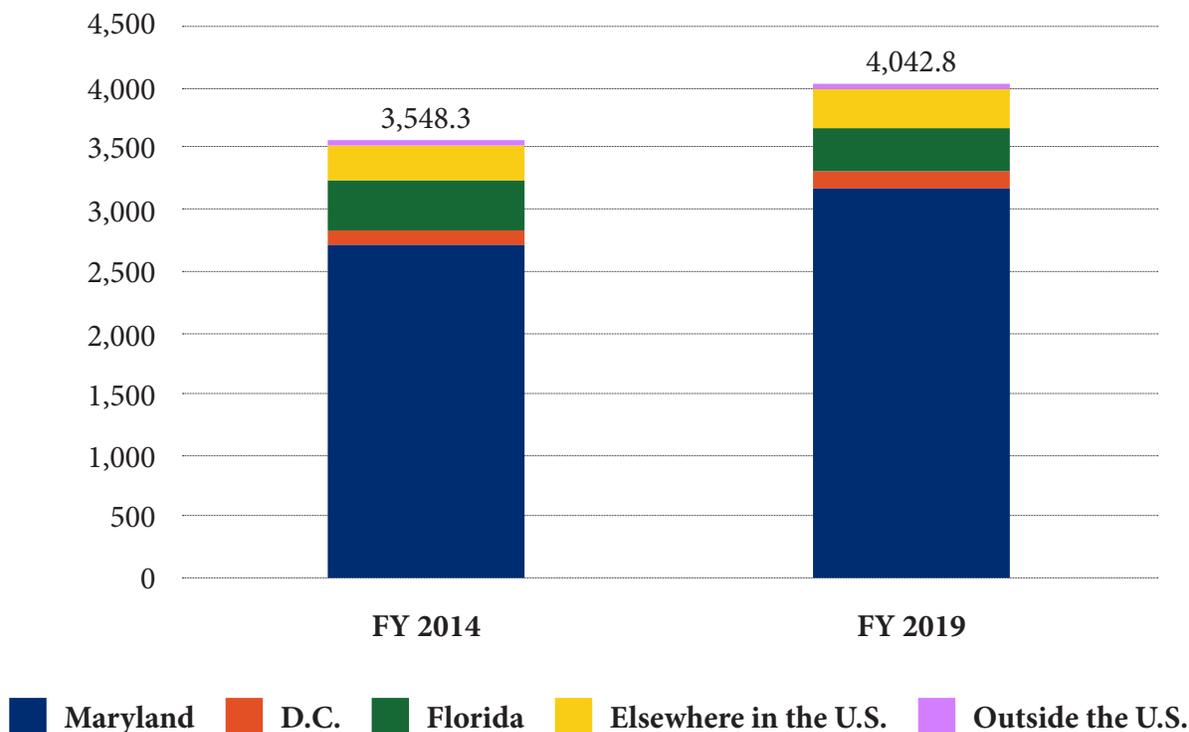
Improving the health of the community

Johns Hopkins is a leading source of high-quality health care for residents of Baltimore and other Maryland communities. For the past several years, Johns Hopkins has steadily expanded the range of services it provides in Maryland, grown the number of State residents its health plans cover, and increased the number of visits by Maryland residents to Johns Hopkins providers. Johns Hopkins has also extended its mission to communities outside the State as well – especially to the District of Columbia and to West Central Florida.

- Through Johns Hopkins Health System's six hospitals, through other subsidiaries of the Johns Hopkins Health System, through Johns Hopkins School of Medicine faculty physicians and Johns Hopkins School of Nursing faculty and nurse practitioners, in fiscal year 2019, the Johns Hopkins Health System handled more than 4.0 million patient visits – a 13.9 percent increase in patient visits since fiscal year 2014.
- During fiscal year 2019, the Johns Hopkins Hospital, Johns Hopkins Bayview Medical Center, Howard County General Hospital, Suburban Hospital and Sibley Memorial Hospital provided inpatient care to 92,403 Maryland residents, including 22,262 who lived in Baltimore City.
- In fiscal year 2019, clinics at or operated by the Health System's hospitals reported a total of 1,332,882 outpatient visits involving Maryland residents (including 480,685 visits involving Baltimore residents), and 200,036 emergency room visits involving Maryland residents (including 66,122 visits by Baltimore residents). In addition to these services:
 - > Johns Hopkins faculty physicians reported a total of 618,837 outpatient visits by Maryland residents (including 113,797 by Baltimore residents).
 - > The 36 primary and specialty care centers operated by Johns Hopkins Community Physicians reported a total of 872,542 patient visits by Maryland residents (including 141,422 by Baltimore residents).
- In fiscal year 2019, Johns Hopkins Home Care Group provided home health services to 67,060 Maryland residents (including 14,333 Baltimore residents), 3,037 D.C. residents, and 9,061 patients living outside of Maryland and D.C. In addition, Potomac Home Health Care – a non-profit joint venture of Sibley Memorial Hospital and Suburban Hospital – provided home care services to 2,646 residents of Maryland, and 827 D.C. residents.
- In fiscal year 2019, managed care plans administered by Johns Hopkins HealthCare (JHHC) provided comprehensive health care coverage to 74,770 Baltimore residents – about 12.2 percent of the City's total population. Statewide (including Baltimore), JHHC provided comprehensive coverage to 410,965 residents of Maryland – about 6.8 percent of the State's total population. In addition, 865 D.C residents were enrolled in JHHC plans during fiscal year 2019.

- Outside of Maryland, other facilities that are part of the Johns Hopkins Health System also provide essential health services to residents of their respective communities:
 - > During fiscal year 2019, Sibley Memorial Hospital, located in Washington, D.C., provided inpatient care to 7,740 D.C. residents, and reported a total of 45,943 outpatient visits and 21,376 emergency room visits involving D.C. residents.
 - > The two primary and specialty care centers operated in D.C. by Johns Hopkins Community Physicians reported a total of 26,531 visits in fiscal year 2019. In total, Johns Hopkins Community Physicians reported a total of 27,939 patient visits involving D.C. residents in fiscal year 2019.
 - > Johns Hopkins All Children’s Hospital, located in St. Petersburg, Florida, provided inpatient care to 6,159 Florida residents, and reported a total of 175,511 outpatient visits and 45,269 emergency room visits involving Florida residents in fiscal year 2019.

Total patient visits at Johns Hopkins entities, by residence of patient, FY 2014 – FY 2019 (in thousands)



- > In addition to its hospital-based outpatient services, Johns Hopkins All Children's Hospital's 10 regional Outpatient Care Centers reported a total of 126,271 outpatient visits by Florida residents in fiscal year 2019.
- During the past few years, Johns Hopkins has undertaken major investments in its hospitals and outpatient clinics, including:
 - > A new 158-bed inpatient building and expansion and modernization of other facilities at Johns Hopkins Bayview Medical Center, to be completed in 2024 at a cost of \$469 million
 - > The Skip Viragh Outpatient Cancer Building, a \$100 million, 184,000-square-foot cancer diagnostic and treatment facility at the Johns Hopkins Hospital – a unit of the Kimmel Cancer Center – completed in 2018
 - > A 300,000-square-foot expansion of its facilities at Suburban Hospital, to be completed in 2020
 - > In 2018, opening a new branch of the Armstrong Institute for Quality and Patient Safety at Howard County General Hospital – the first Armstrong Institute center to be located in a community hospital
- > Sibley Memorial Hospital's new, \$200 million proton therapy center, opened in October 2019
- > Construction of a new research and education building at Johns Hopkins All Children's Hospital, opened in 2018
- > A 110,000-square-foot expansion of the Johns Hopkins Health Care and Surgery Center at Green Spring Station

These and other investments will help ensure that Johns Hopkins stays at the leading edge of health care quality, access and innovation, in Maryland and beyond.

Impacts around the globe

Over the past two decades, Johns Hopkins has increasingly extended its impact to every corner of the world. The Johns Hopkins Health System provides leading-edge services to patients and families from nearly 190 countries and works with local partners on six continents to raise the standard of health care. The University conducts research in 110 countries, and helps prepare its students to live and work in an increasingly integrated world. The following are just a few examples of Johns Hopkins's global reach.

- Jhpiego, a Johns Hopkins organization based in Baltimore, is a world leader in the development and deployment of innovative approaches to improving the health of women and their families in low-income communities around the world. From \$39.5 million in fiscal year 2003, Jhpiego's revenues have grown to \$407.6 million in fiscal year 2018.
- As of 2018, Johns Hopkins International (JHI) – the international arm of Johns Hopkins Medicine – was working with partner institutions and organizations in North and South America, Africa, Asia and the Middle East to strengthen the delivery of health care. In Saudi Arabia, for example, Johns Hopkins Aramco Health Care, a joint venture established in 2013, combines Johns Hopkins Medicine's expertise in clinical care, research and education with the health care delivery system operated by Saudi Aramco (a major oil producer) for its employees in Saudi Arabia and their families – a total of 350,000 people.
- Johns Hopkins is also a leader in preparing students to live and work in an increasingly integrated world – through the degree programs offered by the D.C.-based Paul H. Nitze School of Advanced International Studies, the Carey Business School's Global MBA program, programs in global health and others. At the undergraduate level, the University's Office of Study Abroad estimates that more than 40 percent of all Johns Hopkins undergraduates participate in some type of study outside the U.S before graduation.
- Johns Hopkins conducts research in Europe, Asia, the Middle East, Africa and Latin America in fields as diverse as anthropology, international studies, public health, environmental science and national security. In fiscal year 2019, about 12.4 percent of all University research activity (as measured by spending) occurred outside the U.S. Of particular note, the Bloomberg School of Public Health was as of 2019 operating in 59 countries on six continents. This expanding global knowledge base – and the network of relationships developed in the course of building it – can be a valuable source of future economic growth.

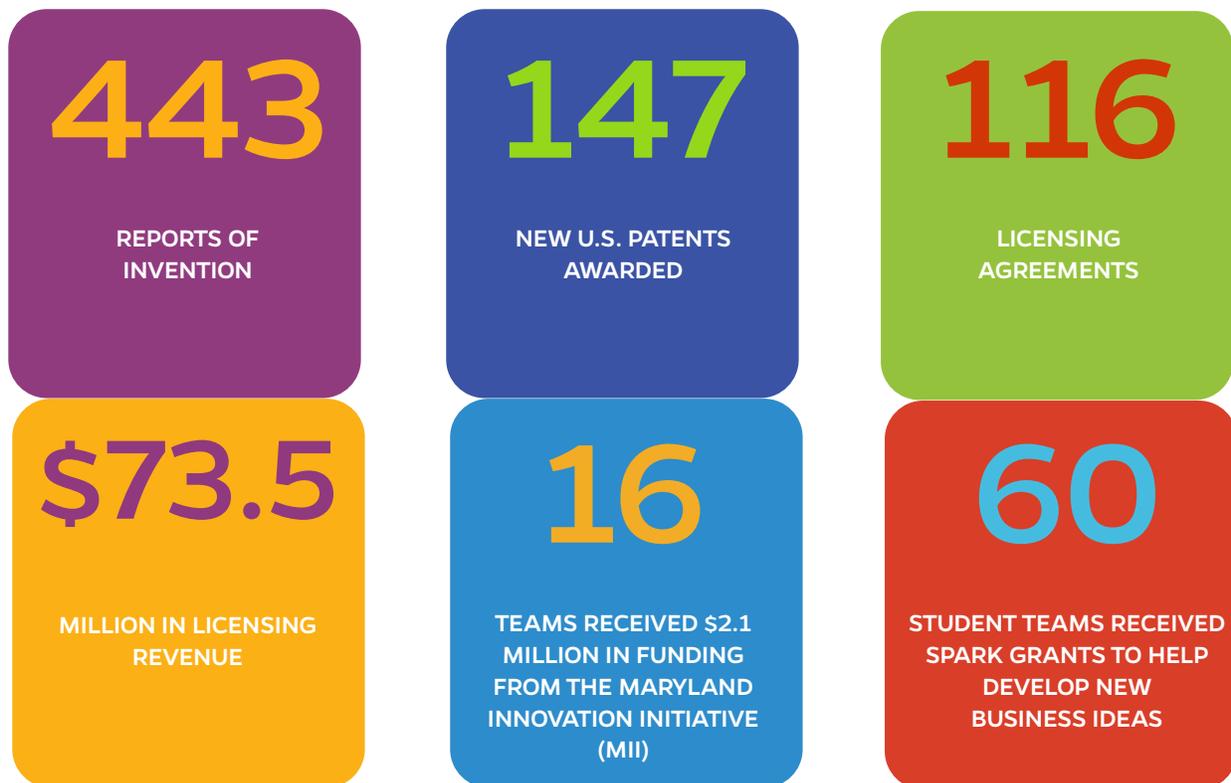
Fueling the growth of Maryland's innovation economy

During the past five years, Johns Hopkins has significantly expanded its commitment to support translation of the intellectual and human capital developed at Johns Hopkins into new products and services, new businesses and new jobs. This effort is already showing results.

- Under its “FastForward” brand, Johns Hopkins Technology Ventures has since 2015 opened four facilities totaling 44,200 square feet – two in East Baltimore and two near the University’s Homewood Campus – that provide co-working, office and lab space, support services and access to equipment for Johns Hopkins-based start-ups. Two of these facilities focus on supporting student start-ups, and two serve commercial start-ups.
- The University offers a growing array of programs aimed at helping students discover and develop their talents as innovators and entrepreneurs. They include:
 - > An undergraduate minor in entrepreneurship and management through the Whiting School of Engineering’s Center for Leadership Education
 - > A nine-course undergraduate design team program, offered through the Center for Bioengineering Innovation and Design (CBID), a joint center of the Whiting School and the School of Medicine
 - > A one-year CBID master’s degree in bioengineering innovation and design
 - > The Carey Business School’s “flexible MBA” in entrepreneurship
- > Johns Hopkins Technology Ventures’ “boot camps” for aspiring technology entrepreneurs
- > The University’s Social Innovation Lab, providing training, space, support services and funding to both University and community-based social entrepreneurs
- > The annual Johns Hopkins Business Plan Competition, hosted by the Whiting School of Engineering’s Center for Leadership Education
- In addition to the resources made available by Johns Hopkins Technology Ventures, several other divisions within the University and Johns Hopkins Health System have emerged as important sources of support for innovation and entrepreneurship in Maryland.
 - > Central Spark is an innovation center for APL scientists, engineers and staff, providing space for collaboration, design work, maker space, training facilities and media resources. Perhaps most important, it provides space, time and freedom to develop and test new ideas relevant to the Lab’s work – especially ideas that bridge the multiple domains across which the Lab works.

- > Sibley Memorial Hospital's Innovation Hub, opened in 2014, provides 6,000 square feet of dedicated space, support staff and equipment, all devoted to helping clinicians, staff and others (including patients' family members and community residents) work through and develop their ideas for new products, new services and new procedures that have the potential to enhance the quality and reduce the cost of health care, especially in community hospital settings.
- > The University's Montgomery County Campus provides space for life sciences and other technology start-ups, small companies and non-profit research organizations. As of mid-2019, the Campus was home to 23 different companies and organizations.
- > Johns Hopkins Medicine's Technology Innovation Center (TIC), established in 2014, is "a hub for clinicians to create novel technology-based solutions that span our medical specialties and practice settings." TIC works with practitioners to understand specific clinical problems, and to design technology solutions. Clinical-technical teams that make significant progress toward developing new technology solutions with commercial potential are eligible to participate in Hexcite, TIC's 16-week pre-accelerator program, aimed at bringing participating teams to the point where they are ready to create a company.
- > TIC has also worked with teams of Johns Hopkins researchers and clinicians to realize the potential of precision medicine, science that combines individual patient data with family history, demographic, environmental and lifestyle data to develop new approaches to diagnosis and treatment that are tailored to each patient's needs. Based on the work of these teams, Johns Hopkins Medicine has as of 2019 established eight Precision Medicine Centers of Excellence dealing with diseases such as prostate, bladder and pancreatic cancer, multiple sclerosis and neurofibromatosis. By the end of 2019, the number of centers is expected to increase to 16.
- > Johns Hopkins HealthCare Solutions, a division of Glen Burnie-based Johns Hopkins HealthCare (JHHC), provides a home for new ventures having shown potential for contributing to JHHC's goals of expanding access to care, improving its quality, increasing efficiency and reducing costs.
- Since 2010, a growing number of start-up companies have been launched in Baltimore and elsewhere in Maryland by Johns Hopkins faculty members or alumni, by former APL employees, or based on technologies first developed at Johns Hopkins. Increasingly, these companies are attracting attention from both regional and national venture capital and private equity firms. From January 2017 through June 2019, such firms announced new investments totaling approximately \$733 million in Maryland-based start-ups with ties to Johns Hopkins.

In 2019, Johns Hopkins Technology Ventures' Technology Transfer group processed 443 reports of invention, secured 147 new U.S. patents and executed 116 new agreements. The office also consulted with dozens of inventors to analyze the market for, plan the development of and secure funding for early stage technologies.



Building healthy communities together

- Since 2003, Johns Hopkins has worked with the City, the State, the Annie E. Casey Foundation, East Baltimore Development Inc. (EBDI), Forest City Science and Technology, residential developers and other partners to support redevelopment of Eager Park, an 88-acre neighborhood adjacent to its East Baltimore campus. Through fiscal year 2019 Johns Hopkins has committed more than \$51 million to this effort. Support from Johns Hopkins has to date included:
 - > Capital funding for construction of the Henderson Hopkins School, development of public open space and other projects
 - > Serving as an anchor tenant for 450,000 square feet of new life sciences research and office space
 - > Through rents paid by its students, indirectly supporting the development of 320 units of graduate student housing
 - > Supporting development of the neighborhood's first new owner-occupied housing through its Live Near Your Work program (described below)
 - > Since 2014, providing \$800,000 annually in operating funds to EBDI
- Major milestones since 2014 have included:
- > Completion of a new, 225,000-square-foot State Health Department lab in 2015
 - > In 2016, completion of 1812 Ashland Avenue – a 170,000-square-foot life sciences building anchored by Johns Hopkins Technology Ventures
 - > In 2016, the opening of Eager Park, a five-acre park that provides a new focal point for the neighborhood
 - > In 2017, the opening of the new 194-room Marriott Residence Inn at Johns Hopkins
 - > In 2017, completion of 49 units of market-rate, owner-occupied housing
 - Under the Homewood Community Partners Initiative (HCPI) Johns Hopkins has committed \$10 million to a series of projects in areas such as elementary and secondary education, housing, commercial development and quality-of-life improvements – aimed at strengthening the neighborhoods that surround the University's Homewood campus. Examples of projects supported with University funds during HCPI's first eight years have included:
 - > Renovation of, and introduction of new programs at, the Margaret Brent and Barclay schools
 - > Providing 152 Live Near Your Work Grants to Johns Hopkins employees who have bought homes in the HCPI area near the Homewood campus
 - > \$800,000 in operating support for the Central Baltimore Partnership
 - > Neighborhood commercial revitalization initiatives, such as the Waverly Main Street and North Avenue improvement strategies

- In addition to its cash contributions, Johns Hopkins has used lease agreements to support \$173 million in new private investments in the HCPI area – such as Remington Row, a \$40 million mixed-use project that includes a JHCP primary care center, and the \$18.5 million renovation of the Center Theater, now the home of a joint Johns Hopkins-MICA film program.
 - Johns Hopkins seeks to strengthen neighborhoods through its Live Near Your Work (LNYW) program, which provides grants to encourage Johns Hopkins employees to purchase homes near its principal locations in Baltimore. From fiscal year 2009 through the fiscal year 2019, over 1,100 homebuyers employed by Johns Hopkins (including the 152 cited above who bought homes in the HCPI area) received LNYW grants totaling \$11,622,000 – an average of approximately \$10,400 per homebuyer – of which \$8.2 million was contributed by Johns Hopkins, along with \$3.3 million provided by the City and the Rouse Foundation.
 - Like other not-for-profit hospitals, the six Johns Hopkins Health System hospitals are required by the federal government to track and report annually on the benefits they provide to their local communities, such as charity care, health education programs, support for community organizations and participation in local community improvement projects. For fiscal year 2018, the community benefits provided by all six health system hospitals totaled nearly \$468.4 million.
- > The community benefits provided by the four JHHS hospitals located in Maryland – Johns Hopkins Hospital, Johns Hopkins Bayview Medical Center, Howard County General Hospital and Suburban Hospital – were valued at more than \$404.4 million.
 - > The community benefits provided in D.C. by Sibley Memorial Hospital in fiscal year 2018 were valued at \$20.6 million, and those provided by Johns Hopkins All Children’s Hospital in Florida at nearly \$43.4 million.
- In 2019 Johns Hopkins Hospital, Johns Hopkins Bayview Medical Center and eight other Baltimore hospitals launched a new initiative that aims to provide stable housing, health care and supportive services for 200 individuals and families who are homeless or at risk of becoming homeless. In addition to housing, the program will teach its clients independent living skills, connect them with community-based health care and provide employment services. The program’s goals include helping clients avoid a return to homelessness, improving their health and reducing their need for emergency care.

Supportive services will be managed by Health Care for the Homeless, a Baltimore-based non-profit. The program will be funded in part by the State’s Medicaid program, and in part by a two-year commitment of \$2 million from the participating hospitals, including \$800,000 from the Johns Hopkins Hospital and Johns Hopkins Bayview.

- Johns Hopkins is engaged in a wide range of partnerships aimed at strengthening K-12 education in Maryland and expanding educational opportunities for the State’s young residents. Examples include:

- > Collaborating with Paul Laurence Dunbar High School to launch one of Maryland's first two P-TECH (Pathways in Technology Early College High School) programs. P-TECH is an innovative program that prepares students for careers in science and technology by combining rigorous high school studies with work for a corporate partner (at Dunbar, either Johns Hopkins or Kaiser Permanente) and a two-year community college degree. Dunbar's program is focused on preparing students for careers in health information. Its first cohort of 50 students was enrolled in September 2016. Total enrollment increased to 150 in 2018-2019, and is projected to reach 250 by 2021. More than 80 percent of participating students were from low-income families, and 100 percent were either African-American or Latino.
- > STEM Achievement in Baltimore Elementary Schools (SABES), a program that seeks to improve science education in grades 3 to 5 in nine of the City's elementary schools.
- > Vision for Baltimore, a program launched in 2016 by Johns Hopkins, the Baltimore City Health Department, the Baltimore City Public Schools and Vision for Learning that is providing free vision screenings to all K-8 students in the City's public schools, and free eyeglasses (donated by manufacturer and online retailer Warby Parker) to students who need them. During its first three years, the program provided over 50,000 screenings and 8,886 eye exams to students, and distributed 6,642 pairs of eyeglasses.
- > During the 2016-2017 academic year, placement of approximately 344 School of Education graduate students in teaching, counseling and other internships in 204 schools, institutions and community organizations in Maryland.
- > APL's Student Program to Inspire, Relate and Enrich (ASPIRE), which during fiscal year 2017 placed 255 high school juniors and seniors in one-on-one internships at APL in areas such as computer science, engineering, physics and applied math. During the academic year, 145 student interns worked at APL for at least five hours each week; 110 summer interns worked at the Lab at least 25 hours a week for six weeks.
- > Maryland MESA, an extracurricular science program at APL for students in grades 3 to 12 that serves approximately 2,500 students and 180 teachers each year.
- > Girl Power, APL's annual STEM expo, which drew approximately 1,100 elementary and middle school students and their families to the Lab for a day of activities designed to inform them about and interest them in STEM education and career opportunities.
- > Medical Explorers, a program offered by both Johns Hopkins All Children's Hospital and Sibley Memorial Hospital, provides high school students with opportunities to meet with and learn from health care professionals about the career opportunities the field offers.

- > Johns Hopkins All Children's Hospital is the lead agency for the Safe Routes to School program. This is a school-based injury prevention program funded statewide by the Florida Department of Transportation that reaches more than 100,000 students and educators in Florida annually to educate K-8 students on proper biking and pedestrian conduct.
- Johns Hopkins has been a partner in Baltimore's efforts to reduce violent crime and drug (especially opioid) abuse.
 - > The Johns Hopkins Hospital's Broadway Center for Addiction is one of Baltimore's leading providers of treatment for opioid abuse. The Center – which serves about 400 patients each year – provides initial screening, referrals to inpatient detox (when needed) at the Hospital, and a comprehensive program of outpatient services that includes treatment with drugs that block the craving for opioids; individual and group counseling; and health and social services. Because most of its patients are homeless, the Center also works with local organizations to provide transitional housing.
- > In 2016 the University and the City launched the Johns Hopkins-Baltimore Collaborative for Violence Reduction – an effort to assist the Baltimore Police Department (BPD) in developing more effective approaches to reducing gun violence in Baltimore, while also taking into account community concerns about previous BPD attempts to address the problem. University researchers have worked with the BPD to evaluate and strengthen existing anti-violence programs; to develop strategies for reducing illegal gun ownership; and to improve police-community relations.
- > In April 2019, the Maryland General Assembly approved the Community Safety and Strengthening Act, a bill that among other initiatives authorizes Johns Hopkins, working closely with the Baltimore Police Department to establish its own police force. The new force will include up to 100 sworn peace officers, trained and certified to carry firearms. The bill also requires extensive training in community policing, conflict de-escalation and violence prevention, and creation of a police accountability board.

- Johns Hopkins is also an important cultural resource for Baltimore-area communities. For example:
 - > Peabody Preparatory provides music lessons, classes and other programs for area residents, both children and adults, at all levels of proficiency. In the fall of 2018, 1,914 were enrolled in Prep courses and programs, including 708 who were residents of Baltimore.
 - > In partnership with 23 local community organizations, Peabody Institute students in 2017-2018 presented 175 “community performances” in neighborhoods across the City.
- Baltimore neighborhoods and their residents also benefit from engagement of Johns Hopkins students in various forms of community service. In 2016-2017:
 - > Homewood students performed more than 124,500 hours of community service. Over 3,600 students performed nearly 100,600 hours of community service work through Center for Social Concern-based programs.
 - > Nearly 1,300 students from the East Baltimore campus performed more than 63,950 hours of community service work through programs affiliated with SOURCE (the Student Outreach Research Center), which provides a focal point for community engagement at the School of Medicine, the School of Nursing and the Bloomberg School of Public Health.

The impact of affiliated institutions

Beyond the impact of Johns Hopkins itself, Baltimore’s economy is strengthened by the presence of institutions that are affiliated with or which have chosen to locate on or near Johns Hopkins’ campuses. While they exist separately from Johns Hopkins and have their own leadership, governing structures and funding, were it not for the presence of Johns Hopkins these institutions might not have located in Baltimore. The most notable are:

- The Kennedy Krieger Institute, with 2,640 employees, an extensive program of health care, rehabilitation and education for children with disabilities, and nearly \$35.8 million in research spending in fiscal year 2017
- The Space Telescope Science Institute, with 661 employees and \$156.6 million in research spending
- The Mount Washington Pediatric Hospital, an affiliate of both the University of Maryland Medical System and Johns Hopkins, with 585 employees
- The Lieber Institute for Brain Development, with 99 employees and \$19.1 million in research spending
- The Howard Hughes Medical Institute, located at Johns Hopkins, with 46 employees and \$4.8 million in research spending
- The Johns Hopkins Federal Credit Union, with 79 employees
- The Carnegie Institution for Science, Department of Embryology, with 75 employees and nearly \$11.1 million in research spending

Together these institutions employed 4,185 people in Baltimore in the spring of 2017.

Johns Hopkins' future economic and community impact

During the next five to ten years, changes in the environments in which Johns Hopkins operates are likely to provide multiple opportunities to expand the University's and the Health System's contributions to the communities where it operates – in Baltimore, in Maryland and beyond. At the same time, the University and the Health System are likely to confront a number of challenges that could constrain their ability to contribute to the creation of a better future for Baltimore, for Maryland, and for D.C. and Florida.

- Johns Hopkins is well-positioned to keep attracting and developing the talented undergraduates, graduate and professional students, post-docs, residents, researchers and clinicians on whom the continued growth of an increasingly knowledge-based economy depends. However, any new restrictions on international students, scholars, health care providers and entrepreneurs – or even the perception that the U.S. is a less welcoming place – could present a serious threat to all of the communities where Johns Hopkins operates.
- Johns Hopkins is one of the world's leading research institutions, with strengths that span the humanities and social sciences, the physical sciences and engineering, medicine and public health, space and national security. The diversity of its research enterprise and its growing strength in cross-disciplinary research mean that it is especially well-positioned to increase its external research revenues. But at the same time, the University's continuing success in attracting external research support makes it particularly vulnerable to across-the-board cutbacks in federal funding. Such cutbacks – not just in direct research spending but in the indirect cost components of federal research funding – could have a devastating effect in Maryland and D.C. (and to a lesser extent, in Florida as well). Johns Hopkins and its state and local partners have a shared interest in conveying to Congress the critical importance of maintaining federal support for university research.
- As noted previously, Johns Hopkins has in the past five years greatly broadened and deepened its support for innovation and entrepreneurship. This effort is already paying off – for the University, the Health System and the communities where they operate – and over the next five years that payoff is almost certain to increase. The challenge now is to take both (and their partners in Maryland's innovation ecosystem) to the next level, and to solidify Maryland's place as one of America's leading centers of innovation.

- Despite some real progress during the past decade, the U.S. has still not succeeded in balancing the goals of expanding access to health care, improving its quality and reducing its costs. While there is no easy answer, it has become clear that innovation – in health care technology, delivery, management and financing – is probably the one essential requirement for achieving all three of these goals. Few if any U.S. health care networks are as well-positioned as Johns Hopkins to address this challenge – and to the extent that it can succeed in doing so, Maryland, D.C. and Florida will all benefit.
- Investments by Johns Hopkins such as those described previously will make the communities in which it operates more attractive places to live, work and do business, and will create new opportunities for residents of those neighborhoods. To maximize its return on those investments, however, Johns Hopkins will have to continue to broaden and deepen its local partnerships – with Baltimore City, with communities elsewhere in Maryland, with D.C. and with communities in West Central Florida, with local institutions and organizations, with the business community and with neighborhood residents.
- The \$1.8 billion gift from Michael Bloomberg cited previously will help make a Johns Hopkins education accessible to many more low- and lower-middle-income students. However, the barriers that these students face are often not just financial. The challenge for Johns Hopkins will be to use its adoption of need-blind admissions as an opportunity to address the full range of problems that lower-income students so often confront in their pursuit of a high-quality education – and thus increase the number of lower-income students who attend and succeed at the University.



Introduction

Johns Hopkins, including Johns Hopkins University and the Johns Hopkins Health System, have long played a central role in the economy of Baltimore City and the State of Maryland. The University and the Health System are major enterprises in themselves, and contribute to the vitality of the City's and the State's economy through activities related to their tripartite mission – education, research and health care. Johns Hopkins' expanding role in innovation and enterprise development, and its engagement with the communities in which it operates, similarly contribute to the ongoing development of the economy, locally and statewide. The impact of Johns Hopkins, however, extends beyond Maryland. Both the University and the Health System have facilities and programs in the District of Columbia; and the Health System network also includes a pediatric hospital in Florida.

This report is intended to serve as a source of facts, figures and economic analysis of Johns Hopkins University and Health System operations in multiple geographic areas. One-page fact sheets appear in the appendices to this document and online at www.jhu.edu/gca.

The report assesses, and where possible quantifies, the impact of Johns Hopkins in Maryland, in D.C. and in Florida, and its contributions to the communities in which it operates. Part One provides a brief overview of Johns Hopkins; and to provide a context for the analysis that follows, briefly discusses recent economic trends in Maryland. Part Two analyzes the impact of Johns Hopkins as an enterprise – a major employer, purchaser of goods and services, and sponsor of construction projects. It also analyzes the impact of spending by students at and visitors to Johns Hopkins.

Part Three discusses the University's role in the development of Baltimore's and Maryland's human capital. Part Four examines how its role as one of the nation's leading research institutions contributes to the City's and the State's economy; and Part Five discusses the role of Johns Hopkins in meeting the health care needs of residents of Maryland, D.C. and Florida.

◀ Shaffer Hall at the Johns Hopkins University Homewood campus with the Chesapeake Bay in the background.

Part Six of the report focuses on the University's and the Health System's growing engagement with countries and communities around the world. Part Seven examines the growing role of Johns Hopkins as a source of innovation and entrepreneurship. Part Eight of the report highlights the multiple ways in which Johns Hopkins helps to strengthen the economy in Maryland and beyond through its investments in and engagement with the local communities. Part Nine briefly describes seven Baltimore institutions that are affiliated with, but not officially connected to, Johns Hopkins, and their contributions to the City's and the State's economy.

Finally, Part Ten of the report highlights several areas in which the University and the Health System will in the years ahead have an opportunity to expand on their current contributions to the economic vitality of the communities where it operates, to the quality of life that residents enjoy and to resolving the challenges they will face as they seek to realize their potential.

In assessing the impact of the Johns Hopkins enterprise on Baltimore's economy, it should be noted that most of the operating revenues generated by the University and the Health System are derived from sources outside the City – much of which is then spent in Baltimore. Likewise, in each of the other geographic areas covered in this report – Maryland (including Baltimore), the District of Columbia and Florida – we focus on economic activity resulting from spending that occurs within each of those geographic areas.

This report analyzes data for fiscal year 2019 (ending June 30, 2019) at The Johns Hopkins University and Health System, with the exception of the Applied Physics Laboratory (APL). APL operates on a federal government fiscal year, which ends on September 30; for APL, financial information for the year ending September 30, 2018 is the most recent data available. In some instances where relevant trends have not changed significantly such as visitor and student spending, information from previous years is quoted.

Acknowledgments

We would like to thank the many staff and faculty at the Johns Hopkins University and the Johns Hopkins Health System who have helped us understand the economic and community impacts of their institutions. Over 60 interviews were conducted with leadership and more than a thousand points of data were gathered from responsible individuals throughout the organization. We would especially like to thank Thomas Lewis, Sharon Tiebert-Maddox and Sherry Fluke of the Office of Government and Community Affairs for their ongoing assistance throughout the preparation of this report.



Part One: Johns Hopkins in Maryland and Beyond – An Overview

The Johns Hopkins University and the Johns Hopkins Health System both trace their origins to Johns Hopkins, a Baltimore merchant who at his death in 1873 left a bequest of \$7 million, to be divided equally between a new university and a new hospital. The Johns Hopkins University opened its doors just three years later (in 1876) and was dedicated to advancing learning and scholarly research. The Johns Hopkins Hospital followed in 1889 and was founded to “administer the finest patient care, train superior physicians and seek new knowledge for the advancement of medicine.”

To this day, Johns Hopkins University and the Johns Hopkins Health System remain committed to their tripartite mission of education, research and health care. They honor the founder’s wish to support education and healthcare for the “good of humanity” and provide for those most in need. Today the Johns Hopkins University is ranked among the world’s leading research universities, and the Johns Hopkins Health System is one of the world’s most highly-regarded providers of health services.

◀ [The Johns Hopkins Hospital in Baltimore looking south.](#)

The Johns Hopkins University

The Johns Hopkins University is comprised of nine schools (as shown in Table 1) with a total enrollment of more than 24,700 undergraduate, graduate and professional students. In addition, the Applied Physics Laboratory is a division of the University whose primary mission is to conduct scientific and technological research for federal agencies on topics related to national and homeland security and space exploration.

Table 1: The Johns Hopkins University – major divisions

School/Division	Year founded	Principal location	Enrollment in spring 2019
Krieger School of Arts & Sciences	1876	Homewood	7,882
School of Education	1907	Homewood	2,242
Whiting School of Engineering	1912	Homewood	6,506
Carey Business School	2007	Harbor East	2,219
Bloomberg School of Public Health	1916	East Baltimore	2,364
School of Medicine	1893	East Baltimore	1,269
School of Nursing	1889	East Baltimore	865
Peabody Institute	1857	Mount Vernon	609
School of Advanced International Studies	1943	Washington, D.C.	826
TOTAL	–	–	24,782
Applied Physics Laboratory	1942	Laurel, MD	–

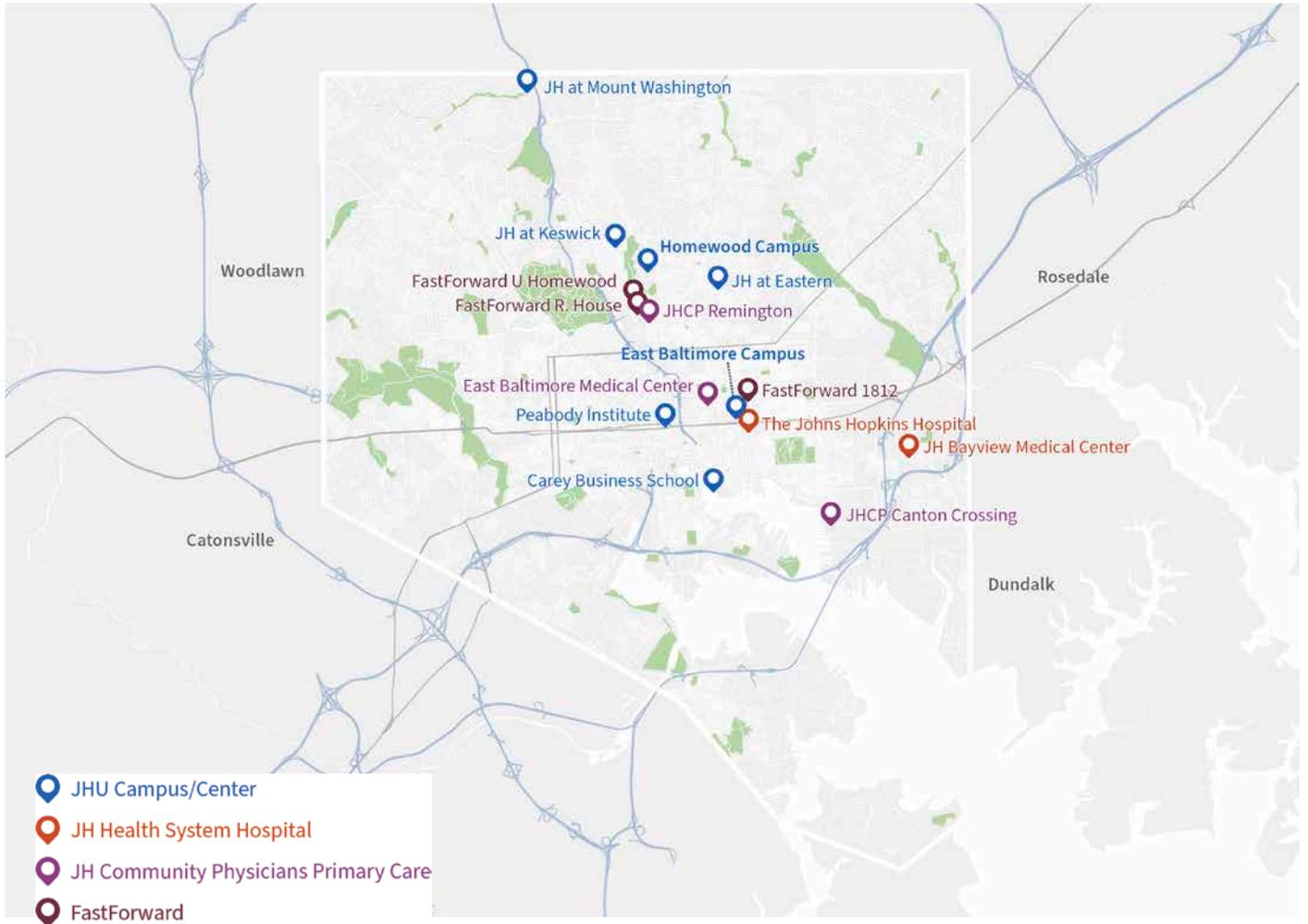
As shown in Figure 1 and Figure 2, the University's major divisions operate at four principal locations in Baltimore, and at several other locations in Maryland and the District of Columbia.

- The **Homewood campus**, located in north Baltimore's Charles Village neighborhood, is the University's headquarters, and home to the Krieger School of Arts and Sciences, the Whiting School of Engineering, and the School of Education.
- The **East Baltimore campus** is home to the School of Medicine, the School of Nursing and the Bloomberg School of Public Health.
- The **Peabody Institute** is located in Baltimore's Mount Vernon neighborhood, near many of the City's leading cultural institutions and organizations.
- The **Carey Business School** occupies four floors of the Legg Mason building in the City's Harbor East area, and offers several part-time master's degree programs at the University's Washington, D.C. Center (described below).
- The **Applied Physics Lab (APL)** is located on a 453-acre campus in Laurel, Maryland, halfway between Baltimore and Washington, D.C. APL also has a field office at a site in Lexington Park, Maryland and at four other sites throughout the U.S.
- The **Paul H. Nitze School of Advanced International Studies (SAIS)** is located in Washington, D.C. Johns Hopkins SAIS also has programs located in Bologna, Italy and Nanjing, China.

- The **Montgomery County Campus**, a 36-acre campus in Rockville, Maryland, offers graduate programs in the arts and sciences. It also includes a 108-acre site nearby that is to be developed as a mixed-use research campus.
- The **Columbia Center**, located in Columbia, Maryland, offers a range of programs for working adults, with a particular focus on teachers and other education professionals.
- At the University's **D.C. Center**, located in Northwest Washington, the Krieger School of Arts and Sciences and the Carey Business School each offer several part-time master's degree programs.

In January 2019, Johns Hopkins announced plans to acquire an existing building on Pennsylvania Avenue in Washington, D.C. that is currently home to the Newseum. Following relocation of the Newseum and an extensive renovation, the 400,000-square-foot building will house Johns Hopkins SAIS, the University's D.C.-based graduate programs in business and the arts and sciences, and potentially other programs as well.

Figure 1: Johns Hopkins locations in Baltimore



The Johns Hopkins Health System

The Johns Hopkins Health System is similarly comprised of multiple divisions operating at multiple locations. The Health System includes six hospitals.

- ***The Johns Hopkins Hospital***, founded in 1889 and located in East Baltimore, is a 1,162-bed acute-care facility that serves as the principal teaching hospital for the Johns Hopkins School of Medicine and as a major center for medical research. Johns Hopkins also operates outpatient health care and surgical centers at several suburban locations.
- ***Johns Hopkins Bayview Medical Center*** is the current incarnation of a hospital that was founded in 1773, making it one of the oldest continuously operating hospitals in the U.S. For many years Johns Hopkins Bayview functioned as a municipal hospital. The City transferred ownership of the facility to Johns Hopkins in 1984. Today it is a 463-bed acute care hospital with particular strengths in geriatric medicine and alcohol and substance use disorder treatment. It also houses Maryland's only burn center.

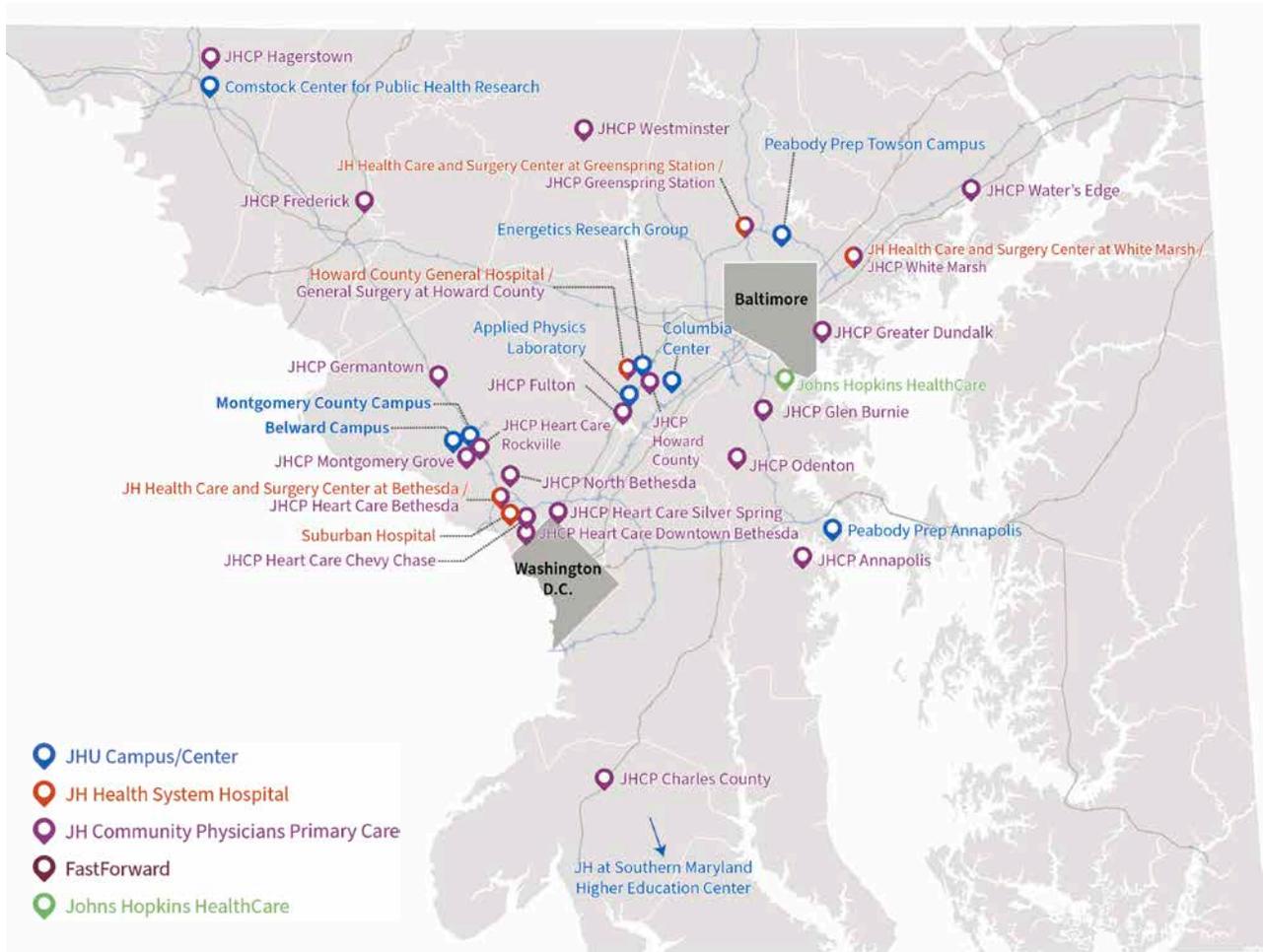
Other facilities located on the Johns Hopkins Bayview 130-acre campus include several biomedical research buildings.

- ***Howard County General Hospital***, located in Columbia, Maryland, was founded in 1973 as a short-stay facility for members of the Columbia Health Plan. It has since evolved into a 243-bed acute care community hospital serving residents of Howard County. The hospital affiliated with the Johns Hopkins Health System in 1998.
- ***Suburban Hospital***, founded in 1943, is a 228-bed acute care community hospital located in Bethesda, Maryland, primarily serving residents of Montgomery County. Suburban has been part of the Johns Hopkins Health System since 2009.
- ***Sibley Memorial Hospital*** is a 288-bed acute care community hospital located in Northwest Washington, D.C. Founded in 1890, Sibley joined the Johns Hopkins Health System in 2010. In addition, it is home to the Grand Oaks assisted living residence, completed in 2000.
- ***Johns Hopkins All Children's Hospital and Health System*** is a pediatric hospital with a 259-bed inpatient facility and an outpatient center in St. Petersburg, Florida. Johns Hopkins All Children's also has 10 children's health centers throughout West Central Florida. Founded in 1926, All Children's joined the Johns Hopkins Health System in 2011.

In addition to its hospital properties, the Johns Hopkins Health System includes several other health service enterprises.

- **Johns Hopkins Community Physicians** provides health services to residents of Maryland and D.C. through a network of 36 primary and specialty health care centers, including 34 in Maryland.
- **Johns Hopkins Home Care Group**, founded in 1983, is a full-service home health care agency owned jointly by the University and the Health System. It provides comprehensive home care services (including medical equipment and supplies) for both adults and children in Baltimore City and in the six-county Greater Baltimore area, and a more limited range of services in six other Maryland counties.
- **Johns Hopkins HealthCare LLC**, based in Glen Burnie, Maryland, is a joint venture of the University and the Health System, created in 1995, that manages four health care plans.
 - > **Priority Partners Managed Care Organization** provides health care for recipients of Medicaid and other publicly-funded health care programs in Maryland.
 - > **Johns Hopkins Employee Health Programs** provides health care for employees of the Johns Hopkins Health System and several partner institutions.
 - > **Johns Hopkins U.S. Family Health Plan** provides health care to military families living in Maryland and in adjoining areas in several other states.
 - > **Johns Hopkins Advantage MD** is a Medicare Advantage plan available to Medicare-eligible residents of Maryland.

Figure 2: Johns Hopkins locations in Maryland



Affiliated institutions

In addition to the schools, research centers and health care providers that are formally part of the Johns Hopkins University and the Johns Hopkins Health System, several other Baltimore institutions share similar missions and locations with Johns Hopkins.

- The ***Space Telescope Science Institute*** manages scientific research, education and public outreach programs for the Hubble Space Telescope and the new James Webb Space Telescope (scheduled to become operational in 2021). The Institute, which was founded in 1981, is located on the University's Homewood campus; it is managed by a consortium of major universities (the Association of Universities for Research in Astronomy) under a contract with NASA.
- The ***Kennedy Krieger Institute***, founded in 1937, serves children and adolescents with developmental disabilities through an array of programs that includes health care, special education, research and professional development. The Institute's principal facilities are adjacent to the Johns Hopkins East Baltimore campus. It also operates a branch of the Kennedy Krieger School in Silver Spring, and offers behavioral health services in Odenton and Columbia.
- The ***Howard Hughes Medical Institute (HHMI)***, a non-profit foundation created in 1953, is one of the world's leading biomedical research organizations. The Institute employs more than 2,300 senior scientists, post-doctoral researchers and graduate students, who work primarily in laboratories located at 58 leading U.S. universities, hospitals and other research centers. Johns Hopkins hosts 46 employees on its East Baltimore campus. HHMI's headquarters is located in Chevy Chase, Maryland.
- The ***Carnegie Institution of Washington's Department of Embryology***, a leading center of research in developmental biology, has been affiliated with Johns Hopkins since 1913. It is located on the Homewood campus, and its researchers work closely with the University's Department of Biology.
- The ***Lieber Institute for Brain Development*** is a non-profit research foundation specializing in neuroscience. The Institute is located in the Science + Technology Park in East Baltimore, a location that the Institute chose in part due to the opportunities it offers for collaboration with researchers at Johns Hopkins.
- ***Mount Washington Pediatric Hospital (MWPH)*** is a 102-bed hospital, located in northwest Baltimore, that provides inpatient and outpatient rehabilitation and other specialty services for children. MWPH was founded in 1922 as a children's convalescent home, and gained Joint Commission certification as a hospital in 1979. Since 2006, MWPH has been jointly owned by and affiliated with the University of Maryland Medical Center and Johns Hopkins.
- The ***Johns Hopkins Federal Credit Union (JHFCU)*** is a full-service financial institution founded in 1971. Membership is open to employees of Johns Hopkins University and the Johns Hopkins Health System, University students and alumni, employees of several Johns Hopkins affiliates and several other Maryland educational institutions, and residents of certain Baltimore neighborhoods. As of the third quarter of 2018, JHFCU had 43,038 members, and assets totaling more than \$452 million.

Johns Hopkins in context: the Maryland economy

Understanding the impact of Johns Hopkins on Baltimore's and Maryland's economy requires an understanding of the economic context within which the University and the Health System operate. That context is shaped in part by the divergent experiences of Baltimore City and the State.

Following the recession of 2000-2002, Maryland as a whole saw five years of moderate growth. Between 2002 and 2007, private payroll employment in Maryland grew by 5.5 percent – an increase of about 108,000 jobs. Health care, education, professional and technical services, construction and hospitality industries all registered strong gains during this period, accounting for much of the State's growth.

The "Great Recession" of 2008-2010, however, effectively wiped out all of the employment growth that had occurred earlier in the decade. Between 2007 and 2010, private payroll employment in Maryland fell by 5.6 percent – a loss of nearly 117,000 jobs. Several sectors of the State's economy were hit especially hard, including construction, manufacturing and financial services.

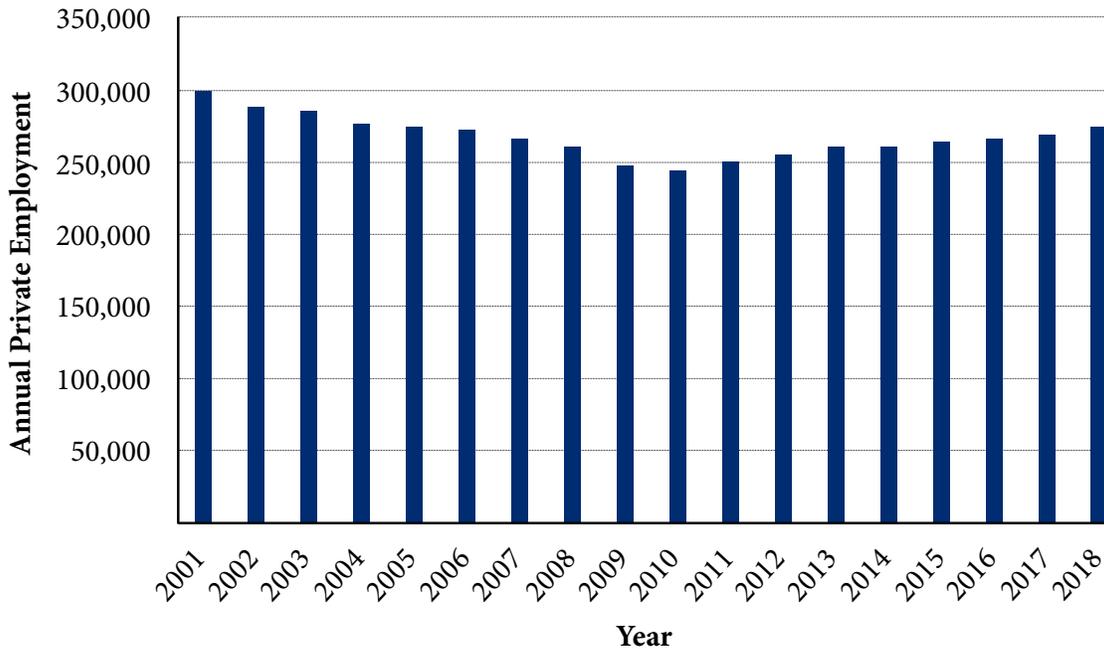
Baltimore City's experience during the century's first decade was markedly worse. The City missed out on the State's and the nation's recovery from the recession of 2000-2002, as its job base continued to erode. It was then hit hard by the financial crisis of 2007-2008 and the recession that followed. Between 2001 and 2010, private-sector wage-and-salary employment in Baltimore fell by 18.3 percent – a loss of nearly 55,000 jobs.

Since 2010, however, the City's record contrasts sharply with its experience during the preceding decade. From 2010 through 2018, average annual private wage-and-salary employment in Baltimore rose by 12.2 percent to 275,311 – a gain of 29,926 jobs. By 2017, the City had gained back all of the jobs it had lost during the recession of 2008-2009, and was still growing. Job growth has been particularly strong in business and professional services, health care, transportation and hospitality.

Among City residents, unemployment dropped from a high of 11.8 percent in August 2010 to 5.3 percent in March 2019.

The State's economy similarly began to recover in 2010, and since then has experienced continued steady growth. From 2010 through 2018, private payroll employment in Maryland grew by 11.2 percent – an increase of more than 219,730 jobs. By 2017 private wage-and-salary employment in Maryland exceeded its pre-recession peak by approximately 82,000 jobs; and by March 2019 the State's unemployment rate had fallen to 3.9 percent.

Figure 3: Average annual private employment in Baltimore City, 2001 – 2018



Source: Quarterly Census of Employment and Wages (BLS)

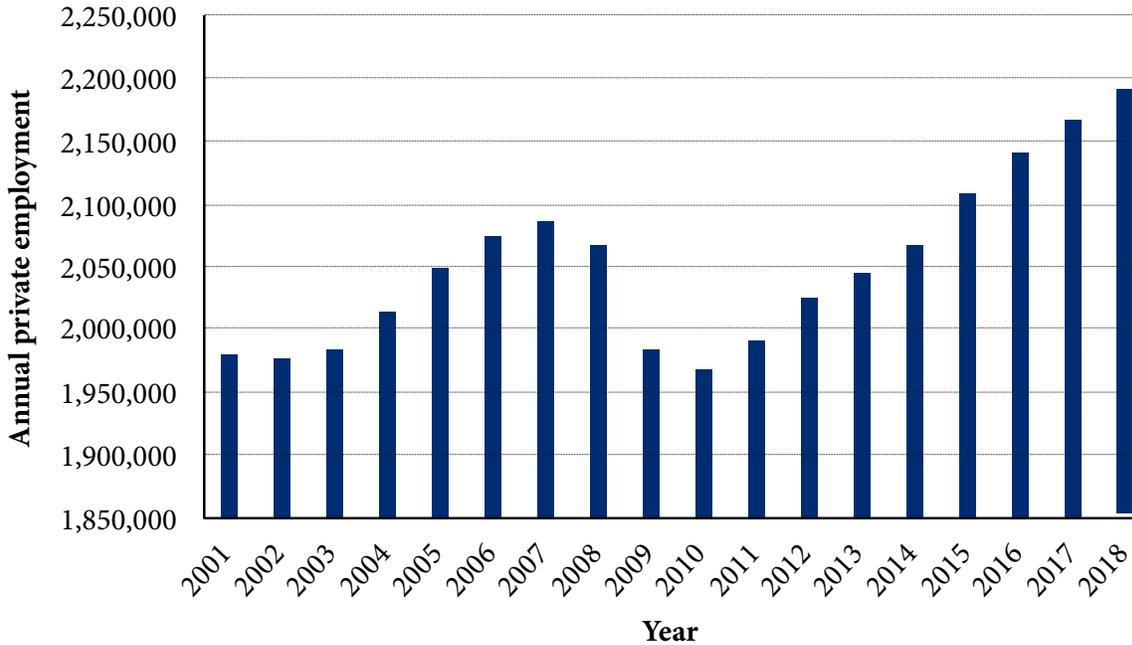
While Baltimore’s job gains since the beginning of the recovery are encouraging, they nevertheless mask some continuing weaknesses.

- Although the long-term decline of the City’s resident population has slowed in recent years, it has not stopped. Between 2013 and 2018, Baltimore’s population fell by nearly 3.2 percent – a loss of about 19,600 residents.
- Baltimore’s median household income in 2018 was \$51,000, nearly 39 percent below Maryland’s median household income (\$83,242).

- In 2018, 17.8 percent of all Baltimore residents – including 24.1 percent of all residents less than 18 years old – lived in households with incomes below the federally-defined poverty level.⁴ Poverty rates in the City have declined in recent years – but only slightly.
- In 2018, more than 59,600 Baltimore residents age 25 and older – about 14.1 percent of the City’s 25-and-older population – had less than a high school education.

⁴ For a family of four, the federally-defined poverty threshold in 2018 was \$25,100.

Figure 4: Average annual private employment in Maryland, 2001 – 2018



Source: Quarterly Census of Employment and Wages (BLS)

- After gradually declining for seven straight years, Baltimore’s violent crime rate surged again after 2014 – from 1,338 violent crimes per 100,000 residents in 2014 to 2,027 in 2017, an increase of 51.5 percent. The City’s homicide rate rose from 33.8 per 100,000 residents in 2014 to 55.8 in 2017 – an increase of 65.0 percent.⁵ This spike in violent crime was halted in 2018, with the City’s overall violent crime rate falling to 1,816 per 100,000 residents, and the murder rate falling from 55.8 to 50.7 per 100,000 residents.⁶ Nevertheless, Baltimore is still by most measures one of the most violent cities in the U.S. – a reality that undermines its ongoing efforts to attract new residents, skilled workers and increased investment.

Across fifteen years of moderate growth, severe recession and gradual recovery, health care and higher education have been among the bright spots in Baltimore’s and Maryland’s economy. After adding 28,800 private wage-and-salary jobs between 2002 and 2007, the health services sector kept growing through the recession and into the recovery. From 2007 through 2018, wage-and-salary employment in health services grew by 64,800 jobs – an increase of 25.0 percent. Higher education has also played an important role – both as a significant industry in its own right and by supporting growth in other sectors.

In both health care and higher education, Johns Hopkins has been a major contributor to the vitality of the City’s and the State’s economy. Part Two of the report examines the impact of Johns Hopkins as the City’s and the State’s largest private enterprise.

5. FBI Uniform Crime Reports, September 2018; Nathan James, *Recent Violent Crime Trends in the United States*, Congressional Research Service, June 20, 2018.

6. Ames Grawert and Cameron Kimble, *Crime in 2018: Updated Analysis*, Brennan Center for Justice, New York University Law School, December 2018.



Part Two: Johns Hopkins Facts, Figures and Impacts Across Maryland, District of Columbia and Florida

As a major enterprise in its own right, Johns Hopkins contributes to the economic vitality of Maryland and other communities where it operates in several ways: as a major employer, a buyer of goods and services from local businesses, a sponsor of construction projects and a generator of tax revenues.

Before assessing the combined impacts of the Johns Hopkins University and the Johns Hopkins Health System in each of these areas, we describe briefly the combined revenues of the Johns Hopkins enterprise, the sources from which those revenues are derived, and the growth in total revenues since 2014.

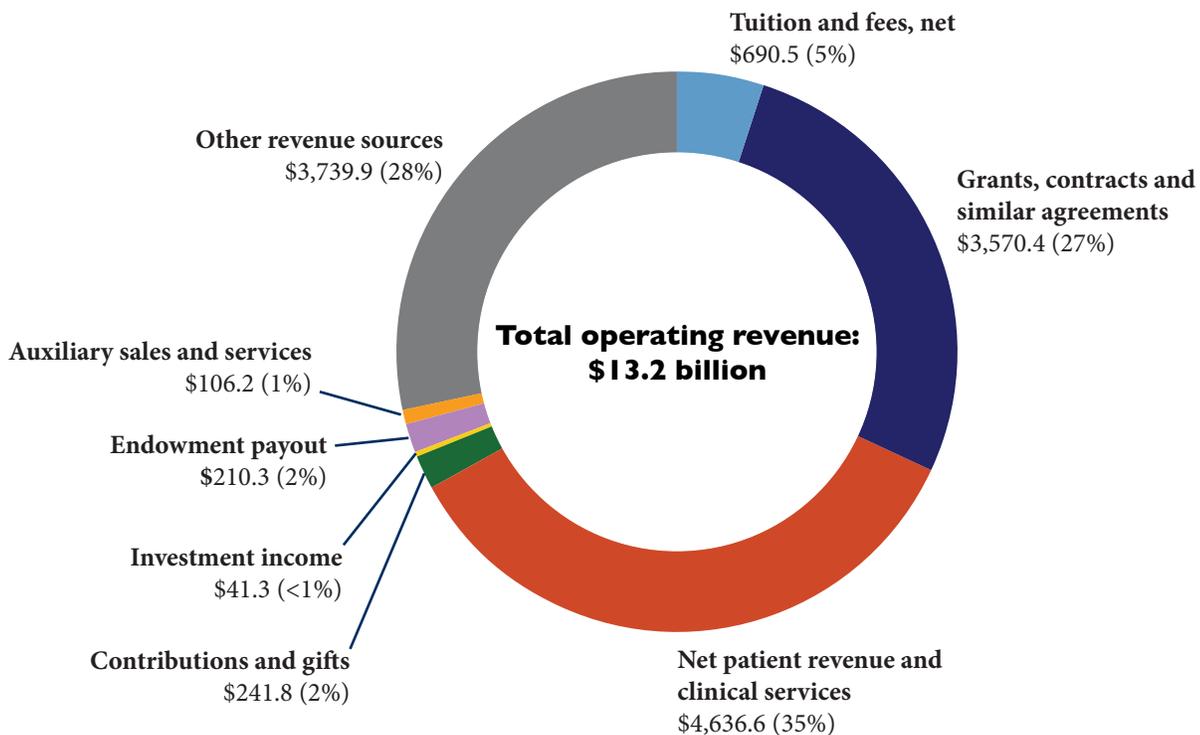
◀ Clockwise from the upper left:

1. The Johns Hopkins Hospital Billings Dome at night.
2. A young musician tries out a contrabassoon at a Peabody community outreach event.
3. Virginia sculptor Kendall Buster's *Vessel Field* hovers above the Gilman Hall atrium at the Johns Hopkins University.
4. Graduation exercises at the Johns Hopkins University Homewood campus.
5. Columns of an entrance into Gilman Quad on the University campus.
6. A Baltimore City resident is fitted with free eyeglasses as part of the Vision for Baltimore project.
7. Set Designer Robert Israel's *School of Puffer Fish* sculpture swims above patients and visitors in the Bloomberg Children's Center of the Johns Hopkins Hospital.
8. Sibley Memorial Hospital's Club Memory members and staff participate in the Walk to End Alzheimer's.

The combined operating revenues of the Johns Hopkins University and the Johns Hopkins Health System totaled \$13.2 billion in fiscal year 2019 – an increase of 5.7 percent from fiscal year 2018, and an increase of 31.1 percent since fiscal year 2014. As Figure 5 shows:

- Net patient care and clinical services (\$4.6 billion) accounted for 35.0 percent of total operating revenues
- Grants and contracts (nearly \$3.6 billion) accounted for nearly 27.0 percent
- Tuitions and fees (net of institutional scholarships and fellowships) totaled nearly \$690.5 million – 5.2 percent
- Contributions and gifts (nearly \$241.8 million) accounted for 1.8 percent
- Endowment payout (\$210.3 million) accounted for nearly 1.6 percent
- Auxiliary sales and services accounted for nearly \$106.2 million, nearly 1.0 percent
- Investment income totaled \$41.3 million – less than 1.0 percent
- Other sources accounted for the remaining \$3.7 billion – 28.2 percent – including nearly \$2.1 billion in insurance premium revenue, nearly \$598.5 million in affiliate revenue and nearly \$27.3 million in Maryland State aid

Figure 5: The Johns Hopkins University and the Johns Hopkins Health System combined operating revenues, FY 2019 (\$ millions)



Employment at Johns Hopkins

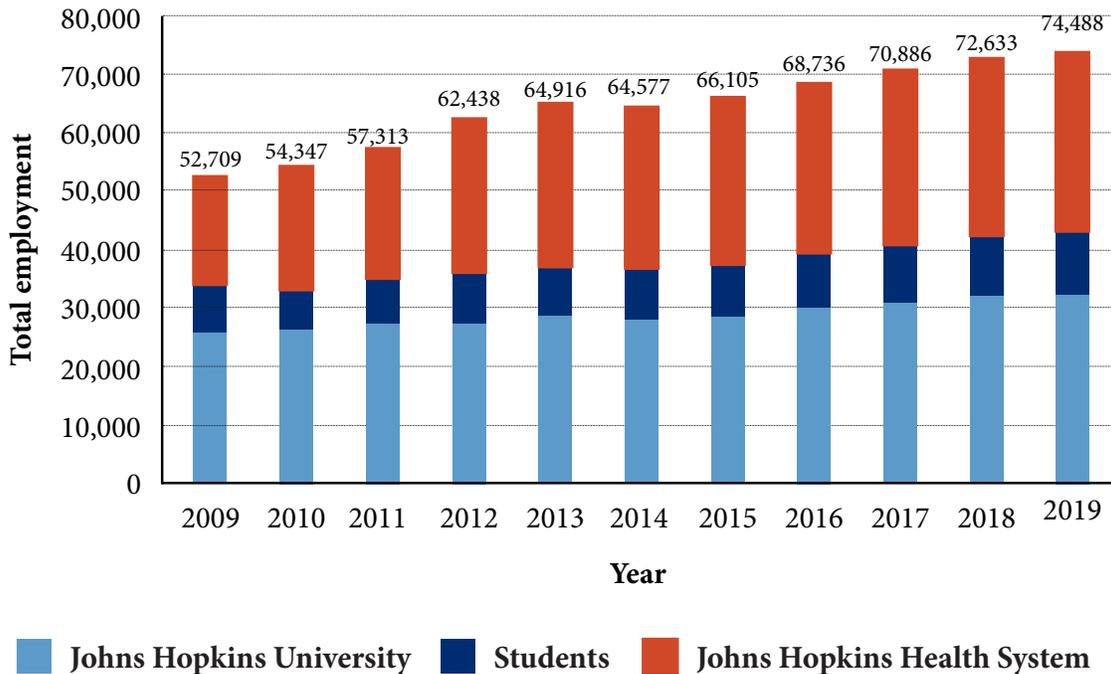
In assessing the impact of the Johns Hopkins enterprise on Baltimore’s economy, it should be noted that most of the operating revenues generated by the University and the Health System are derived from sources outside the City – much of which is then spent in Baltimore.

Nearly all of the operating revenues that Johns Hopkins generates each year are spent directly on education, health care, research, community service and investments in new and existing facilities. In fiscal year 2019, the combined net operating revenues of the University and the Health System accounted for approximately 1.6 percent of total operating revenues. Maintaining this relatively modest operating margin helps stabilize the University’s and the Health System’s operations.

In the spring of 2019, Johns Hopkins directly employed 74,488 people (including students) – an increase of 15.3 percent (9,911 jobs) since the spring of 2014, and an increase of 41.3 percent (21,779 jobs) since 2009 (as shown in Figure 6). This total included:

- 63,844 regular employees, of whom 77.9 percent worked full-time
- 10,644 undergraduate, graduate and professional students who were employed in a variety of part-time positions

Figure 6: Johns Hopkins total employment, spring 2009 – spring 2019



Of the 63,844 people (excluding students) directly employed by Johns Hopkins in the spring of 2019, 54,623 (85.6 percent) worked at Johns Hopkins locations in Maryland. This included 40,564 non-student employees (63.5 percent of all Johns Hopkins non-student employees) who worked at Johns Hopkins locations in Baltimore City, primarily on the Homewood or East Baltimore campuses.

In addition to these regular employees, Johns Hopkins employed 9,970 students at its various locations in Maryland (primarily in Baltimore), for a total of 64,593 Johns Hopkins employees working in Maryland, including 50,297 in Baltimore.

Johns Hopkins is Baltimore's (and Maryland's) largest private employer. By adding 4,497 non-student jobs at its various Baltimore locations between the spring of 2014 and the spring of 2019, Johns Hopkins directly accounted for approximately 29.2 percent of Baltimore's private-sector job growth during that same period. Between the spring of 2014 and the spring of 2019, the number of Johns Hopkins non-student employees working in Maryland increased nearly 12.9 percent – an increase of 6,226 jobs.

Table 2 shows the breakdown of Johns Hopkins employment (excluding students) by worksite location as of the spring of 2019.

As shown in Table 2, Johns Hopkins also employed 9,221 people (excluding students) at its locations outside of Maryland, including:

- 3,535 employees at its various locations in D.C.
- 3,610 employees at Johns Hopkins All Children's Hospital's main campus and other facilities in Florida

In addition to these regular employees, Johns Hopkins employed 539 students at its various locations in D.C., for a total of 4,074 Johns Hopkins employees working in D.C.

Table 2: Johns Hopkins employment (excluding students) by worksite location, spring 2019

Worksite location	Jobs
Maryland	54,623
<i>Baltimore</i>	40,564
Homewood campus	4,666
East Baltimore campus	26,598
Johns Hopkins Bayview Campus	4,671
Peabody campus	550
Harbor East	436
Other Baltimore locations	3,643
<i>Howard County</i>	9,357
Applied Physics Laboratory	6,774
Columbia Center	165
Howard County General Hospital	1,962
Other Howard County locations	456
<i>Montgomery County</i>	2,276
Montgomery County Center	116
Suburban Hospital	1,925
Other Montgomery County locations	235
<i>Anne Arundel County</i>	1,389
Johns Hopkins Healthcare	1,235
Other Anne Arundel County locations	154
<i>Baltimore County</i>	793
JH Health Care & Surgery Center – Green Spring Station	238
Other Baltimore County locations	555
<i>All other Maryland locations</i>	244
Other JHU Maryland locations	83
Other JHHS Maryland locations	161
Washington, D.C. locations	3,535
Sibley Memorial Hospital	2,267
Other D.C. locations	1,268
Other U.S. locations	5,541
Johns Hopkins All Children’s Hospital (Florida)	3,610
Other U.S. locations	1,931
Non-U.S. locations	145
JHU non-U.S. locations	145
JHHS non-U.S. locations	–
TOTAL	63,844

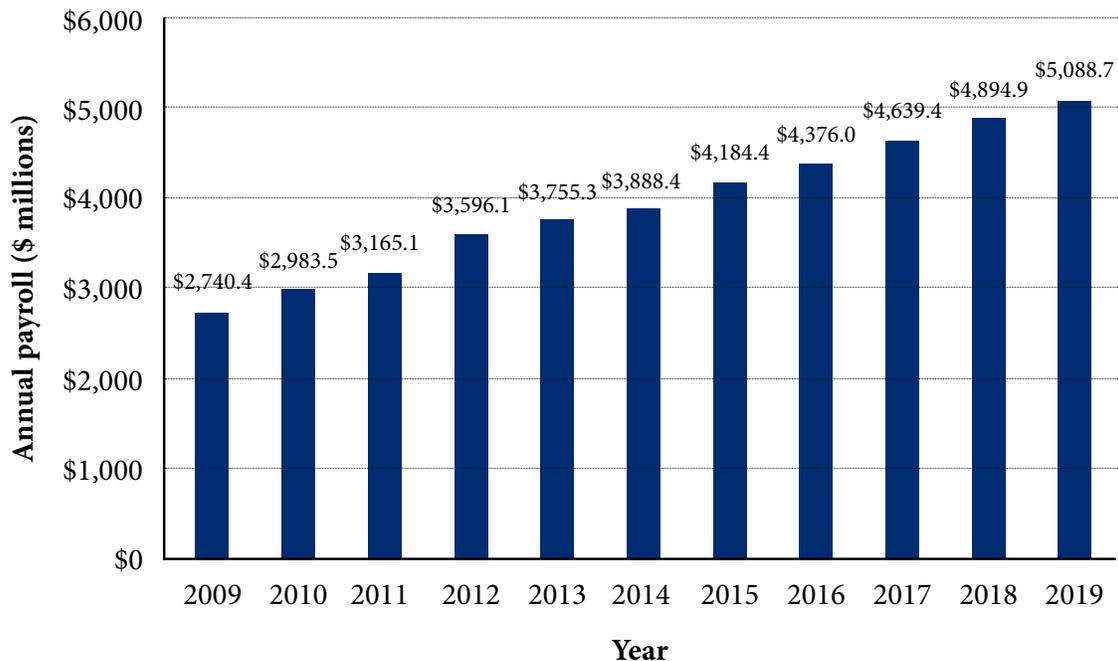
In fiscal year 2019, Johns Hopkins paid a total of nearly \$5.1 billion in salaries and wages – an increase of 30.9 percent since fiscal year 2014 (as shown in Figure 7). This total included nearly \$5.0 billion in salaries and wages paid to regular employees and nearly \$108.3 million in student wages.

Of the nearly \$5.0 billion in non-student payroll in fiscal year 2019, nearly \$4.4 billion (87.8 percent of total non-student payroll) was paid to employees who work primarily in Maryland, including \$3.1 billion (62.3 percent of total non-student payroll) paid to employees who work primarily in Baltimore. An additional \$104.7 million was paid to students employed by Johns Hopkins at its various Maryland locations, including \$100.5 million paid to students employed at Johns

Hopkins’ Baltimore locations. In total, nearly \$4.5 billion in salaries and wages were paid to Johns Hopkins employees working in Maryland, of which more than \$3.2 billion was paid to Johns Hopkins employees working in Baltimore.

In addition, Johns Hopkins paid a total of nearly \$607.2 million in wages and salaries (excluding wages paid to student employees) to employees who work outside of Maryland. This total included \$209.5 million in wages and salaries paid to Johns Hopkins non-student employees who work primarily in D.C. and nearly \$285.1 million to non-student employees at Johns Hopkins All Children’s Hospital’s main campus and other facilities in Florida.

Figure 7: Johns Hopkins annual payroll (including wages paid to student employees), FY 2009 – FY 2019 (\$ millions)



Where Johns Hopkins employees live

As Figure 8 shows, in the spring of 2019, 53,310 Johns Hopkins non-student employees lived in Maryland (83.5 percent of all non-student employees), including 17,005 non-student employees (26.6 percent) who lived in Baltimore City. Based on 2017 American Community Survey data, approximately 6.0 percent of all employed Baltimore residents work for Johns Hopkins.

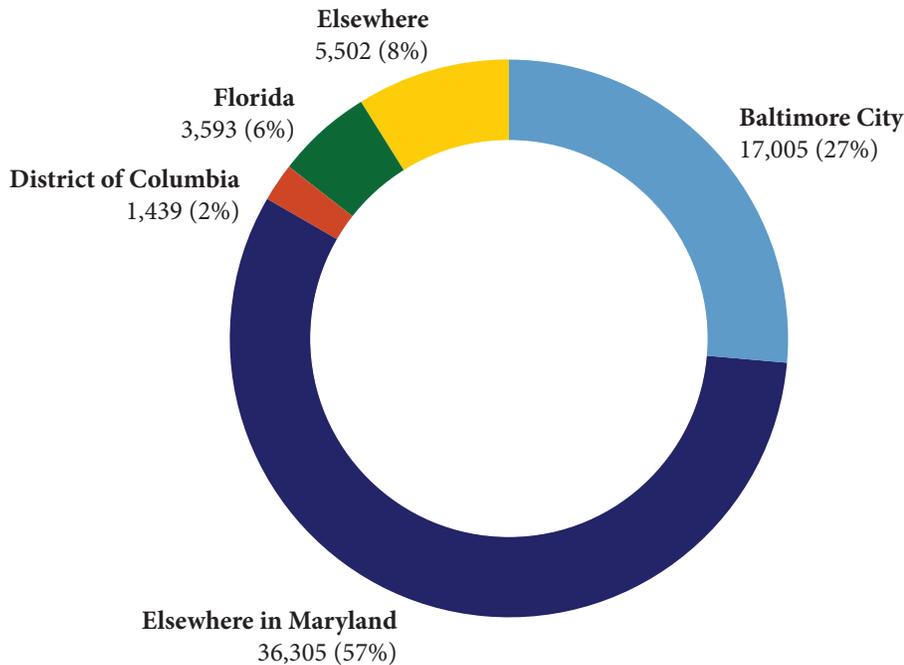
In addition to these regular employees, 7,374 Johns Hopkins student employees also lived in Maryland during the spring of 2019, including 6,467 who lived in Baltimore.

Another 1,439 non-student employees lived in D.C. – 2.3 percent of all non-student employees – and 3,593 (5.6 percent) lived in Florida.

Salaries and wages (excluding wages paid to student employees) paid by Johns Hopkins to Maryland residents in fiscal year 2019 totaled more than \$4.2 billion – 85.0 percent of the total payroll for non-student employees. This total included nearly \$1.2 billion paid by Johns Hopkins to Baltimore residents. Between fiscal year 2014 and fiscal year 2019, total salaries and wages paid by Johns Hopkins to non-student employee residents of Maryland grew by 30.9 percent.

In addition, Johns Hopkins paid nearly \$97.6 million in salaries and wages (excluding wages paid to student employees) to residents of D.C. in fiscal year 2019, and nearly \$282.1 million to non-student employees living in Florida.

Figure 8: Number of Johns Hopkins non-student employees by place of residence, spring 2019



Diversity and quality of Johns Hopkins employment

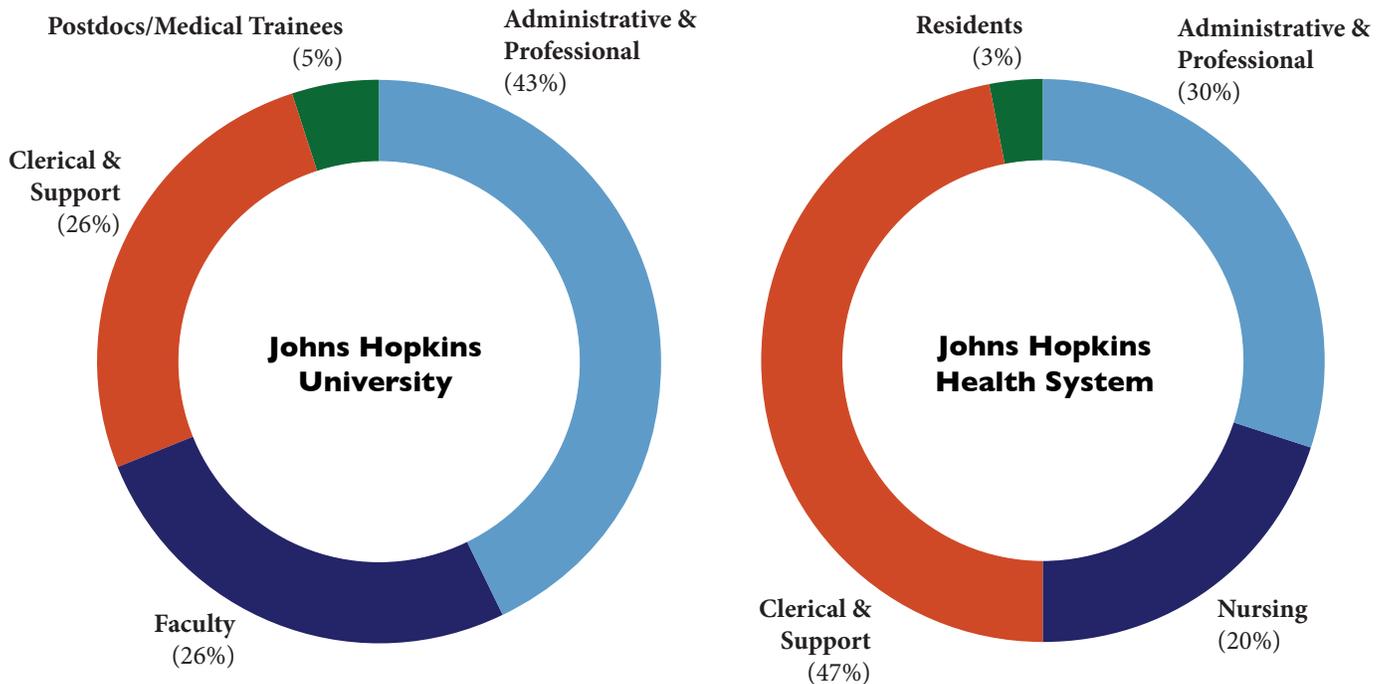
Johns Hopkins offers a variety of high-quality jobs. As Figure 9 shows:

- At the University (including the Applied Physics Laboratory), faculty account for 25.9 percent of total non-student employment; administrative and other professionals account for 43.5 percent; clerical, technical and support staff for 25.6 percent; and postdoctoral and medical trainees, 5.1 percent.
- At the Johns Hopkins Health System, physicians, administrative and other professionals account for 30.4 percent of total non-student employment; nursing staff for 19.9 percent; clerical, technical and support staff for 46.8 percent; and residents, 2.9 percent.

As Figure 10 shows:

- At the University campuses and other locations in Baltimore, faculty account for 30.5 percent of total non-student employment; administrative and other professionals account for nearly 32.5 percent; clerical, technical and support staff for 29.3 percent; and postdoctoral and medical trainees, 7.7 percent.
- At Baltimore-based Johns Hopkins Health System locations, physicians, administrative and other professionals account for 24.2 percent of total non-student employment; nursing staff for 23.6 percent; clerical, technical and support staff for 47.6 percent; and residents, 4.6 percent.

Figure 9: Johns Hopkins non-student employment by occupation, spring 2019



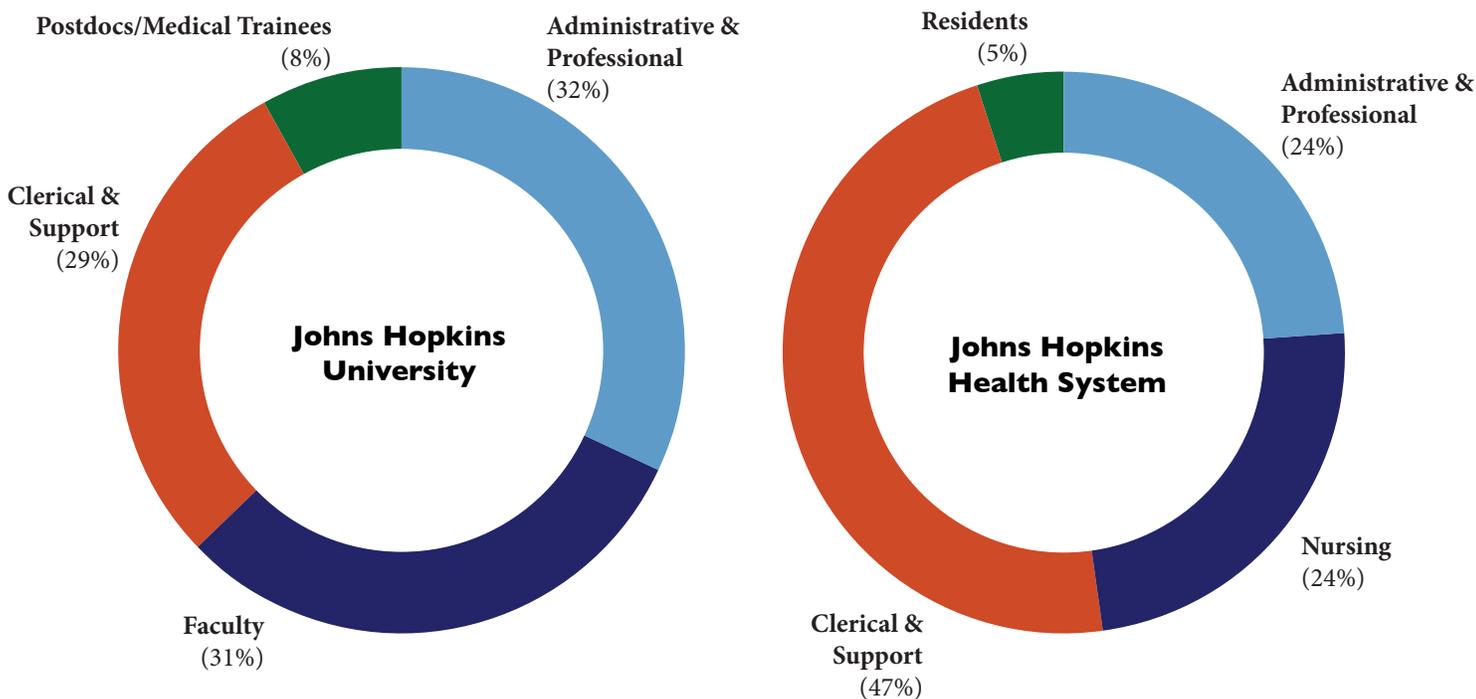
In fiscal year 2019:

- The average salary for full-time, full-year non-faculty employees at the Johns Hopkins University was \$91,092
- The average salary for full-time, full-year Johns Hopkins Health System employees was \$75,449

Earnings are, of course, not the only factor that affects the quality of jobs. Johns Hopkins also provides a wide range of benefits to its employees. They include:

- Health, dental and vision insurance
- Flexible spending accounts
- Life, disability, and long-term care insurance
- Tax-deferred retirement plans
- Live Near Your Work, a program that provides incentives for employees to purchase homes near Johns Hopkins' principal locations in Baltimore (described in Part Eight)

Figure 10: Johns Hopkins non-student employment by occupation at Baltimore locations, spring 2019



Johns Hopkins also provides its employees with training and education opportunities. In fiscal year 2019, Johns Hopkins provided nearly \$67.2 million to their employees in education program benefits.

The University's contribution (excluding APL) included \$30.8 million through the following programs:

- Tuition Remission – Employees and members of their families can be reimbursed tuition costs up to \$5,250 per year for part-time, credit and non-credit, graduate or undergraduate courses at a Johns Hopkins University school. The University provided nearly \$3.6 million in tuition remission to 1,198 employees in fiscal year 2019.
- Tuition Grant – The University provides 50 percent of full-time undergraduate tuition and mandatory academic fees to dependent children of employees for up to four years. In fiscal year 2019, the University provided \$26.7 million for 1,480 children of its employees.
- Tuition Reimbursement – Employees taking part-time undergraduate courses at other universities and colleges may be reimbursed for up to \$2,000 per year for tuition costs. In fiscal year 2019, 300 employees received \$501,482 in tuition reimbursement.

The Johns Hopkins Health System provided \$21.3 million in education benefits to their employees through the programs described below:

- Tuition Assistance – Employees are eligible for up to \$15,000 per year for part-time undergraduate or graduate degree-seeking coursework. The Health System provided \$9.6 million in tuition assistance to 2,825 employees in fiscal year 2019.

- Dependent Child Tuition – The Health System provides 50 percent of undergraduate tuition for dependent children of full-time employees. In fiscal year 2019, the Health System provided nearly \$11.7 million for 1,081 children of its employees.

In addition, the Applied Physics Laboratory provided \$15.0 million in tuition assistance and reimbursement to 5,589 employees and their dependents in fiscal year 2018.

While Johns Hopkins, its employees and their families all benefit directly from these programs, they also benefit Maryland's economy more broadly.

- By making higher education more affordable for thousands of employees and their dependents, they help increase overall levels of educational attainment of the State's and the region's workforce, which (as discussed in Part Three) has positive spillover effects on the Maryland economy as a whole.
- Some of the workers who use these programs to earn undergraduate or graduate degrees may eventually move on from Johns Hopkins to other employers in Maryland, bringing with them the knowledge and skills they have acquired.
- By making higher education more affordable for employees' children, Johns Hopkins also supports greater economic mobility between generations – a critically important step toward solving many of the State's (and the nation's) most pressing economic and social problems.

The impact of purchasing and construction

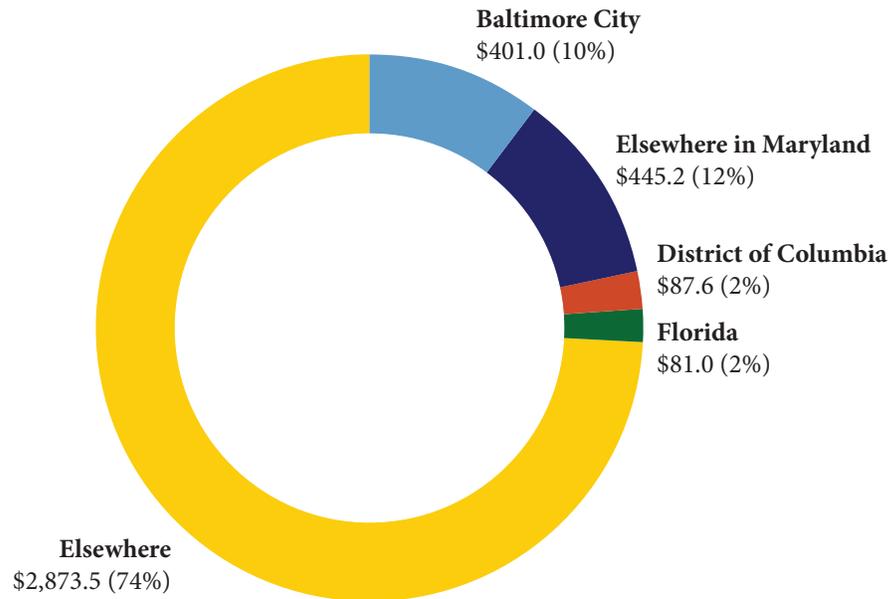
In addition to the people it employs directly, Johns Hopkins supports Maryland's economy and the other communities in which it operates through its purchases of goods and services from local companies, and through construction and renovation of its facilities.

Purchasing goods and services

In fiscal year 2019, Johns Hopkins spent nearly \$3.9 billion on the purchase of goods and services. As shown in Figure 11, of this total approximately \$846.2 million (21.8 percent of total purchasing) was spent on goods and services provided by Maryland companies, including more than \$401.0 million (10.3 percent of total purchasing) spent on goods and services provided by Baltimore companies.⁷

7. For purposes of calculating the local economic impact of Johns Hopkin spending, employee health insurance is treated as a purchased service, with two-thirds of net expenditures allocated according to full-time employees' place of residence.

Figure 11: Johns Hopkins purchasing by location of vendor, FY 2019 (\$ millions)



Leading categories of goods and services purchased from businesses in Maryland in fiscal year 2019 include:

- Professional and technical services
- Leasing of space
- Employee health insurance
- Building services and facilities support

Using the IMPLAN input-output economic modeling system – a modeling tool commonly used in economic impact analyses – we estimate that in fiscal year 2019, Johns Hopkins’ purchases of goods and services directly supported approximately 5,166 jobs in Maryland, including 2,303 jobs in Baltimore.

In addition to their spending with Maryland-based suppliers, Johns Hopkins’ purchases of goods and services in fiscal year 2019 included:

- Nearly \$87.6 million spent with vendors located in D.C., directly supporting 390 jobs in D.C.
- More than \$81.0 million spent with vendors located in Florida, directly supporting 619 jobs in Florida

HopkinsLocal

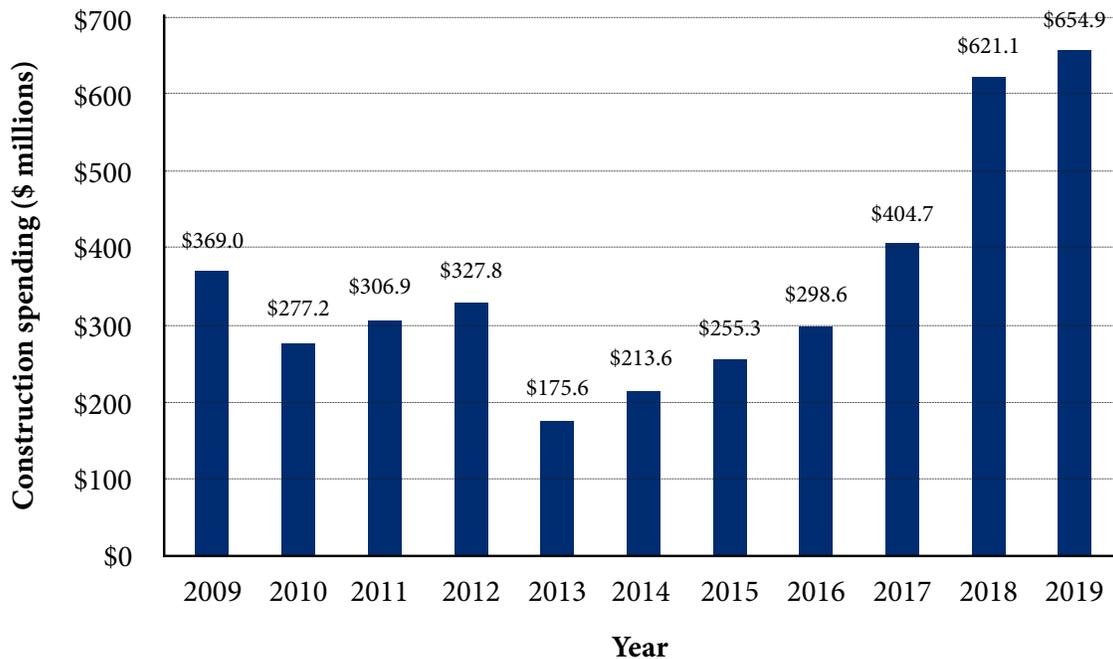
HopkinsLocal, launched in 2015 by Johns Hopkins is an initiative aimed at expanding economic opportunity in Baltimore through its purchasing, construction and hiring activities. In fiscal year 2018, Johns Hopkins:

- Increased purchasing in targeted categories of goods and services from vendors located in selected Baltimore ZIP codes by \$29 million, to a total of \$118.4 million
- Spent \$48.5 million on construction services provided by local minority, women and disadvantaged businesses
- Hired 381 new employees in selected job titles from targeted ZIP codes in Baltimore

Investing in University and Health System facilities

In addition to generating jobs and economic activity through its purchases of goods and services, Johns Hopkins also does so through its investments in its University and Health System facilities. As Figure 12 shows, between fiscal year 2009 and fiscal year 2019, Johns Hopkins invested a total of \$3.9 billion in facility construction and renovation – an average of \$354.9 million annually.

Figure 12: Johns Hopkins construction spending, FY 2009 – FY 2019 (\$ millions)

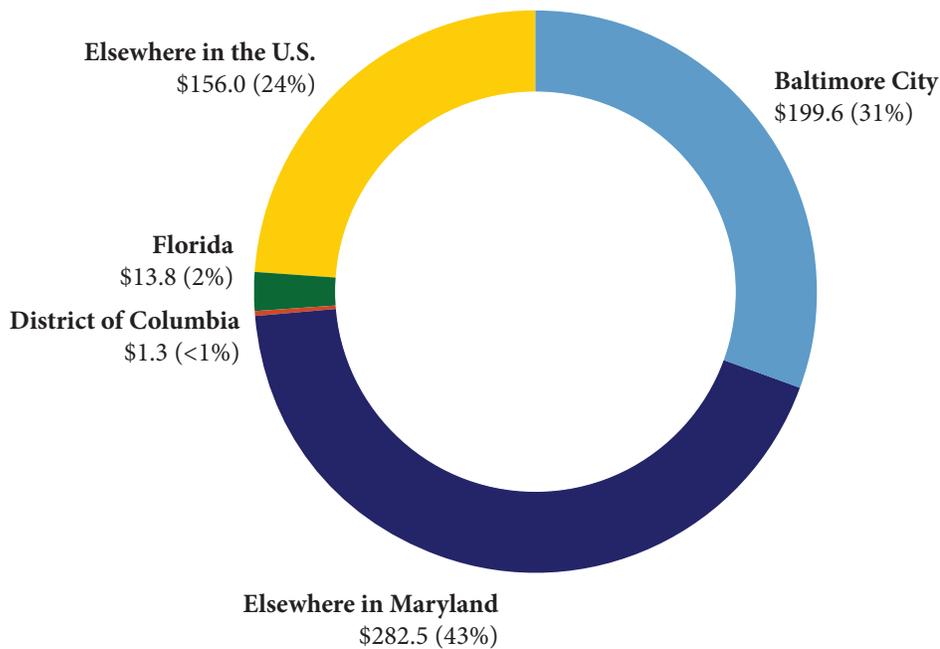


In fiscal year 2019 (as shown in Figure 13), Johns Hopkins spent nearly \$654.9 million on construction and renovation of facilities, of which \$482.1 million (73.6 percent of total construction spending) was paid to contractors and subcontractors located in Maryland, including nearly \$199.6 million (30.5 percent of total construction spending) paid to contractors and subcontractors located in Baltimore. Using IMPLAN, we estimate that in fiscal year 2019, investments in facility construction and renovation directly supported 2,534 jobs in Maryland in construction and related industries, including 1,029 jobs with Baltimore-based firms.

Construction spending in fiscal year 2019 also included:

- Nearly \$1.3 million paid to contractors located in D.C., directly supporting 6 jobs with D.C. contractors
- Nearly \$13.8 million paid to contractors located in Florida, directly supporting 76 jobs with Florida contractors

Figure 13: Johns Hopkins construction spending by location of contractor, FY 2019 (\$ millions)



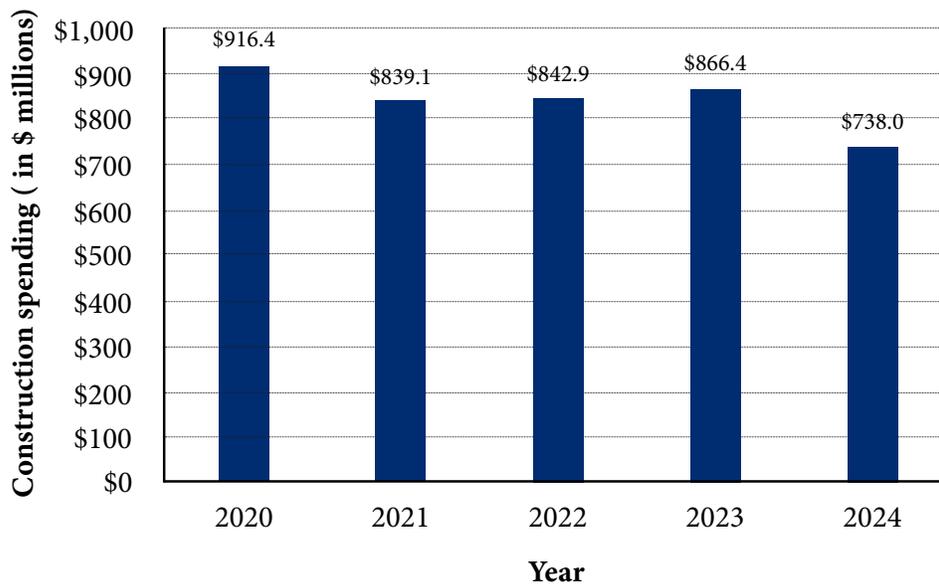
Recently completed major projects included:

- The *Skip Viragh Outpatient Cancer Building*, a new 184,000-square-foot, \$100 million cancer treatment center – a unit of the Kimmel Cancer Center – that opened in the spring of 2018
- A \$26.8 million gut renovation of the 50-year-old *Macaulay Hall*, converting it into 37,000 square feet of new research space for the Krieger School of Arts and Sciences, completed in 2018

The impact of construction spending goes beyond the opportunities it creates for contractors and construction workers in Maryland and elsewhere. Investments by Johns Hopkins in construction and renovation of facilities enhances its ability to fulfill its mission of education, research and patient care, which in turn leads to further growth in employment at Johns Hopkins and enhances its capacity to contribute to the ongoing development of Maryland’s economy and those of the other communities in which it operates.

As shown in Figure 14, over the next five years from fiscal year 2020 to fiscal year 2024, Johns Hopkins estimates it will spend a total of \$4.2 billion in new construction and renovation – an average of approximately \$840.6 million per year.

Figure 14: Johns Hopkins projected construction spending, FY 2020 – FY 2024 (\$ millions)



A new home for Johns Hopkins in Washington, D.C.

In January 2019 Johns Hopkins University announced that it had reached an agreement to purchase 555 Pennsylvania Avenue, a 400,000-square-foot building located in the heart of Washington, D.C. that is now home to the Newseum. The building will provide a single home for the School of Advanced International Studies and other University graduate programs that are now spread across four buildings near DuPont Circle. In addition to these educational programs, 555 Pennsylvania Avenue will provide additional space for University research and a forum for public discussion of issues facing the nation and the world.

In addition to its investment of \$372.5 million in the acquisition of the property, Johns Hopkins estimates that it will spend approximately \$225 million in conversion of 555 Pennsylvania Avenue to academic use. Appleseed estimates that from August 2020 through June 2023, University spending on renovation of the building will directly support an average of 388 jobs each year in construction and related industries, with annual wages averaging \$26.9 million.

As of the spring of 2019, the University employed approximately 1,200 people at its D.C. locations, and enrolled approximately 2,000 students.

Creating opportunities for minority- and women-owned businesses

A significant share of the money Johns Hopkins spends on purchasing and construction is paid to minority- and women-owned businesses. In fiscal year 2019, Johns Hopkins spent \$107.2 million on goods, services and construction work provided by minority- and women-owned businesses. This total included nearly \$39.4 million paid to vendors and contractors in Maryland, including nearly \$17.8 million paid to vendors and contractors in Baltimore.

Direct, indirect and induced effects

The jobs and economic activity generated by Johns Hopkins' spending on payroll, purchasing and construction are not limited to the direct impacts cited above. Using a tool of economic analysis called an input-output model, we can also estimate the indirect and induced (or "multiplier") effects of spending by Johns Hopkins. For example:

- Some of the money that Johns Hopkins pays to its local suppliers and contractors is used to buy goods and services from other local companies, which in turn buy goods and services from other local businesses (the indirect effect)
- Johns Hopkins employees, and the employees of its suppliers and contractors, similarly use part of their earning to buy a wide variety of goods and services, such as housing, utilities, food, personal services and other household needs, from local businesses; the employees of those businesses do the same (the induced effect)

Using IMPLAN, we estimate that in Maryland (including Baltimore), Johns Hopkins' spending on non-student payroll, purchasing and construction in fiscal year 2019 indirectly accounted for:

- 30,746 jobs in Maryland (including Baltimore), with earnings totaling \$1.6 billion
- Nearly \$5.9 billion in statewide economic output

In Baltimore, we estimate that Johns Hopkins' spending on non-student payroll, purchasing and construction in fiscal year 2019 indirectly accounted for:

- 7,469 jobs in Baltimore, with earnings totaling \$427.9 million
- \$1.5 billion in citywide economic output

Beyond Maryland, we estimate that Johns Hopkins' spending on non-student payroll, purchasing and construction in fiscal year 2019 indirectly accounted for:

- 684 jobs in D.C., with \$149.6 million in economic output in D.C.
- 2,527 jobs in Florida, with \$416.1 million in statewide economic output

When we combine these indirect and induced effects with the direct effects cited previously (as shown in Table 3), we estimate that in fiscal year 2019, spending by Johns Hopkins on non-student payroll, purchasing and construction directly and indirectly accounted for:

- 104,517 jobs in Maryland, D.C. and Florida, with earnings totaling \$7.2 billion
- Nearly \$12.8 billion in economic output in Maryland, D.C. and Florida

Table 3: Direct, indirect and induced impacts of Johns Hopkins spending in Maryland and beyond, FY 2019 (earnings and output in \$ millions)

	University			Health System			Total Impact
	<i>Direct impact</i>	<i>Indirect/ induced</i>	<i>Total impact</i>	<i>Direct impact</i>	<i>Indirect/ induced</i>	<i>Total impact</i>	
Maryland							
Jobs	33,821	15,712	49,533	28,501	15,034	43,536	93,069
Wages	\$2,881.6	\$834.0	\$3,715.6	\$1,983.1	\$792.4	\$2,775.5	\$6,491.1
Output	\$3,367.3	\$2,986.0	\$6,353.3	\$2,334.3	\$2,867.5	\$5,201.8	\$11,555.1
District of Columbia							
Jobs	1,557	442	2,000	2,374	242	2,616	4,616
Wages	\$99.0	\$36.4	\$135.4	\$153.5	\$17.5	\$171.0	\$306.4
Output	\$140.6	\$95.2	\$235.8	\$157.8	\$54.5	\$212.3	\$448.0
Florida							
Jobs	37	39	76	4,267	2,489	6,756	6,832
Wages	\$2.1	\$1.9	\$4.0	\$319.2	\$109.8	\$429.0	\$433.0
Output	\$5.9	\$5.6	\$11.5	\$374.0	\$410.5	\$784.5	\$796.0
TOTAL							
Jobs	35,416	16,193	51,609	35,143	17,765	52,908	104,517
Wages	\$2,982.7	\$872.3	\$3,855.0	\$2,455.7	\$919.7	\$3,375.4	\$7,230.4
Output	\$3,513.7	\$3,086.8	\$6,600.6	\$2,866.0	\$3,332.5	\$6,198.5	\$12,799.1

In Maryland (including Baltimore), we estimate that in fiscal year 2019 (as shown in Table 4), spending by Johns Hopkins on non-student payroll, purchasing and construction directly and indirectly accounted for:

- 93,069 jobs in Maryland (including Baltimore), with earnings totaling nearly \$6.5 billion
- Nearly \$11.6 billion in statewide economic output

Table 4: Direct, indirect and induced impacts of Johns Hopkins spending in Maryland (including Baltimore), FY 2019 (earnings and output in \$ millions)

	Direct spending impact		Indirect and induced effects		Total impact
	<i>Employment/ Payroll</i>	<i>Purchasing/ Construction</i>	<i>Employee spending</i>	<i>Vendor/ contractor spending</i>	
University					
Jobs	29,492	4,329	13,229	2,483	49,533
Wages	\$2,610.0	\$271.6	\$689.2	\$144.8	\$3,715.6
Output	\$2,610.0	\$757.3	\$2,584.6	\$401.4	\$6,353.3
Health System					
Jobs	25,131	3,370	12,881	2,154	43,536
Wages	\$1,763.3	\$219.8	\$668.7	\$123.7	\$2,775.5
Output	\$1,763.3	\$571.0	\$2,520.4	\$347.2	\$5,201.8
TOTAL					
Jobs	54,623	7,700	26,109	4,637	93,069
Wages	\$4,373.2	\$491.4	\$1,357.9	\$268.5	\$6,491.1
Output	\$4,373.2	\$1,328.3	\$5,105.0	\$748.6	\$11,555.1

In Baltimore, we estimate that in fiscal year 2019 (as shown below in Table 5), spending by Johns Hopkins on payroll (excluding student employees), purchasing and construction directly and indirectly accounted for:

- 51,364 jobs in Baltimore, with earnings totaling \$3.7 billion
- \$5.2 billion in citywide economic output

Table 5: Direct, indirect and induced impacts of Johns Hopkins spending in Baltimore, FY 2019 (earnings and output in \$ millions)

	Direct spending impact		Indirect and induced effects		Total impact
	<i>Employment/ Payroll</i>	<i>Purchasing/ Construction</i>	<i>Employee spending</i>	<i>Vendor/ contractor spending</i>	
University					
Jobs	21,201	2,257	3,368	933	27,759
Wages	\$1,749.0	\$137.0	\$189.1	\$58.2	\$2,133.4
Output	\$1,749.0	\$411.3	\$709.1	\$155.6	\$3,025.1
Health System					
Jobs	19,363	1,074	2,696	472	23,605
Wages	\$1,353.9	\$68.8	\$150.8	\$29.6	\$1,603.2
Output	\$1,353.9	\$189.3	\$572.2	\$78.6	\$2,194.0
TOTAL					
Jobs	40,564	3,332	6,064	1,405	51,364
Wages	\$3,102.9	\$205.8	\$340.0	\$87.9	\$3,736.6
Output	\$3,102.9	\$600.6	\$1,281.3	\$234.2	\$5,219.1

Beyond Maryland (as shown in Table 6), we estimate that spending by Johns Hopkins on non-student payroll, purchasing and construction in fiscal year 2019 directly and indirectly accounted for:

- 4,616 jobs in D.C., with \$448.0 million in economic output in D.C.
- 6,832 jobs in Florida, with \$796.0 million in statewide economic output

Table 6: Direct, indirect and induced impacts of Johns Hopkins spending in D.C. and Florida, FY 2019 (earnings and output in \$ millions)

	DISTRICT OF COLUMBIA				FLORIDA			
	Direct spending impact		Indirect/ induced effects	Total impact	Direct spending impact		Indirect/ induced effects	Total impact
	Employment/ Payroll	Purchasing/ Construction			Employment/ Payroll	Purchasing/ Construction		
University								
Jobs	1,242	315	442	2,000	–	37	39	76
Wages	\$67.0	\$32.0	\$36.4	\$135.4	–	\$2.1	\$1.9	\$4.0
Output	\$67.0	\$73.6	\$95.2	\$235.8	–	\$5.9	\$5.6	\$11.5
Health System								
Jobs	2,293	81	242	2,616	3,610	657	2,489	6,756
Wages	\$142.5	\$11.0	\$17.5	\$171.0	\$285.1	\$34.1	\$109.8	\$429.0
Output	\$142.5	\$15.3	\$54.5	\$212.3	\$285.1	\$88.9	\$410.5	\$784.5
TOTAL								
Jobs	3,535	397	684	4,616	3,610	695	2,527	6,832
Wages	\$209.5	\$43.0	\$53.9	\$306.4	\$285.1	\$36.3	\$111.6	\$433.0
Output	\$209.5	\$88.9	\$149.6	\$448.0	\$285.1	\$94.8	\$416.1	\$796.0

Contributing to state and local revenues

Despite its tax-exempt status, Johns Hopkins is a significant source of revenues for state and local governments. As shown in Table 7, in fiscal year 2019, Johns Hopkins paid more than \$356.0 million in taxes and fees to the State of Maryland.

Johns Hopkins also paid nearly \$23.3 million in taxes, fees and other payments to Baltimore City and other local governments in Maryland. This total did not include usage fees such as the \$6.6 million paid for water and sewer usage. These payments are summarized below in Table 8.

In addition to these direct payments to the City, in fiscal year 2019, Johns Hopkins spent more than \$7.0 million to provide off-campus security in the neighborhoods where it operates, thus relieving the City of a significant cost it would have to incur if it were to provide these services directly.

As shown in Table 7, Johns Hopkins, as the largest private employer in Maryland, paid \$285.1 million in employment related taxes and fees to the State of Maryland in fiscal year 2019, including nearly \$282.4 million in state and local income taxes withheld from the wages and salaries of Johns Hopkins employees. We estimate that employment at Baltimore-based Johns Hopkins facilities generated approximately \$193.6 million out of the total \$282.4 million in state and local income taxes withheld from all Johns Hopkins employees.

Table 7: Taxes and fees paid by Johns Hopkins to the State of Maryland, FY 2019

Type of tax/fee	Amount
State income taxes withheld	\$282,393,872
Unemployment insurance payments	\$2,747,177
Other taxes and fees	\$70,867,879
TOTAL	\$356,008,928

We further estimate that in fiscal year 2019, the City’s share of income taxes withheld from the salaries and wages of Baltimore residents employed by Johns Hopkins totaled approximately \$20.8 million. Combining this with the nearly \$17.2 million in direct payments to the City, we estimate that in fiscal year 2019, taxes and fees paid by Johns Hopkins to the City of Baltimore totaled nearly \$38.0 million.

Also, under the terms of an agreement that in 2016 was renewed for 10 years, Johns Hopkins gives an annual voluntary contribution of \$3.26 million to Baltimore City.

Table 8: Taxes and fees paid by Johns Hopkins to local governments in Maryland, FY 2019

Type of tax/fee	Amount
City of Baltimore	
Property tax	\$4,963,999
Parking tax	\$6,050,746
Energy taxes	\$4,525,475
Telecom taxes	\$236,305
Licenses/permits/fees	\$947,517
Other taxes and fees	\$463,131
<i>Subtotal, City of Baltimore</i>	\$17,187,174
Other counties/municipalities	
Property tax	\$4,872,390
Other taxes and fees	\$1,193,345
<i>Subtotal, other counties/municipalities</i>	\$6,065,735
TOTAL	\$23,252,908

**This does not include usage fees such as the \$6.6 million paid for water and sewer usage.*

The impact of student and visitor spending

In addition to the impact of its spending on payroll, purchasing and construction, Johns Hopkins contributes to the vitality of Maryland’s economy through off-campus spending by Johns Hopkins students and by out-of-town visitors to the University and the Health System’s hospitals.

The impact of student spending

The impact of student spending is determined in part by whether students live on campus, in off-campus housing owned by the University, or elsewhere in Baltimore or the surrounding communities. In the spring of 2019, 5,390 undergraduate and 19,392 graduate and professional students were enrolled at the Johns Hopkins University. Approximately 45 percent of undergraduate students lived in on-campus housing while virtually all graduate students lived off-campus in Baltimore or the surrounding area.

Based on responses from an online survey on student spending⁸ and supplemental data provided by the University’s Office of Financial Aid, we estimate that during the 2018-2019 academic year, average annual expenditures on housing, transportation, books, supplies, food and personal expenses was \$15,381 for undergraduates living off-campus and \$20,107 for graduate students living off-campus (as shown in Table 9). For undergraduate students living on-campus, we estimate that off-campus spending averaged \$3,731.

8. During the fall of 2014, Appleseed conducted an online survey to understand student spending. Questions captured residence location and type, program and degree status, and weekly expenditures on goods and services. A total of 1,456 undergraduate, graduate and professional students completed the survey. The results of this survey were used to estimate average annual student living expenses for the 2018-2019 academic year.

Table 9: Average annual off-campus expenditures for Johns Hopkins students living off-campus, 2018-2019 academic year

Type of expense	Undergraduate	Graduate
Room and board	\$11,650	\$16,376
Supplies, entertainment and personal expenses	\$3,165	\$3,165
Transportation	\$566	\$566
TOTAL	\$15,381	\$20,107

Based on these average annual off-campus expenditures, we estimate that in fiscal year 2019, off-campus spending in Maryland by Johns Hopkins students totaled approximately \$193.9 million. This figure includes off-campus spending by undergraduate students and off-campus spending by full-time graduate students.⁹ Spending by part-time graduate students was excluded from the analysis as we assume they would have been in Baltimore regardless of their enrollment at Johns Hopkins. In addition, spending was excluded for the 25 percent of undergraduate and graduate students originally from Maryland who indicated that they would have attended another college or university in Maryland if they did not attend Johns Hopkins.

Using IMPLAN (as shown in Table 10), we estimate that in fiscal year 2019, off-campus student spending directly and indirectly accounted for:

- 1,991 jobs in Maryland, with earnings totaling nearly \$71.8 million
- \$288.6 million in statewide economic output

⁹. Excludes students enrolled in the Johns Hopkins University's SAIS program.

Table 10: Direct, indirect and induced impacts of off-campus student spending in Maryland, FY 2019 (earnings and output in \$ millions)

	Jobs	Wages	Output
Direct impact	1,395	\$39.8	\$193.9
Indirect/induced effects	596	\$32.0	\$94.8
TOTAL	1,991	\$71.8	\$288.6

In Baltimore, we estimate that in fiscal year 2019, off-campus spending in Baltimore by Johns Hopkins students totaled nearly \$198.4 million. This figure includes off-campus spending by undergraduate students and off-campus spending by full-time graduate students. Spending by part-time graduate students was excluded from the analysis as we assume they would have been in Baltimore regardless of their enrollment at Johns Hopkins. In addition, spending was excluded for the 25 percent of undergraduate and graduate students originally from Baltimore who indicated that they would have attended another college or university in Maryland if they did not attend Johns Hopkins.

Using IMPLAN (as shown in Table 11), we estimate that in fiscal year 2019, off-campus student spending directly and indirectly accounted for:

- 1,658 jobs in Baltimore, with earnings totaling nearly \$57.7 million
- More than \$258.8 million in citywide economic output

In addition to the students enrolled in the University’s Maryland-based programs, 803 graduate students were enrolled full-time in Johns Hopkins SAIS programs in Washington, D.C. in the spring of 2019. We estimate that in fiscal year 2019, off-campus spending in D.C. by full-time graduate students enrolled at Johns Hopkins SAIS in D.C. totaled \$16.1 million. Using IMPLAN, we estimate that in fiscal year 2019, this off-campus spending directly and indirectly accounted for:

- 119 jobs in D.C., with earnings totaling \$5.2 million
- More than \$20.0 million in economic output in D.C.

Table 11: Direct, indirect and induced impacts of off-campus student spending in Baltimore, FY 2019 (earnings and output in \$ millions)

	Jobs	Wages	Output
Direct impact	1,302	\$36.4	\$198.4
Indirect/induced effects	356	\$21.2	\$60.4
TOTAL	1,658	\$57.7	\$258.8

The impact of visitor spending

Every year, Johns Hopkins attracts visitors to its campuses who then spend money within the local economy. Using estimated annual data on visitors to the University (as shown in Table 12), we estimate that approximately 395,600 non-Johns Hopkins affiliated visitors (excluding patient visitors) came to one of the Johns Hopkins campuses in fiscal year 2019. Of these visitors, we estimate that approximately 126,900 (about 32.1 percent of total visitors) came from outside of Maryland. As also shown in Table 12, we estimate that approximately 288,200 non-Johns Hopkins affiliated visitors¹⁰ (excluding patient visitors) came to one of the Baltimore-based Johns Hopkins

campuses in fiscal year 2019. Of these visitors, we estimate that approximately 93,800 (about 32.5 percent of total visitors to Baltimore-based campuses) came from outside of Baltimore.

Using data on visitor spending compiled by Visit Maryland, we estimate that in fiscal year 2019, visitors to Johns Hopkins from outside of Maryland (excluding patient visitors) spent nearly \$26.0 million on off-campus purchases in Maryland for lodging, food, shopping, entertainment and transportation. We similarly estimate that in fiscal year 2019, visitors to Johns Hopkins from outside of Baltimore (excluding patient visitors) spent approximately \$27.2 million on off-campus purchases in Baltimore for lodging, food, shopping, entertainment and transportation.

10. Non-Johns Hopkins affiliated visitors refers to visitors to Johns Hopkins that are neither students nor employees of Johns Hopkins.

Table 12: Estimated visitors to Johns Hopkins University, FY 2019

Type of visitor	Total visitors	# from outside Maryland	# from outside Baltimore	# of days spent	Maryland visitor-days	Baltimore visitor-days
Alumni visitors	10,556	1,011	7,344	2	2,020	14,688
Admissions visitors	28,766	25,302	28,452	1-3	29,430	32,968
Commencement visitors	12,000	7,200	10,200	3	21,600	30,600
Peabody concerts	11,746	674	1,686	1	674	1,686
Museum/exhibition visitors	160,293	481	1,924	2	962	3,849
Athletic visitors	36,158	14,463	29,649	1	14,463	29,649
Conferences/lectures	23,397	13,548	13,811	2	27,096	27,621
Summer camps	4,448	–	–	–	–	–
Vendors	887	788	788	1	788	788
Total visitors to JH Baltimore locations	288,251	–	93,854	–	–	141,849
APL visitors	107,392	63,481	–	1	63,481	–
Total visitors to JH Maryland locations	395,643	126,947	–	–	160,514	–

In addition, the Health System's four Maryland-based hospitals – the Johns Hopkins Hospital (JHH), Johns Hopkins Bayview Medical Center (JHBMC), Howard County General Hospital (HCGH) and Suburban Hospital – also bring patients' friends and family and other patient visitors to Maryland. As Table 13 shows, in fiscal year 2019, there were 227,832 outpatient visits to the four Maryland hospitals by patients from outside of Maryland, including 208,889 visitors from patients from elsewhere in the U.S. and 18,943 visitors from patients from outside the U.S.

Using visitor spending data reported by Visit Baltimore, we estimate that in fiscal year 2019, patients' companions and visitors spent nearly \$41.7 million in Maryland for lodging, food, retail, entertainment and transportation.

In fiscal year 2019 (also shown in Table 13), there were 10,471 inpatient discharges from the four Maryland hospitals involving patients from outside of Maryland. This included 9,470 patients from elsewhere in the U.S. and 1,001 patients from outside the U.S.

Table 13: Estimated number of patients, visitors and visitor-days for Johns Hopkins hospitals in Maryland, FY 2019

	JHH & JHBMC	HCGH & Suburban	Average length of stay	Maryland visits/patient-days	Visitors per patient	Maryland visitor-days
Outpatient visits						
<i>From outside Maryland:</i>						
District of Columbia	12,853	4,125	–	16,978	0.5	8,489
Elsewhere in the U.S.	186,730	5,181	–	191,911	1.0	191,911
Outside the U.S.	18,329	614	–	18,943	3.0	56,829
TOTAL	217,912	9,920	–	227,832	–	257,229
Inpatient discharges						
<i>From outside Maryland:</i>						
District of Columbia	424	698	3.6	4,039	0.5	2,020
Elsewhere in the U.S.	7,472	876	3.6	30,053	2.0	60,106
Outside the U.S.	931	70	3.6	3,604	3.0	10,811
TOTAL	8,827	1,644	–	37,696	–	72,936

In Baltimore, the Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center also bring patients' friends and family and other patient visitors to the City. As Table 14 shows, in fiscal year 2019, there were 985,098 outpatient visits to the Johns Hopkins Hospital and Johns Hopkins Bayview by patients from outside of Baltimore, including 966,769 visits from patients from elsewhere in the U.S. and 18,329 visits from patients from outside the U.S.

Using visitor spending data reported by Visit Baltimore, we estimate that in fiscal year 2019, patients' companions and visitors spent approximately \$96.4 million in Baltimore for lodging, food, retail, entertainment and transportation.

In fiscal year 2019 (also shown in Table 14), there were 43,618 inpatient discharges from the two Baltimore hospitals involving patients from outside of Baltimore. This included 42,687 patients from elsewhere in the U.S. and 931 patients from outside the U.S.

Table 14: Estimated number of patients, visitors and visitor-days for Johns Hopkins hospitals in Baltimore, FY 2019

	The Johns Hopkins Hospital	Johns Hopkins Bayview	Average length of stay	Baltimore visits/patient-days	Visitors per patient	Baltimore visitor-days
Outpatient visits						
<i>From outside Baltimore:</i>						
Other Maryland/D.C.	561,906	218,133	–	780,039	0.5	390,020
Elsewhere in the U.S.	162,902	23,828	–	186,730	1.0	186,730
Outside the U.S.	16,347	1,982	–	18,329	3.0	54,987
TOTAL	741,155	243,943	–	985,098	–	631,737
Inpatient discharges						
<i>From outside Baltimore:</i>						
Other Maryland/D.C.	23,434	11,781	3.6	126,774	0.5	63,387
Elsewhere in the U.S.	6,464	1,008	3.6	26,898	2.0	53,797
Outside the U.S.	848	83	3.6	3,352	3.0	10,057
TOTAL	30,746	12,872	–	157,025	–	127,241

Using IMPLAN (as shown in Table 15), we estimate that in fiscal year 2019, off-campus spending by visitors to the University and the four Maryland hospitals directly and indirectly accounted for:

- 707 jobs in Maryland, with earnings totaling nearly \$26.8 million
- \$71.2 million in statewide economic output

In Baltimore (as shown in Table 16), we estimate that in fiscal year 2019, off-campus spending by approximately 761,000 visitors from outside Baltimore to the University and the two Baltimore hospitals directly and indirectly accounted for:

- 1,329 jobs in Baltimore, with earnings totaling \$58.4 million
- Nearly \$139.6 million in citywide economic output

In addition, in fiscal year 2019 there were 90,835 outpatient visits to Sibley Memorial Hospital by patients from outside of D.C., and 8,932 inpatient discharges from Sibley Memorial Hospital involving patients from outside of D.C. We estimate that in fiscal year 2019, Sibley patients' companions and visitors spent approximately \$11.6 million in D.C. for lodging, food, retail, entertainment and transportation. Using IMPLAN, we estimate that in fiscal year 2019, this spending directly and indirectly accounted for:

- 148 jobs in D.C., with earnings totaling nearly \$6.9 million
- Nearly \$15.7 million in economic output in D.C.

Table 15: Direct, indirect and induced impacts of off-campus visitor spending in Maryland, FY 2019 (earnings and output in \$ millions)

	Jobs	Wages	Output
Direct impact	522	\$16.6	\$41.7
Indirect/induced effects	185	\$10.2	\$29.5
TOTAL	707	\$26.8	\$71.2

Table 16: Direct, indirect and induced impacts of off-campus visitor spending in Baltimore, FY 2019 (earnings and output in \$ millions)

	Jobs	Wages	Output
Direct impact	1,074	\$43.0	\$96.4
Indirect/induced effects	255	\$15.4	\$43.1
TOTAL	1,329	\$58.4	\$139.6

Impact of commuter spending

Johns Hopkins employees who commute to a Johns Hopkins location in Baltimore from outside the City also contribute to the local economy through off-campus spending on food, entertainment and retail. Appleaseed conducted an online survey of all Johns Hopkins employees during the fall of 2014 asking employees who commute to Baltimore about their average weekly off-campus expenditures in the City.

Based on the responses to the survey, we estimate that Johns Hopkins employees that commute to Baltimore spend an average of \$75.60 per week on off-campus expenditures. Assuming these approximately 18,980 commuters worked in Baltimore 48 weeks during fiscal year 2019, we estimate that they spent nearly \$68.9 million in off-campus expenditures in Baltimore. Using IMPLAN (as shown in Table 17), we estimate that in fiscal year 2019, off-campus spending by Johns Hopkins employees who commute to Baltimore from outside the City directly and indirectly accounted for:

- 894 jobs in Baltimore, with earnings totaling \$34.6 million
- \$94.1 million in citywide economic output

In addition, Johns Hopkins employees who commute to a Johns Hopkins location in Washington, D.C. from outside D.C. also contribute to the local economy through their off-campus spending. We estimate that during fiscal year 2019, these 1,525 commuters spent more than \$5.5 million in off-campus expenditures in D.C. Using IMPLAN, we estimate that in fiscal year 2019, off-campus spending by Johns Hopkins employees who commute to D.C. from outside D.C. directly and indirectly accounted for:

- 61 jobs in D.C., with earnings totaling \$2.6 million
- Nearly \$7.0 million in economic impact in D.C.

Table 17: Direct, indirect and induced impacts of off-campus commuter spending in Baltimore, FY 2019 (earnings and output in \$ millions)

	Jobs	Wages	Output
Direct impact	746	\$25.7	\$68.9
Indirect/induced effects	148	\$8.9	\$25.2
TOTAL	894	\$34.6	\$94.1

Adding it all up

Combining all these impacts (as shown in Table 18), we estimate that in fiscal year 2019, spending by Johns Hopkins, its employees, vendors, contractors, students, visitors and affiliates in Maryland, D.C. and Florida directly and indirectly accounted for:

- 114,179 jobs in Maryland, D.C. and Florida, with earnings totaling \$7.7 billion
- Nearly \$13.9 billion in economic output in Maryland, D.C. and Florida

As shown in Table 19, we estimate that in fiscal year 2019:

- The Johns Hopkins University and the Johns Hopkins Health System directly employed 54,623 people (excluding student employees) in Maryland, with a payroll of nearly \$4.4 billion and through payments of \$1.3 billion to Maryland vendors and contractors, directly supported 7,700 additional jobs in Maryland.

Table 18: Impact of spending by Johns Hopkins, students, visitors and affiliates in Maryland and beyond, FY 2019 (earnings and output in \$ millions)

	Direct spending impact		Indirect/ induced effects	Total impact
	Employment/ Payroll	Purchasing/ Construction		
Maryland				
Jobs	58,808	10,369	33,227	102,404
Wages	\$4,637.2	\$586.5	\$1,759.0	\$6,982.7
Output	\$4,637.2	\$1,663.9	\$6,300.5	\$12,601.7
District of Columbia				
Jobs	3,535	675	733	4,943
Wages	\$209.5	\$53.7	\$57.9	\$321.1
Output	\$209.5	\$122.2	\$159.0	\$490.7
Florida				
Jobs	3,610	695	2,527	6,832
Wages	\$285.1	\$36.3	\$111.6	\$433.0
Output	\$285.1	\$94.8	\$416.1	\$796.0
TOTAL				
Jobs	65,953	11,738	36,488	114,179
Wages	\$5,131.8	\$676.4	\$1,928.5	\$7,736.8
Output	\$5,131.8	\$1,880.9	\$6,875.6	\$13,888.3

- Institutions affiliated with Johns Hopkins (listed in Part One and described in more detail in Part Nine) directly employed 4,185 people, with a payroll of \$264.0 million and through payments of nearly \$74.1 million to Maryland vendors and contractors, directly supported 423 additional jobs in Maryland.
- Approximately \$261.6 million in off-campus spending by Johns Hopkins students and by visitors to Johns Hopkins directly supported 2,246 jobs in Maryland.

Table 19: Impact of spending by Johns Hopkins, students, visitors and affiliates in Maryland, FY 2019 (earnings and output in \$ millions)

	Direct spending impact		Indirect/ induced effects	Total impact
	Employment/ Payroll	Purchasing/ Construction		
Johns Hopkins				
Jobs	54,623	7,700	30,746	93,069
Wages	\$4,373.2	\$491.4	\$1,626.4	\$6,491.1
Output	\$4,373.2	\$1,328.3	\$5,853.6	\$11,555.1
Affiliate spending				
Jobs	4,185	423	1,583	6,192
Wages	\$264.0	\$28.3	\$84.1	\$376.4
Output	\$264.0	\$74.1	\$304.3	\$642.4
Student spending				
Jobs	–	1,395	596	1,991
Wages	–	\$39.8	\$32.0	\$71.8
Output	–	\$193.9	\$94.8	\$288.6
Visitor spending				
Jobs	–	851	302	1,153
Wages	–	\$27.0	\$16.5	\$43.4
Output	–	\$67.7	\$47.9	\$115.5
TOTAL				
Jobs	58,808	10,369	33,227	102,404
Wages	\$4,637.2	\$586.5	\$1,759.0	\$6,982.7
Output	\$4,637.2	\$1,663.9	\$6,300.5	\$12,601.7

- Through the multiplier effect, spending by Johns Hopkins, its employees, vendors and contractors, by students and visitors, and by affiliated institutions indirectly supported 33,227 jobs, with nearly \$1.8 billion in wages and \$6.3 billion in economic output in Maryland.

In total, in fiscal year 2019, spending by Johns Hopkins, its employees, students, visitors, and affiliated institutions directly and indirectly accounted for:

- 102,404 jobs in Maryland, with earnings totaling nearly \$7.0 billion
- More than \$12.6 billion in statewide economic output

In Baltimore (as shown in Table 20), we estimate that in fiscal year 2019:

- The Johns Hopkins University and the Johns Hopkins Health System directly employed 40,564 people (excluding student employees) in Baltimore, with a payroll of \$3.1 billion and through payments of \$600.6 million to Baltimore vendors and contractors, directly supported 3,332 additional jobs in Baltimore.
- Institutions affiliated with Johns Hopkins directly employed 4,185 people, with a payroll of \$264.0 million and through payments of \$47.0 million to Baltimore vendors and contractors, directly supported 257 additional jobs in Baltimore.

- Approximately \$391.0 million in off-campus spending by students, visitors and Johns Hopkins employees who commute into Baltimore, directly supported 3,428 jobs in Baltimore.

- Through the multiplier effect, spending by Johns Hopkins, its employees, vendors and contractors, by students and visitors, and by affiliated institutions indirectly supported 8,944 jobs, with \$514.1 million in wages and nearly \$1.8 billion in economic output in Baltimore.

In total, in fiscal year 2019, spending by Johns Hopkins, its employees, students, visitors, and affiliated institutions directly and indirectly accounted for:

- 60,710 jobs in Baltimore, with earnings totaling more than \$4.2 billion
- Nearly \$6.2 billion in citywide economic output

Table 20: Impact of spending by Johns Hopkins, students, visitors and affiliates in Baltimore, FY 2019 (earnings and output in \$ millions)

	Direct spending impact		Indirect/ induced effects	Total impact
	Employment/ Payroll	Purchasing/ Construction		
Johns Hopkins				
Jobs	40,564	3,332	7,469	51,364
Wages	\$3,102.9	\$205.8	\$427.9	\$3,736.6
Output	\$3,102.9	\$600.6	\$1,515.6	\$5,219.1
Affiliate spending				
Jobs	4,185	257	644	5,087
Wages	\$264.0	\$17.8	\$36.3	\$318.1
Output	\$264.0	\$47.0	\$129.9	\$440.9
Commuter spending				
Jobs	–	746	148	894
Wages	–	\$25.7	\$8.9	\$34.6
Output	–	\$68.9	\$25.2	\$94.1
Student spending				
Jobs	–	1,302	356	1,658
Wages	–	\$36.4	\$21.2	\$57.7
Output	–	\$198.4	\$60.4	\$258.8
Visitor spending				
Jobs	–	1,380	328	1,708
Wages	–	\$55.1	\$19.8	\$74.9
Output	–	\$123.7	\$55.3	\$178.9
TOTAL				
Jobs	44,749	7,017	8,944	60,710
Wages	\$3,366.9	\$340.8	\$514.1	\$4,221.8
Output	\$3,366.9	\$1,038.5	\$1,786.4	\$6,191.9

Beyond Maryland, we estimate that in fiscal year 2019 (as shown in Table 21):

- Johns Hopkins directly employed 3,535 people (excluding students) at its various locations in D.C., with a payroll of \$209.5 million and through payments of \$88.9 million to D.C. vendors and contractors, directly supported an additional 397 jobs in D.C.
- Johns Hopkins directly employed 3,610 people (excluding students) at Johns Hopkins All Children Hospital's main campus and other facilities in Florida, with a payroll of nearly \$285.1 million and through payments of nearly \$94.8 million to Florida vendors and contractors, directly supported an additional 695 jobs in Florida.
- Approximately \$33.2 million in off-campus spending by Johns Hopkins students enrolled at Johns Hopkins SAIS in Washington, D.C., visitors to patients at Sibley Memorial Hospital and Johns Hopkins employees who commute into D.C., directly supported 278 jobs in D.C.

- Through the multiplier effect, spending by Johns Hopkins, its employees, vendors, contractors, students and visitors indirectly supported 733 jobs and \$159.0 million in economic output in D.C. and 2,527 jobs and \$416.1 million in economic output in Florida.

In total, in fiscal year 2019, spending by Johns Hopkins, its employers, students and visitors in directly and indirectly accounted for:

- 4,943 jobs in D.C., with nearly \$490.7 million in economic output in D.C.
- 6,832 jobs in Florida, with nearly \$796.0 million in statewide economic output

Table 21: Impact of spending by Johns Hopkins, students and visitors in D.C. and Florida, FY 2019 (earnings and output in \$ millions)

	DISTRICT OF COLUMBIA				FLORIDA			
	Direct spending impact		Indirect/ induced effects	Total impact	Direct spending impact		Indirect/ induced effects	Total impact
	Employment/ Payroll	Purchasing/ Construction			Employment/ Payroll	Purchasing/ Construction		
Johns Hopkins								
Jobs	3,535	397	684	4,616	3,610	695	2,527	6,832
Wages	\$209.5	\$43.0	\$53.9	\$306.4	\$285.1	\$36.3	\$111.6	\$433.0
Output	\$209.5	\$88.9	\$149.6	\$448.0	\$285.1	\$94.8	\$416.1	\$796.0
Commuter spending								
Jobs	-	53	7	61	-	-	-	-
Wages	-	\$2.0	\$0.6	\$2.6	-	-	-	-
Output	-	\$5.5	\$1.4	\$7.0	-	-	-	-
Student spending								
Jobs	-	98	20	119	-	-	-	-
Wages	-	\$3.6	\$1.6	\$5.2	-	-	-	-
Output	-	\$16.1	\$3.9	\$20.0	-	-	-	-
Visitor spending								
Jobs	-	126	21	148	-	-	-	-
Wages	-	\$5.1	\$1.8	\$6.9	-	-	-	-
Output	-	\$11.6	\$4.0	\$15.7	-	-	-	-
TOTAL								
Jobs	3,535	675	733	4,943	3,610	695	2,527	6,832
Wages	\$209.5	\$53.7	\$57.9	\$321.1	\$285.1	\$36.3	\$111.6	\$433.0
Output	\$209.5	\$122.2	\$159.0	\$490.7	\$285.1	\$94.8	\$416.1	\$796.0



Part Three: Educating Students and Cultivating Lifelong Learning

Human capital, the accumulated knowledge, skills, and experience of a nation's, a state's or a city's people, is perhaps the single most important contributor to economic growth. At the individual level, the relationship between education and income is clear. As Figure 15 shows, in 2018 the median earnings of Maryland residents who had four-year college degrees were 77.2 percent higher than the earnings of those who had only a high school diploma; and the median earnings of Maryland residents who had graduate or professional degrees were 140.7 percent higher than the earnings of those who had no education beyond high school.

The economic value of education, however, is not limited to its impact on individual earnings. 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.

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.¹¹

Even non-college educated workers benefit from this effect. 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.”¹²

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

12. Enrico Moretti, *The New Geography of Jobs*, (New York: Houghton Mifflin Harcourt, 2012), 98.

◀ [Johns Hopkins University graduate students.](#)

Developing human capital is not, of course, solely a question of how many years students spend in school, or of their paper qualifications. Recent research has shown that the correlation between education and economic growth is even stronger when we take into account not just formal educational attainment but also the *quality* of education to which students have access, and the specific types of knowledge and skills they are able to acquire during their time in school.¹³

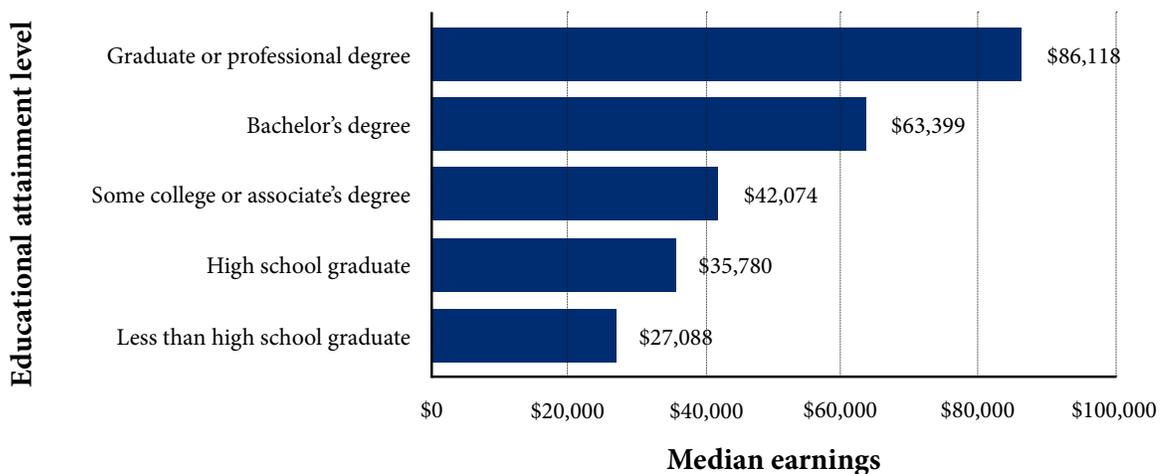
Johns Hopkins University contributes in several ways to the development of Maryland’s human capital:

- By providing a high-quality education for thousands of Maryland residents
- By attracting talented students from around the world, some of whom stay in Maryland after they graduate
- By preparing both undergraduates and graduate students for careers in fields that are critical to the future of Maryland’s economy
- By providing opportunities for working professionals to upgrade their skills

Part Three of this report examines these four aspects of Johns Hopkins’s role in the development of the State’s human capital.

13. See for example Robert J. Barro and Jong-Wha Lee, *Education Matters: Global Schooling Gains from the 19th to the 21st Century* (New York: Oxford University Press, 2015) and Eric A. Hanushek and Ludger Woessmann, *The Knowledge Capital of Nations: Education and the Economics of Growth* (Boston: MIT Press, 2015).

Figure 15: Median earnings by educational attainment for Maryland residents age 25 years and older, 2018



Source: 2018 American Community Survey (1-Year Estimates), U.S. Census Bureau

Student enrollment at Johns Hopkins

During the spring of 2019, a total of 24,782 students were enrolled in for-credit programs at Johns Hopkins University, including 5,390 undergraduates and 19,392 graduate and professional students. While total undergraduate enrollment has been stable in recent years, total graduate and professional school enrollment grew by 34.9 percent between the spring of 2014 and the spring of 2019. Table 22 shows total for-credit enrollment for each of the University's eleven schools and programs.

Table 22: Total for-credit enrollment by school, spring 2019

School	Undergraduate	Graduate/ professional
Advanced Academic Programs	–	3,634
Krieger School of Arts and Sciences	3,355	893
Carey Business School	–	2,219
School of Education	7	2,235
Whiting School of Engineering	1,735	1,363
Engineering for Professionals	–	3,408
School of Nursing	–	865
Bloomberg School of Public Health	–	2,364
Peabody Institute	293	316
SAIS	–	826
School of Medicine	–	1,269
TOTAL	5,390	19,392

As of the spring of 2019, 563 Johns Hopkins undergraduates – about 10.4 percent of total undergraduate enrollment – were residents of Maryland, as were 27.6 percent of all graduate students. Figure 16 shows the distribution of Johns Hopkins undergraduate and graduate and professional students by place of residence.

In fiscal year 2019, Johns Hopkins provided more than \$86.5 million in financial aid from University sources to students who identified themselves as residents of Maryland – an increase of 14.2 percent over the nearly \$75.8 million in University financial aid provided in fiscal year 2014. This total included nearly \$56.9 million in financial aid provided from University sources to students who identified themselves as residents of Baltimore City.

In 2018-2019, Johns Hopkins awarded 8,673 degrees, including 1,389 undergraduate degrees, 6,590 master’s degrees and 694 doctoral degrees. As shown in Figure 17, approximately 24.0 percent of all undergraduate degrees were awarded to residents of Maryland (including 18.2 percent awarded to Baltimore residents), and 35.4 percent of all graduate, professional and medical degrees were awarded to Maryland residents (including 20.6 percent awarded to Baltimore residents). In addition, Johns Hopkins awarded 865 graduate certificates in 2018-2019, of which 378 (43.7 percent of all certificates awarded) were awarded to Maryland residents, including 247 (28.6 percent) to residents of Baltimore.

Figure 16: Enrollment by student’s permanent residence, spring 2019

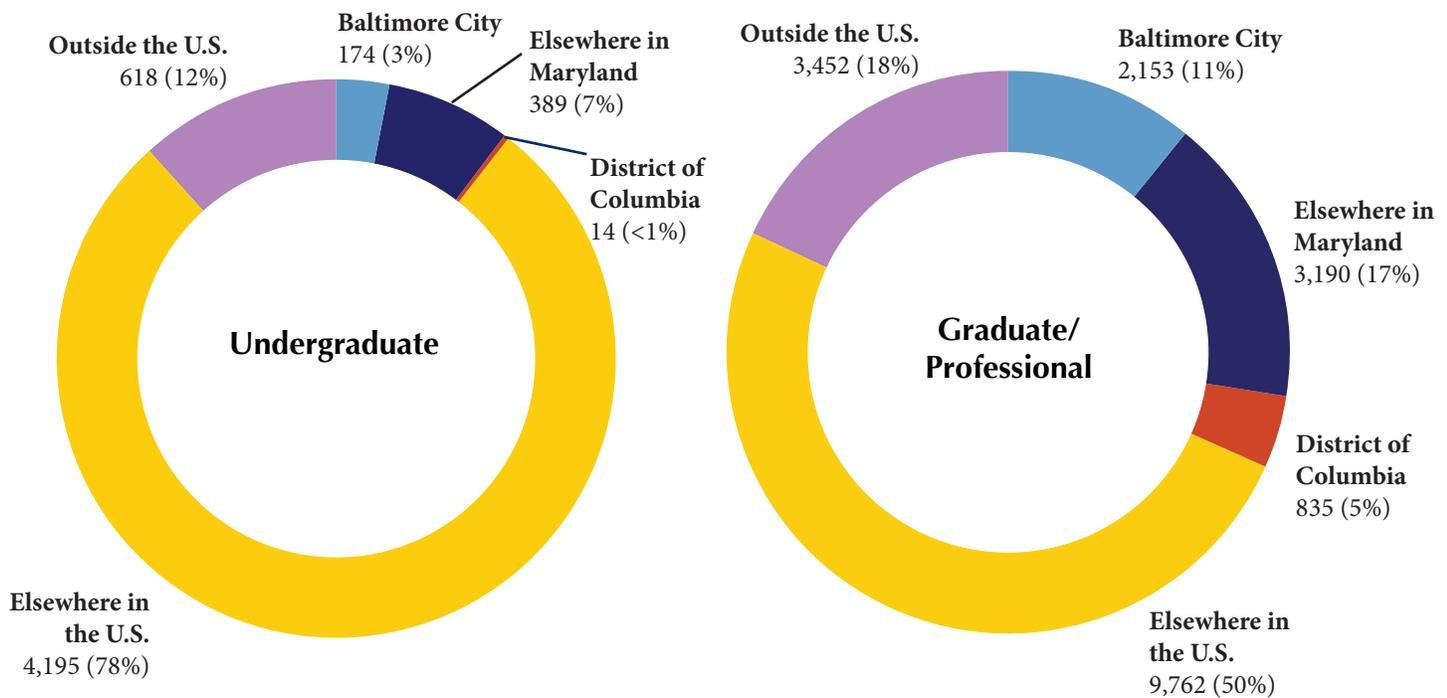
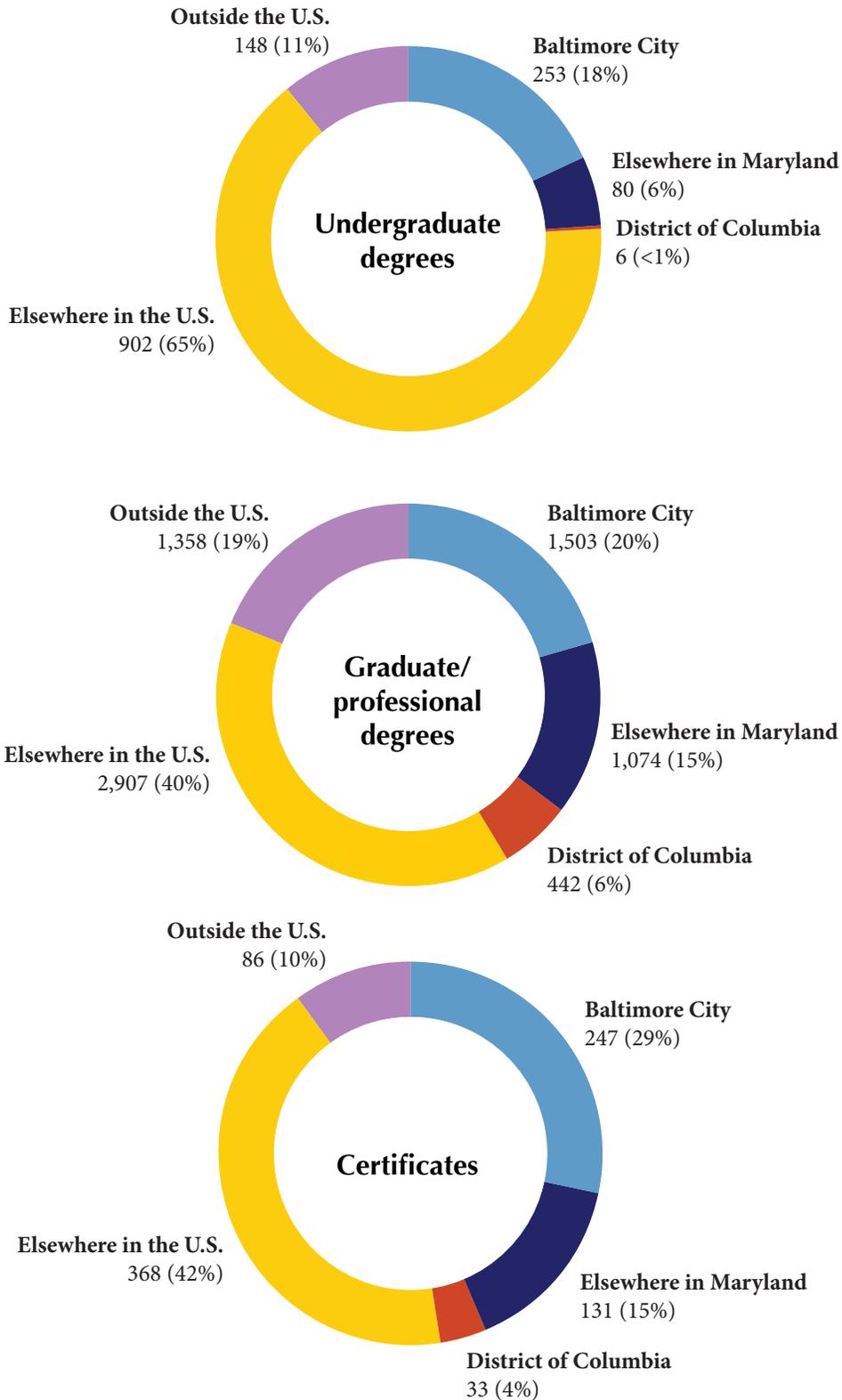


Figure 17: Number of degrees and certificates granted by student's permanent residence, 2018-2019 academic year



Where Johns Hopkins alumni live

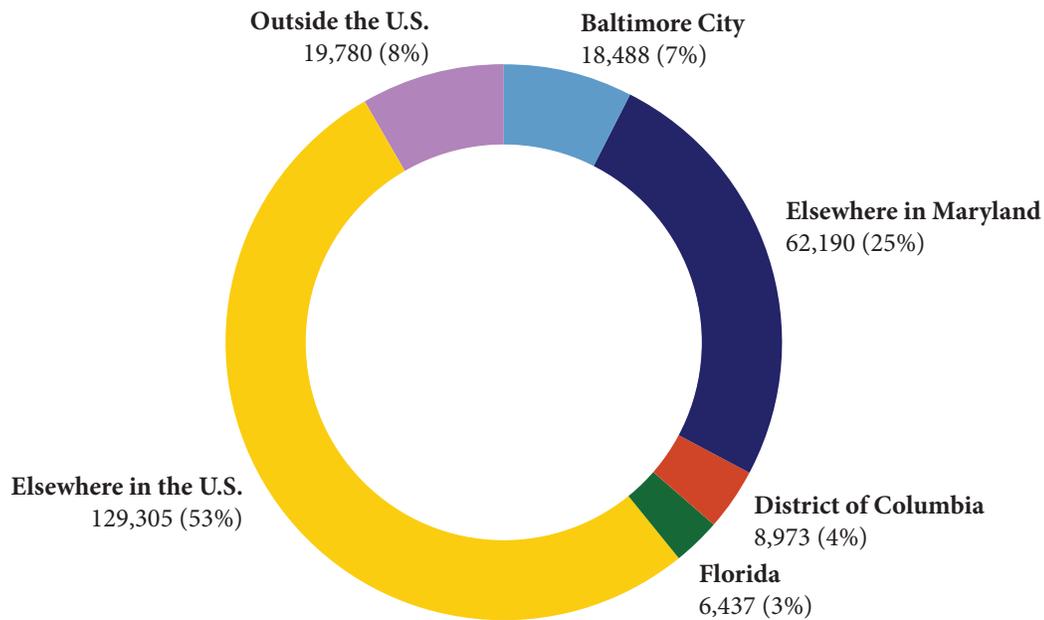
In fiscal year 2019 (as shown in Figure 18), Johns Hopkins had 245,173 living alumni, of whom 80,678 (32.9 percent of all living alumni) resided in Maryland, including 18,488 (7.5 percent) who lived in Baltimore City. Based on 2017 American Community Survey data, we estimate that about 13.2 percent of all Baltimore residents who have at least a bachelor's degree, and about 4.7 percent of all Maryland residents with at least a bachelor's degree, are graduates of Johns Hopkins.

Higher education for the 21st century

The nature of higher education is changing. Compared to a decade ago, it is increasingly:

- *Cross-disciplinary*, based on a growing recognition that many of the community's, the nation's and the world's most pressing problems cannot be understood or addressed within traditional academic boundaries;
- *Experiential*, providing students at all levels with more opportunities for hands-on "learning by doing;" and
- *A continuing process*, in which working adults are seeking to acquire the new skills and new knowledge they need to advance in their careers, or to take advantage of new opportunities.

Figure 18: Current address of Johns Hopkins alumni, FY 2019



For the past decade Johns Hopkins has been fully engaged in all of these processes of change – and has been a leader in many of them. The following are examples of new academic programs that the University has launched during that period.

- The Krieger School of Arts and Sciences offers an interdisciplinary **major in global environmental change and sustainability (GECS)**. GECS majors take a range of courses in the physical, environmental and social sciences, and are required to select a particular theme or focus area – such as environmental health, energy or public policy – around which to organize their course work. The program also requires an “applied experience” (an internship or research project) and a fourth-year capstone in which students plan, develop and execute a sustainability project.
- The Krieger School also offers a popular new interdisciplinary **major in medicine, science and the humanities**. The program has attracted students planning to attend medical school or to pursue graduate studies in the biomedical sciences, but who also want to obtain a broader undergraduate education, and a chance to explore the social and cultural aspects of medicine.
- Students pursuing the Peabody Institute’s **bachelor’s degree in music for new media**, introduced in the fall of 2018, explore the creation of music for non-linear formats such as video games, and the use of technologies such as virtual reality to create new ways for listeners to experience music.
- In collaboration with the Whiting School of Engineering, the Peabody Institute offers a five-year, **dual-degree program in recording arts and sciences** that prepares students to work as audio technicians, engineers and producers. Through the first four years of the program students combine music studies with training in recording technologies and courses at the Whiting School in areas such as computer science and electrical engineering. Students are also required to work in Peabody’s recording studio and on recording live performances; and in the program’s fifth year, work as interns with music companies and radio and television stations.
- The Whiting School of Engineering and the Johns Hopkins Information Security Institute (JHUI SI) offer a concurrent bachelor’s/master’s degree program in **security informatics**. After completing their sophomore year, students majoring in fields such as mathematics and computer science can apply to JHUI SI’s MS in security informatics program. If accepted, they can then enroll each semester in a mix of undergraduate- and graduate-level courses, enabling them to earn both degrees in five years (and in some cases less).
- In the spring of 2019, the Whiting School of Engineering began offering a master’s degree in **health care systems engineering**. The program prepares students to use the tools and methods of systems engineering to address major problems in health care delivery, including cost, productivity, patient safety and security.

- The Carey Business School and the Maryland Institute College of Art offer a **dual degree (MBA/MA) in design leadership**. The program helps students acquire the skills and experience they need to lead organizations through the process of applying “design thinking” to the search for practical solutions to real-world business problems.
- Since its creation in 2010, the Krieger School’s Center for Biotechnology Education has continued to develop new programs aimed at meeting the professional workforce needs of Maryland’s life sciences sector.
 - > In 2017 the Center introduced a new **MS degree in individualized genomics and health**, designed to equip students with both the theoretical knowledge and practical skills needed for work in the fast-growing field of personalized medicine.
 - > In 2018 the Center expanded its MS in biotechnology, adding a new **concentration in regeneration and stem cell technologies**. The program combines online learning with on-campus courses at the University’s Montgomery County Campus.
- The **Johns Hopkins-MedImmune Scholars Program** is a first-of-its-kind educational collaboration between a major U.S. university and a leading biopharmaceutical company. The program provides opportunities for PhD students in both the School of Medicine and in the Whiting School’s Biomedical Engineering program to gain experience doing research in an industry setting, and to learn about the processes of drug discovery and development. Students also have the option to do a year-long internship at MedImmune.
- The Whiting School’s new **Doctor of Engineering (DEng)** program is designed to meet the needs of full-time working professionals interested in acquiring the advanced skills and knowledge required to address major engineering problems. Each student’s program is organized around a project – selected by the student – aimed at addressing a real-world engineering challenge facing the company or agency where they work. This work is supplemented by a series of online courses – also selected by the students – and twice-a-year conferences on the University’s Homewood campus with fellow DEng students and Johns Hopkins faculty members. The DEng program was designed by Whiting School faculty in collaboration with scientists and engineers at the Applied Physics Lab and several leading Maryland companies.
- As part of its Doctor of Nursing Practice program, the School of Nursing in 2019 announced the creation of a new track in **nurse anesthesiology**. This rigorous three-year program – which requires 2,000 hours of clinical work, and provides hands-on experience in the administration of more than 600 different anesthetics on a wide variety of settings – will prepare students in one of the fastest-growing (and highest-paid) occupations in health care.

Expanding online access to a Johns Hopkins education

The University has used the tools of online learning to expand working adults' access to advanced education in other areas as well.

- In addition to offering on-campus part-time master's degree programs in Baltimore, Washington, D.C. and at the University's Montgomery County Campus, the Krieger School of Arts and Sciences' **Advanced Academic Programs (AAP)** offer 21 fully-online master's degrees in areas such as:
 - > Energy policy and climate
 - > Food safety regulation
 - > Geospatial intelligence
 - > Individualized genomics and health
 - > Museum studies
- The Bloomberg School of Public Health's **Online Programs for Applied Learning (OPAL)** offers fully online, part-time master's degrees in six areas:
 - > Community-based primary health care programs in global health
 - > Global health planning and management
 - > Humanitarian health
 - > Patient safety and healthcare quality
 - > Population health management
 - > Spatial analysis for public health
- The Bloomberg School of Public Health also offers a **Doctor of Public Health (DrPH)** degree, designed to prepare working professionals who already have an MPH or equivalent degree for leadership positions in the field, that can be completed online.
- The School of Nursing's **Doctor of Nursing Practice (DNP)** program offers multiple tracks tailored to students' particular interests. In several of these tracks – for example, the DNP Executive Track, which prepares students for both clinical leadership and health care management roles – DNP students can complete the program almost entirely online.
- The School of Education's new **Doctor of Education (EdD)** program is an online program designed to equip working professionals with the skills and knowledge they need to play a leading role in the transformation of schools and school systems.
- The Whiting School's **Johns Hopkins Engineering for Professionals (JHEP)** program has for several decades offered working engineers the opportunity to earn master's degrees in a variety of specialized fields. During the past five years, however, the Whiting School has greatly expanded the range of master's degrees that are available online. Of the 21 part-time master's degrees now offered, 19 can be completed online including cutting-edge programs in areas such as:
 - > Applied biomedical engineering
 - > Cybersecurity
 - > Data science
 - > Financial mathematics
 - > Space systems engineering

At any one time, more than 2,600 students are enrolled in JHEP courses – approximately half of them residents of Maryland. As of 2019, 82 percent of all JHEP course enrollments were online.



Johns Hopkins University students.

- The Carey Business School's ***Flexible MBA*** allows students to complete the program entirely on-campus (either in Baltimore or in Washington, D.C.), entirely online, or through a blend of on-campus and online courses. Students can choose among several concentrations, such as financial businesses and health care management.

Beyond the ability to earn degrees online, Johns Hopkins provides a rapidly-growing array of online resources for continuing education. The following are just a few examples.

- In addition to the master's degrees described above, the Whiting School's JHEP program offers online graduate and post-master's certificates in 17 fields. These certificates typically require successful completion of six online courses.

- The Krieger School's AAP offers 13 fully online graduate certificate programs in fields such as biotechnology enterprise, geographic information systems, intelligence, non-profit management, science writing and genomic sequencing and analysis.
- The Bloomberg School of Public Health offers 13 online graduate certificates in fields such as adolescent health, clinical trials, global health practice, population health management, and spatial analysis for public health. Students are generally required to complete courses totaling at least 25 credits.

Multiple locations for learning

In addition to making a wide variety of part-time graduate programs available online, the University provides on-campus access to the same programs at several locations outside Baltimore.

- At the University's **Montgomery County Campus**, the Krieger School's AAP program offers master's degrees in several fields directly related to the County's life sciences sector, including biotechnology, bioinformatics and regulatory science.
- At the **Applied Physics Laboratory** campus in Laurel, the Whiting School's JHEP program offers 11 part-time master's degree programs onsite in fields such as computer science, applied and computational mathematics, cybersecurity, information systems engineering and space systems engineering. During 2016-2017, more than 200 APL employees taught JHEP courses; and as noted above, APL has worked closely with the Whiting School's Doctor of Engineering program.
- The Whiting School also offers a master's degree in systems engineering at the **Southern Maryland Higher Education Center**, a State-sponsored multi-university campus in California, Maryland.
- At the University's **Columbia Center**, the School of Education offers a Master of Arts in teaching, MS degrees in special education and counseling, and an MS in education with concentrations in areas such as reading, digital age learning and school administration.
- Two Johns Hopkins schools offer programs at the University's **D.C. Center**, near Dupont Circle.

Helping students prepare for jobs in the digital economy

In 2019 the Whiting School of Engineering, in collaboration with Trilogy Educational Services, introduced a new 24-week part-time certificate program aimed at helping working adults learn coding and web development. The program is designed to address a chronic shortage of workers who are skilled in these areas – and at the same time to prepare Baltimore-area residents to take advantage of the opportunities the region's digital economy offers. Burning Glass Technologies, a leading labor market analytics firm, reports that in 2018 there were 36,000 job openings in the Baltimore area that required some level of coding skills.

Students learn the basics of coding, algorithms and data structure, along with intensive training in coding languages such as HTML/CSS and JavaScript. The program – which does not require students to have a college education or any previous technical experience – also offers career planning services, introductions to employers, and a “demo day” where students get to showcase their work before a group of industry professionals.

The program enrolled its first cohort of 25 students in September 2019, and will enroll a similar-sized cohort each quarter thereafter.

Making a Johns Hopkins education more affordable for low-income students

- > The Krieger School's AAP program offers eleven master's degrees and four graduate certificates in areas such as energy policy and climate, global security studies, government analytics and science writing. (AAP also has its headquarters at this location.)
- > The Carey Business School offers five MS degrees at the D.C. Center, including finance, applied economics, information systems, business analytics and risk management and real estate and infrastructure.

In 2022, the programs now offered at the University's D.C. Center will be shifting to the recently-acquired 555 Pennsylvania Avenue.



University students provide one-on-one help in reading and math as part of the Johns Hopkins Tutorial Project.

The University has also sought in recent years to expand access to a Johns Hopkins education by making it more affordable for students from low-income families, and providing the resources these students need to succeed.

- In 2015 the University restructured its **Baltimore Scholars Program**, which provides financial aid to graduates of Baltimore City Public Schools who are admitted to and attend Johns Hopkins, in order to focus its resources more clearly on students from lower-income and middle-income families. The program now covers the full cost of attendance (including tuition, fees, room and board and other expenses) for students with family incomes up to \$80,000; and for those with family incomes between \$80,000 and \$150,000, limits the family's contribution to 10 percent of family income. During the 2018-2019 academic year, 58 Baltimore Scholars were actively enrolled at Johns Hopkins.

Beyond financial aid, the program provides a range of other resources and services aimed at helping Baltimore Scholars succeed at Johns Hopkins and beyond, including faculty and peer mentoring, alumni networking, lectures, paid internships, and funding for research and creative projects.

From its creation in 2005 through 2018-2019, the Baltimore Scholars Program has awarded (including future year commitments) more than \$31.6 million in financial assistance to 358 Johns Hopkins undergraduates.

- In 2016 Johns Hopkins joined twelve other independent colleges and universities in Maryland in a commitment to match grants the State provides to low-income students attending these institutions. Through this ***Maryland Guaranteed Access Partnership***, students from Maryland families with incomes below 130 percent of the federal poverty level (\$32,630 as of 2018) who maintain a GPA of at least 2.5 are eligible for up to \$35,000 in combined state and University financial aid annually, for up to four years.
- In 2016 Johns Hopkins also joined the ***American Talent Initiative***, an alliance of 30 public and independent undergraduate institutions nationwide¹⁴ dedicated to expanding high-achieving low-income students' access to higher education. Participating institutions all have a six-year graduation rate of at least 70 percent, and all of them have committed to:
 - > Stepping up their recruitment of low-income students;
 - > Prioritizing need-based financial aid;
 - > Ensuring enrollment and retention of low-income students through policies and practices that have been shown to be effective;
 - > Minimizing or eliminating gaps in progression and graduation rates based on income.

14. The American Talent Initiative has since expanded to include more than 100 public and independent colleges and universities.

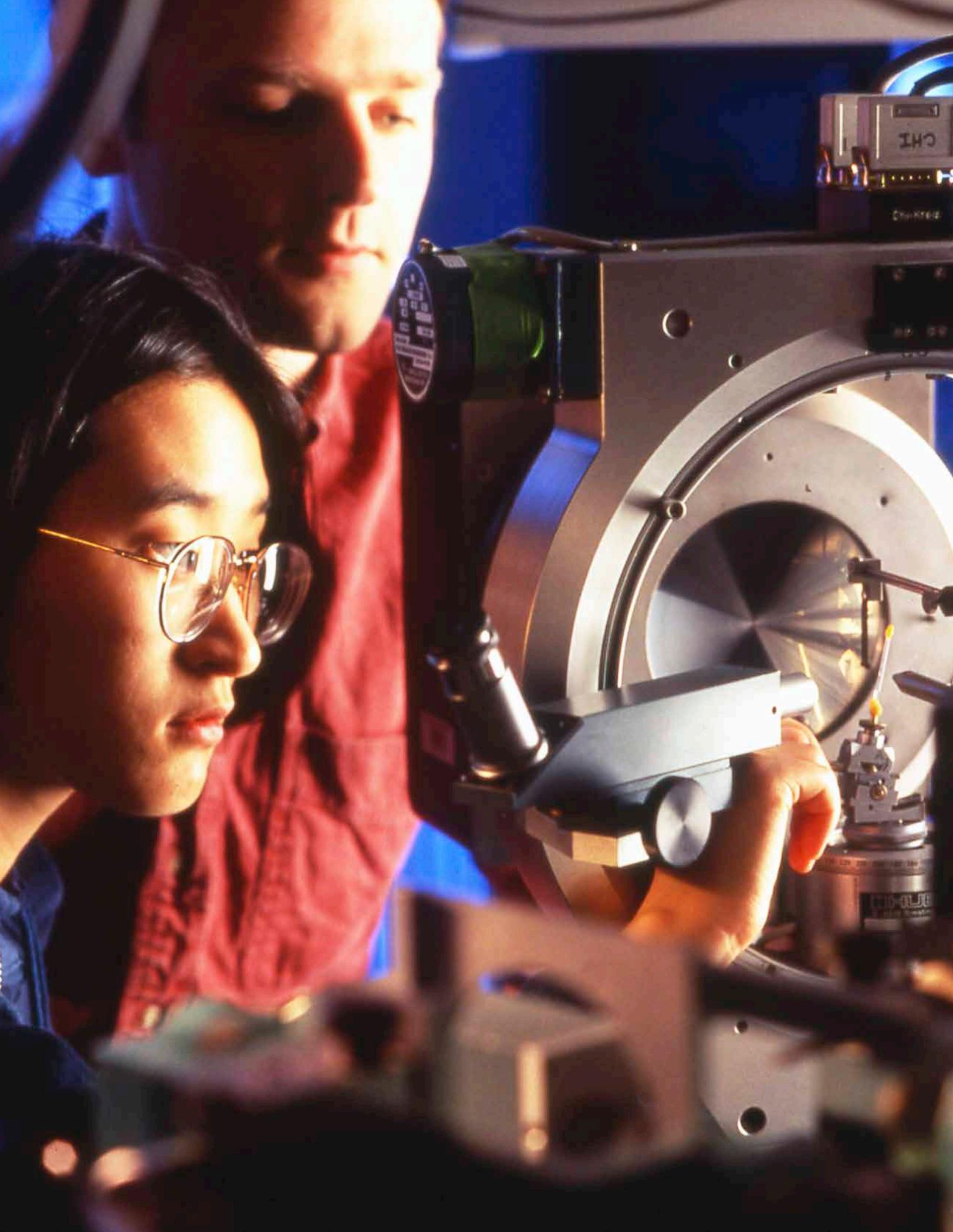
The Initiative's goal is to increase enrollment of low-income undergraduate students at participating institutions by 50,000 by 2023.

- In November 2018, University President Ron Daniels announced that Johns Hopkins was adopting a policy of “need-blind” admissions, ensuring that an undergraduate education at Hopkins will be within reach of all qualified, high-achieving students regardless of their ability to pay. This new policy – which will substantially increase the amount of financial aid provided by the University, and eliminate loans from University financial aid packages – was made possible by a \$1.8 billion gift from alumnus Michael Bloomberg.

The undergraduate Class of 2023, which entered the University in the fall of 2019, is the first to enjoy the full benefit of this policy. Johns Hopkins is now among the top universities in the U.S. in financial aid per student.

Education for Maryland's future

The research cited above makes clear that access to a high-quality education at all levels is increasingly critical to the success not just of individual students, but of cities, states and nations. Johns Hopkins is uniquely well-positioned to help Maryland respond to that challenge.



Part Four: Research that Drives Economic Growth

Johns Hopkins was America's first research university, and today it consistently ranks among the world's leading research institutions.¹⁵ Research conducted at Johns Hopkins contributes in several ways to the strength of Maryland's economy, and to the vitality of its communities.

- By attracting nearly \$3.4 billion annually in external research funding, a substantial part of which – especially in the field of biomedical research – is spent locally.
- By directly addressing some of the State's, the nation's and the world's most pressing problems.

15. The Times Higher Education's World University Rankings 2019, for example, rates Johns Hopkins as tied for twelfth in its list of the world's top 200 universities.

- By generating new ideas and new knowledge that – with additional investments of time, talent and funding – can be translated into new products and services, new businesses and new jobs.

This part of the report addresses the first two of these impacts. Johns Hopkins' contributions to the growth of Maryland's innovation economy are discussed in Part Seven.

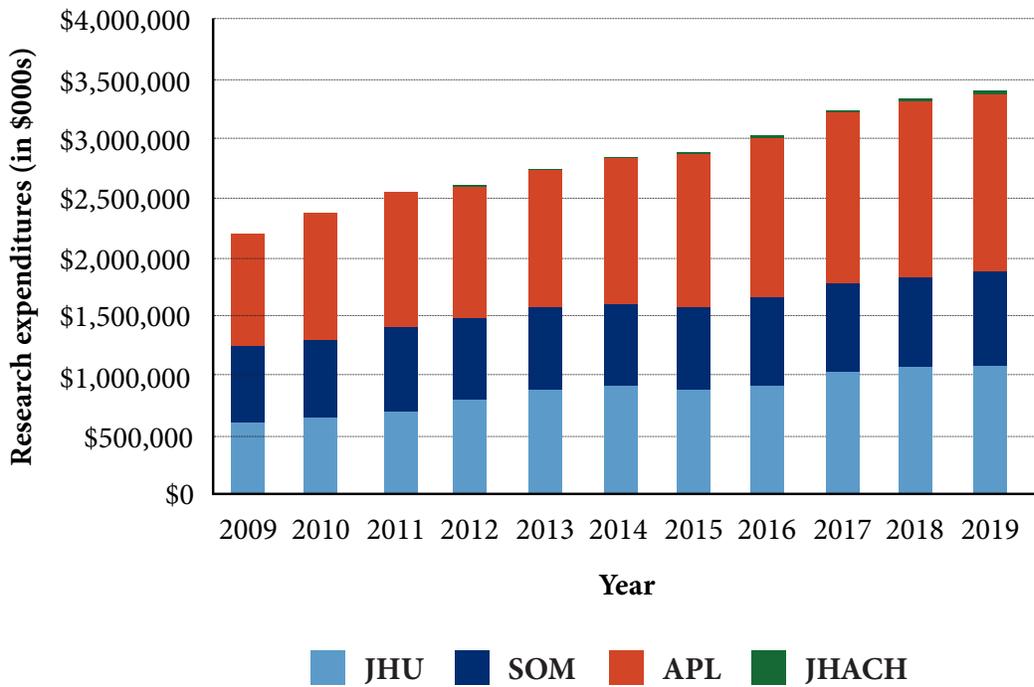
◀ Colleagues collaborate in a Johns Hopkins laboratory.

Growth in research and related spending

During fiscal year 2019, Johns Hopkins’ externally-funded spending on research and related programs totaled nearly \$3.4 billion – an increase of approximately 19.5 percent since fiscal year 2014, and an average annual increase of 3.6 percent.

As Figure 20 shows, the Advanced Physics Laboratory, located in Laurel, Maryland, accounted for 44.1 percent of total Johns Hopkins research and related spending in fiscal year 2019. The School of Medicine accounted for 23.6 percent of such spending; all other divisions within the University accounted for 32.0 percent; and Johns Hopkins All Children’s Hospital for 0.3 percent.

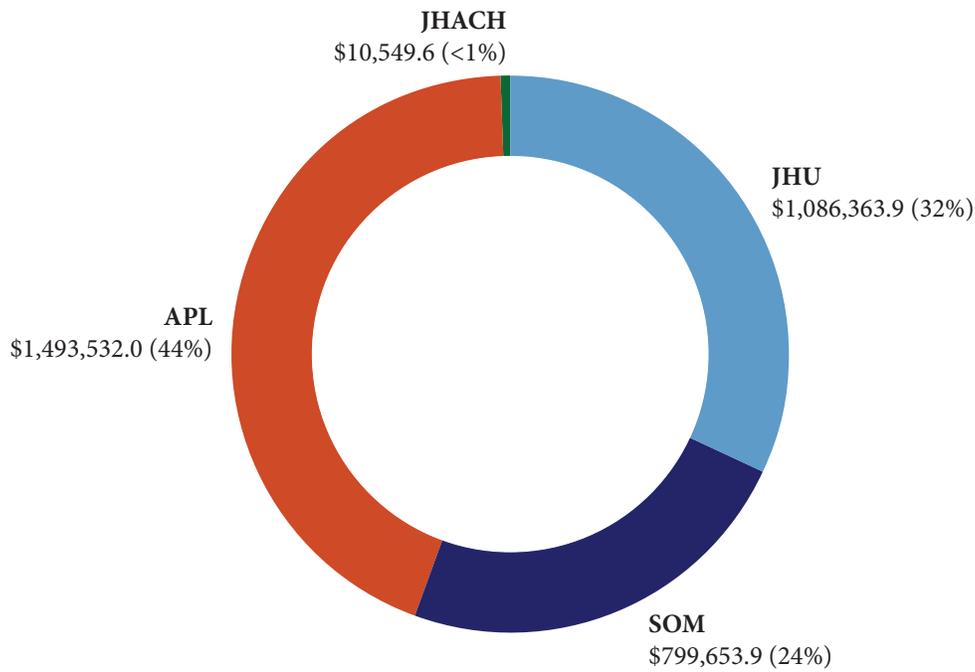
Figure 19: Total research and related spending by Johns Hopkins, FY 2009 – FY 2019 (\$000s)



Approximately 84.3 percent of all Johns Hopkins research and related spending in fiscal year 2019 was funded by federal agencies, including the Department of Defense (DOD), the National Institutes of Health (NIH), the U.S. Agency for International Development (USAID) and the National Aeronautics and Space Administration (NASA) (Figure 21). Foundations and other non-profit sources accounted for 8.8 percent, and corporate sources for 3.6 percent.

Johns Hopkins' ability to sustain the continued growth of its research enterprise in an era of federal budgetary constraints has been enhanced by the University's recent investments in its ability to compete successfully for federal funds.

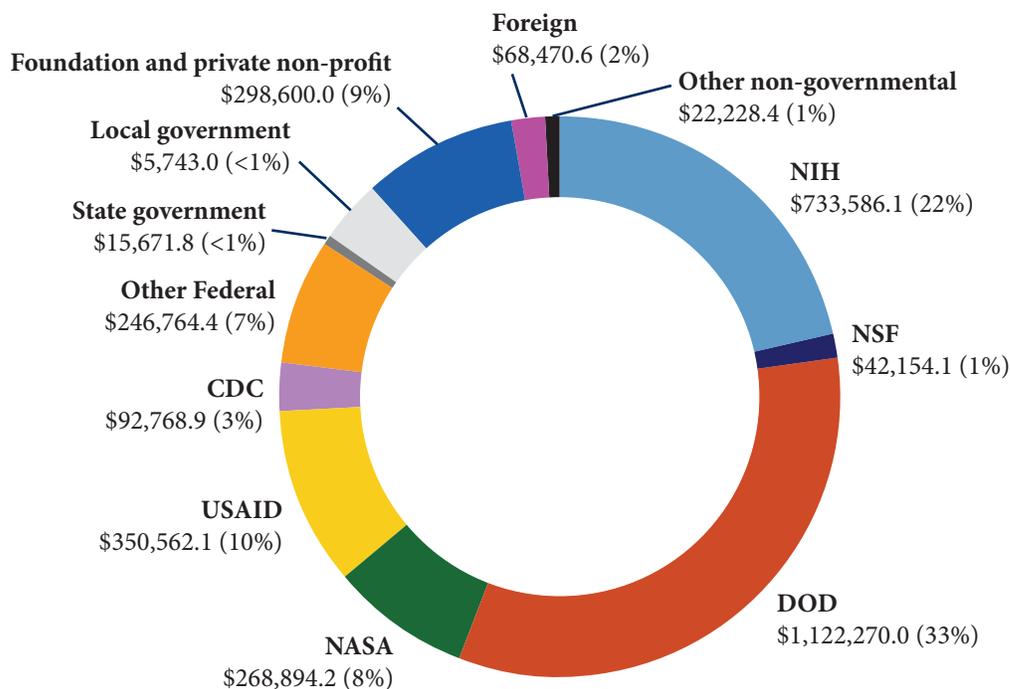
Figure 20: Johns Hopkins research and related spending, by division, FY 2019 (\$000s)



- Discovery Awards**, launched in 2015, provide up to \$100,000 to cross-divisional teams of researchers for early-stage work in new areas (that is, the funds cannot be used to continue or extend existing research). Grants of up to \$150,000 are also available for work aimed at preparing specific proposals to federal or other funding sources. Teams must include faculty members and other researchers from at least two Johns Hopkins divisions. From 2015 through 2019, Discovery funds have been awarded to 135 cross-divisional teams.
- Catalyst Awards**, also launched in 2015, provide grants of up to \$75,000 to early-career faculty to support promising new research or creative work. From 2015 through 2019, 170 young faculty members have received Catalyst Awards.
- Established in 2015 with a \$1.25 million gift from Trustee Louis Forster and alumna Kathleen Pike, the **President's Frontier Award** provides one \$250,000 competitive research grant each year to a Johns Hopkins faculty member whose scholarship shows exceptional potential for important future work.

As the share of federal funding going to major multi-disciplinary (and in many cases multi-institutional) centers has risen, Discovery Awards have enabled researchers at Johns Hopkins to conduct the early-stage research and team-building that are often a necessary first step toward competing effectively for major center designations. Similarly, Catalyst Awards help the recipients do the early-stage work needed to compete effectively for federal and other research funding.

Figure 21: Johns Hopkins research and related spending, by source, FY 2019 (\$000s)



Research at Johns Hopkins: A sampler

In addition to funding early-stage collaborative research, the Vice Provost's office also supports faculty efforts to secure high-value grants and contracts through its Research Development Team – a dedicated staff group, established in 2016, that assists cross-divisional teams in preparing proposals to federal agencies and foundations.

In 2017, an analysis prepared for the Vice Provost for Research reported that the University had awarded 178 Discovery and Catalyst awards totaling \$10.0 million during the programs' first two years. Teams and individual faculty members receiving awards in 2015 and 2016 were subsequently awarded \$91.6 million in external funding (including \$68.7 million in direct funding and \$22.9 million in indirect cost reimbursement). Catalyst Awards, with a return of \$12.10 for every dollar invested, proved to be especially productive. Moreover, because these results were reported in the fall of 2017, it is likely that the University's initial investment of \$5.0 per year million has since led to additional external funding.¹⁶

Johns Hopkins has also succeeded in increasing private-sector support for University research. Between fiscal years 2014 and 2019, corporate funding of Johns Hopkins research grew by nearly 72 percent, to nearly \$122.4 million.

16. An updated analysis of the University's return on its investment in Catalyst and Discovery awards is expected to be available in the spring of 2020.

Johns Hopkins has made Baltimore a center for new scientific discoveries, and for research into some of the most critical issues affecting the City, the nation and the world. The following are just a few examples of research conducted at Johns Hopkins.

- The University's **21st Century Cities Initiative** – one of five University-wide “signature initiatives” launched by President Ron Daniels in 2013 – is committed to understanding and solving economic, health, educational, safety and housing inequities that many cities are struggling to address. The research that the Initiative supports is focused primarily on applied research projects that are designed to yield actionable findings in six to eighteen months. In 2015, 21st Century Cities – with support from the Annie E. Casey Foundation – launched several “Rapid Response Research Projects,” focused on problems of economic and social inclusion in Baltimore.

Working with city housing officials, for example, a Whiting School professor of applied mathematics used a 21st Century Cities grant to build the most comprehensive data base ever developed on unoccupied houses in Baltimore, along with analytics that can be used to determine which are candidates for demolition, which can be rehabilitated – and where spending on demolition or rehabilitation is likely to have the greatest payoff at the neighborhood level.

- Closely related to the 21st Century Cities Initiative is the **Center for Government Excellence**, established in 2015 in conjunction with Bloomberg Philanthropies' What Works Cities Initiative – a project aimed at helping 100 mid-sized U.S. cities (including Baltimore) “use data and facts effectively to tackle their most pressing challenges and drive progress for the nation.” The Center conducts applied research on topics such as using data and technology to improve service delivery, improving education and employment outcomes for young city residents and preserving affordable housing.

The Center also supports the participating cities with training, technical assistance and advanced analytics. Since 2015, the Center has trained more than 2,000 city employees.

- Through another signature initiative – Johns Hopkins inHealth – the University and the Johns Hopkins Health System are working at the frontier of individualized health care. In 2016, Johns Hopkins inHealth unveiled plans to create several **Precision Medicine Centers of Excellence**, each focused on a specific disease, with the first three focusing on multiple sclerosis, prostate cancer and complex heart arrhythmias. By the summer of 2019 six more centers had been created, specializing in pancreatic cancer, bladder cancer, neurofibromatosis, myositis, scleroderma and disease comorbidities across large populations. Researchers at these centers are combining clinical, genetic, demographic and lifestyle data to devise new approaches and develop new tools for prevention, diagnosis and treatment of these diseases. By the end of 2019, the number of Precision Medicine Centers of Excellence is expected to increase to a total of 16.

- In 2016 the Whiting School of Engineering launched the **Malone Center for Engineering in Healthcare**. A focal point for collaboration among engineers, clinicians and School of Medicine faculty, the Center is “leveraging data analytics in novel ways...pioneering new technologies and applying systems engineering principles to speed the development of research-based innovations that will enhance the efficiency, effectiveness and consistency of health care.” Research projects at the Center include:

- > The development of “socially assistive” robots for children with autism spectrum disorders
- > Development of microsurgical assistant systems
- > Improving clinicians’ ability to assess individual patients’ risk of strokes
- > Analyzing social media data to better understand group-based attitudes toward and narratives about vaccination

- The Johns Hopkins **Mathematical Institute for Data Science (MINDS)**, established in 2017, works at the intersection of mathematics, statistics and computer science to develop the theoretical principles that underlie the organization, analysis and interpretation of massive volumes of complex data. MINDS also trains faculty members and students in data science, and organizes conferences and symposia – including its inaugural symposium, held in Baltimore in September 2017.

- The *Kavli Neuroscience Discovery Institute (Kavli NDI)*, founded in 2016 with a \$10 million grant from the Kavli Foundation and \$10 million from Johns Hopkins, seeks to develop a better understanding of the workings of the human brain through the combined efforts of neuroscientists, biomedical engineers and data scientists. The Institute's members include 45 researchers from the schools of Medicine, Engineering, Arts and Sciences and Public Health and the Applied Physics Lab. Kavli NDI is one of just three research centers nationwide whose work is supported by the federal government's BRAIN (Brain Research through Advancing Innovative Neurotechnologies) initiative.
 - In 2016, Bloomberg Philanthropies marked the 100th anniversary of the Johns Hopkins Bloomberg School of Public Health by committing \$300 million to a new *Bloomberg American Health Initiative*, an effort to improve the nation's health by strengthening public health research, education and practice. The Initiative:
 - > Supports research at Johns Hopkins in five issue areas critical to public health – addiction and overdose, environmental challenges, obesity and the food system, risks to adolescent health and violence
 - > Awards 50 full-tuition scholarships each year, to allow individuals already working in these five areas in communities across the country to earn an MPH or DPH degree at the Bloomberg School (conditioned on their returning to, and working for at least a year in, their home communities)
 - > Is developing a nationwide network of professionals committed to translating the results of public health research into improved policies and practices
 - The *Center for Behavioral and Experimental Agri-Environmental Research (C-Bear)* is a multi-university consortium – founded in 2014 with support from the U.S. Department of Agriculture, and co-led by researchers from the Carey Business School and the University of Delaware – that seeks to use insights from behavioral and experimental economics to increase acceptance of sustainable agricultural and land management practices among farmers and landowners.
 - The *Environmental, Energy, Sustainability and Health Institute (E2SHI)*, established in 2011, supports research in two areas:
 - > Developing and delivering sustainable solutions to today's energy challenges
 - > Understanding and better managing interconnections among food, water and energy systems
- In 2018 the U.S. Department of Energy awarded a grant of nearly \$2 million to a team led by E2SHI engineers and including researchers from IBM, the University of Texas at Dallas and the National Renewable Energy Lab that is using “big data” and artificial intelligence to improve day-by-day forecasting of solar power production.
- Such forecasts are needed by grid operators to determine each day's requirements for generation of electricity from sources other than solar. Improving their accuracy will help generators and grid operators reduce the costs associated with overestimating the volume of conventional energy that may be required (unnecessary consumption of fossil fuel, increased pollution); or underestimating it (increased risk of short-term power shortages). With renewables accounting for an ever-increasing share of the nation's power supply, the ability to forecast accurately and manage an increasingly complex mix of energy sources is becoming more and more important.

- In 2015, the Johns Hopkins School of Education launched a new ***Institute for Education Policy***. The Institute conducts research on effective education and works with education leaders to translate research into policy and practice. It “operates on the understanding that education policy must be informed both by real-world conditions and also by excellent research... Education must be driven and sustained by evidence about what works and what does not.”

Since its founding, the Institute has published research and policy briefs on topics such as targeted support for low-performing students, improving English language learners’ curricula, and requirements for successful career and technical education programs; and hosted national and international conferences on topics such as higher education reform. It has also worked with state education agencies and local school districts – including Baltimore City – to improve the performance of local public schools.

- In 2019 the University announced creation of a new ***Center for Safe and Healthy Schools***, led by the Johns Hopkins School of Education. The Center will conduct research on school health and safety, school security and school-community engagement. It will also offer online courses on these topics, and provide seed grants for innovative projects.

Strengthening democracy in America and around the world

In 2017, Johns Hopkins – with a commitment of \$150 million from the Stavros Niarchos Foundation – announced the creation of the ***Agora Institute***. The new Institute, part of the Krieger School of Arts and Sciences, is dedicated to strengthening democracy both in the U.S. and around the world. It:

- Conducts cross-disciplinary research and analyses on the causes and dynamics of social, cultural and political polarization in the U.S. and elsewhere; and is developing ways to improve public discourse and decision-making, and new approaches to resolving especially divisive policy issues;
- Offers courses on topics such as nationalism and identity politics, political polarization, dictatorship and dissidence in Central Europe, populism and the future of American democracy;
- Organizes conferences, workshops, and other programs aimed at disseminating its findings and translating them into action.

The Institute is located on the Homewood campus, where its new home is now being developed at a site on Wyman Park Drive. Construction will start in the fall of 2020, and is scheduled to be completed in the fall of 2022. The new building will include classrooms, faculty offices, research space, seminar rooms, student co-working areas, meeting and conference space, exhibit areas and other public spaces.

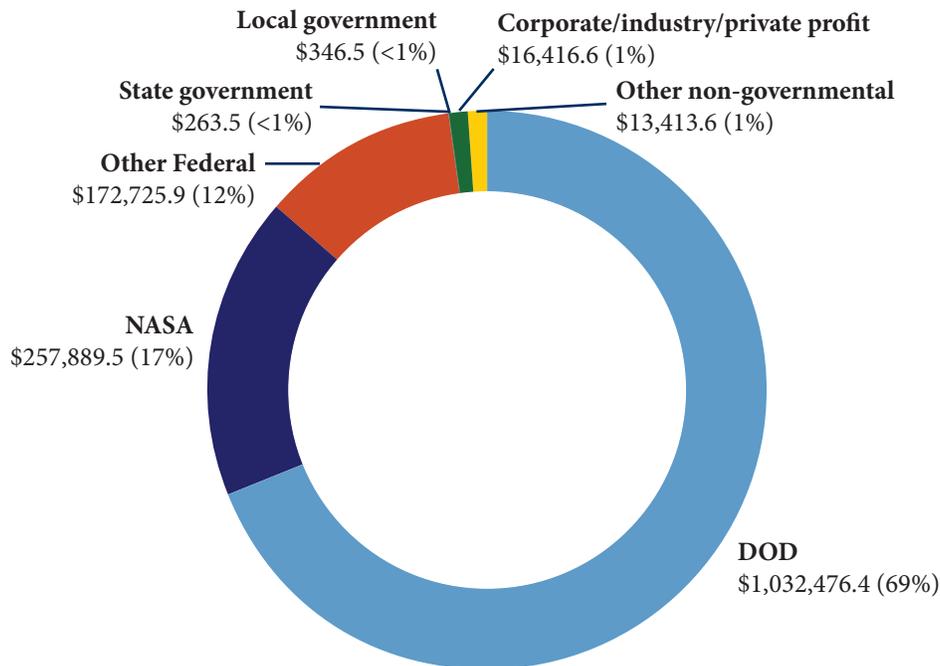
The Applied Physics Laboratory

With contract revenues of more than \$1.5 billion in fiscal year 2018, the Applied Physics Laboratory (APL) in Laurel, Maryland is one of the largest university-affiliated research centers in the United States, and Howard County's largest private employer. APL's work encompasses research on national security problems, the development and testing of new defense technologies, information security, the planning and management of major space missions for NASA, and the development of innovative medical devices.

APL's history dates back to 1942, when in the aftermath of Pearl Harbor the Navy charged a group of Johns Hopkins scientists and engineers with developing new ways to defend its ships against attacking aircraft. Since then, the Laboratory has continued to play a leading role in the development of new defense systems and technologies, and in the exploration of space. In 1954, APL moved from Silver Spring to its present location – a 453-acre campus in Laurel, Maryland, with a nearby satellite campus.

In fiscal year 2018, 98 percent of APL's research and related spending was funded by federal grants and contracts. As Figure 22 shows, in fiscal year 2018 the Department of Defense (DOD) funded 69.1 percent of APL's research spending, NASA funded 17.3 percent, and other federal agencies funded 11.6 percent.

Figure 22: APL research spending by source of funds, FY 2018 (in \$000s)



As of the spring of 2019, the Applied Physics Lab employed 7,331 people (including students) – an increase of 32.2 percent since the spring of 2014.

APL's work encompasses a wide range of activities – basic and applied scientific research; the development, testing and evaluation of new defense systems; development and management of space missions; and strategic analyses and national security policy. Most of its work is concentrated in several major areas, including:

- Air and missile defense
- Civilian space exploration
- Homeland protection
- Information security
- Analysis of national security issues
- Developing space-based solutions to national security challenges
- Improving the armed forces' precision strike capabilities
- Collaborative research on and exploratory development of new technologies that can help meet critical needs
- Developing technologies to support special operations
- Strategic deterrence
- Undersea warfare

Notable developments in recent years have included:

- Creation of APL's *Intelligent Systems Center*, drawing on the Lab's expertise in robotics, machine learning, neuroscience and other fields to accelerate the development and deployment of "autonomous systems."
- Development of a framework for the integration of multiple cybersecurity systems (IACD – Integrated Adaptive Cyber Defense). With several partners, APL is now working on deployment of IACD in the financial services sector.

- In 2015, the historic flyby of Pluto by NASA's *New Horizons* space probe, built and managed by APL. New Horizons is now exploring the Kuiper Belt, a zone at the outer rim of the solar system populated by asteroids, comets, and other space objects, many of them consisting mostly of ice. In January 2019 New Horizons sent back photographs of Ultima Thule, a snowman-shaped "Kuiper Belt object" located more than 4 billion miles from Earth.
- The development and 2018 launch of NASA's *Parker Solar Probe*, which is flying closer to the sun than any previous spacecraft. Also built and managed by APL, the Parker Solar Probe's mission is to collect hitherto unavailable data on conditions in the sun's corona, how they affect the Earth, and the origins of solar winds, one of the solar system's most powerful forces.
- Development of portable technologies for low-cost production of vaccines and other therapeutics in remote areas under adverse conditions.
- Development of a portable, low-cost, multi-purpose water purification system that can be used both in military applications and to provide clean water in low-income communities in developing countries. This new system was named APL's "Invention of the Year" for 2017.
- A contract from the Centers for Disease Control in 2017 for continued development and maintenance of *ESSENCE*, a web-based surveillance system that collects and analyzes a wide range of data from diverse non-traditional sources to provide early indicators at the local community level of potential disease outbreaks and other emerging bio-threats.



Designed and built by APL – with contributions from research institutions and companies around the world – the MESSENGER spacecraft tackled the challenges associated with orbiting Mercury.

- In June 2019, NASA’s selection of a team led by APL to manage the newest mission in its New Frontiers program. The new mission, called *Dragonfly*, will send a robot rotorcraft to Titan – a moon of Saturn considered by scientists to be the body in the solar system that most closely resembles Earth. Titan’s relatively dense atmosphere makes it feasible to use a rotorcraft to move from place to place across the moon’s surface, allowing the Dragonfly team to

explore much more territory than could be covered with a Mars-type surface rover.

Dragonfly is scheduled to launch in 2026, and to reach its destination in 2034. Scientists believe that the study of Titan’s “prebiotic” environment can teach us much about how life arose on Earth, and the conditions under which it might exist elsewhere.

Enabling growth through high-performance computing

The Maryland Advanced Research Computing Center (MARCC, pronounced “MAR-see”) is a shared facility of the Johns Hopkins University and the University of Maryland College Park, located on the Johns Hopkins Bayview Medical Center campus in Baltimore. With \$27.1 million in financing provided by the Maryland Legislature, construction of the new computing center began in the fall of 2014; and by July 2015 MARCC was completed and fully operational.

The heart of MARCC consists of more than 21,000 core processors, with a combined capacity to execute more than 900 billion calculations per second. MARCC also has 17 petabytes (that is, 17 million gigabytes) of data storage; and is connected to research facilities on both universities’ campuses by a network of 100 megabyte-per-second fiber optic links.

Since its opening, MARCC has provided Johns Hopkins and University of Maryland faculty members, staff, students and post-docs with a level of computing power that had previously not been available within the State. It enables researchers to apply the methods and tools of “big data” to a wide range of problems across a wide range of disciplines; and to do so much more quickly and at lower cost than they ever could before.

MARCC plays an essential role in research projects across a wide range of disciplines, on topics such as improving the efficiency of wind energy, advancing our understanding of the role of environmental and behavioral factors in the development of chronic diseases, protecting water quality in the Chesapeake Bay, and

searching distant skies for clues to the origins and ongoing evolution of the universe. From its opening through June 2017, MARCC supported approximately 250 research projects involving 500 university faculty and staff, 1,000 graduate students and 200 undergraduates. Recognizing the role the facility plays in major research projects, the NSF in 2019 awarded MARCC a \$4 million Major Instrumentation Grant.

MARCC contributes in several ways to the ongoing growth and development of Maryland’s economy.

- By helping the two universities attract, develop and retain top researchers from around the U.S. and the world.
- By enhancing their ability to compete effectively for federal and other external research funding.
- By supporting the creation of new knowledge that in the years ahead can be a source of new products and services, new businesses and new jobs, and that can provide solutions to some of the nation’s (and the world’s) most pressing problems.
- By equipping students with the advanced skills and experience in high-performance computing and analytics that Maryland’s leading science- and technology-based industries increasingly require.

MARCC should not be seen, however, as a one-time investment. The global competition to stay on the leading edge of high-performance computing is relentless. Staying in the race will require ongoing investment and improvement.

Other Johns Hopkins research centers

In addition to its main campuses in Baltimore and the Applied Physics Lab in Laurel, Johns Hopkins conducts research at several other locations in Maryland and elsewhere.

- Since 1921, the Bloomberg School of Public Health's **Comstock Center for Public Health Research and Prevention**, located in Hagerstown, has been conducting large-scale, long-term studies of cardiovascular risk, cancer and other public health issues among residents of Washington County. In recent years the Center has also focused on strategies for maintaining cognitive health in older adults, preventing falls, and reducing the risk of gout through healthier eating.
- The Whiting School of Engineering's **Advanced Engine and Rocket Fuels Lab**, located in Columbia, has for more than 70 years been providing research on liquid-fuel propulsion systems to federal agencies, industry and academic experts. Operated by the School's Energetics Research Group, the Lab is currently working on development of the next generation of liquid-fueled rocket engines.
- Johns Hopkins Medicine's **Office of Capital Region Research (CAPRES)** provides research management, infrastructure and support services for clinical research in areas such as oncology, neurology and cardiology at JHM's three facilities in the Washington, D.C. area – Howard County General Hospital, Suburban Hospital and Sibley Memorial Hospital.
- The Nitze School of Advanced International Studies' **Henry A. Kissinger Center for Global Affairs** sponsors and supports research on some of today's most complex global challenges, such as the re-emergence of great power rivalries, cybersecurity and climate change.
- The Johns Hopkins All Children's Hospital's **Institute for Fundamental Biomedical Research** is using the tools of basic science to better understand how diseases develop, and how they might be treated – and prevented – more effectively. The Institute's Center for the Metabolic Origins of Disease is focusing on conditions such as obesity and Type 2 diabetes, and its Center for RNA Biology is studying ribonucleic acids at the molecular level, to see how these acids affect the development and treatment of cancer and other diseases.

The platform that Johns Hopkins provides within a single, integrated enterprise for collaboration across disciplines and among scientists, engineers, clinicians and other professionals is one of its greatest strengths as a research institution. This strength has in recent years been reinforced by the University's **Bloomberg Distinguished Professorships**, 50 new faculty positions established in 2014 with a \$250 million gift from alumnus Michael Bloomberg. As of mid-2019, 46 of these positions – which are focused on interdisciplinary research, teaching and service – have been filled, with the rest scheduled to be filled in the next few years. The Bloomberg Professorships have already enhanced the University's ability to attract leading scholars, as well as external research funding.



Part Five: Improving the Health of the Community

Johns Hopkins has long been committed to protecting the health of Maryland residents, to better understanding and preventing the diseases that afflict them, and providing them with essential health services. More recently, Johns Hopkins has extended its mission to communities outside the State as well – especially to the District of Columbia and to West Central Florida.

The Johns Hopkins University and the Johns Hopkins Health System fulfill this commitment in several ways:

- By providing health care to residents of surrounding communities, cities and regions
- Through the education of physicians and other health professionals
- Through biomedical research and innovation

In particular their involvement in preserving and improving the health of Maryland residents is also among the University's and the Health System's most important contributions to the health of the State's economy.

◀ **Left:** A young patient at the Johns Hopkins All Children's Hospital in St. Petersburg, FL.

- Health care is one of Maryland's largest industries. The State's role as a major regional, national and global center for the delivery of health services is among its greatest strengths.
- Access to high-quality health care is critical to maintaining the health of the State's residents and the productivity of its work force – and for attracting and retaining the talented people on whom Maryland's future prosperity depends.
- Poor health is simultaneously a consequence and a cause of poverty and economic immobility. Improving the health of Maryland's low-income residents is likely to be an essential element in any long-term strategy for reducing poverty and improving the quality of life for the entire community.

Part Four of the report highlighted the strengths of Johns Hopkins as a center of biomedical research. This part of the report describes its role in caring for residents of Maryland, the District of Columbia and Florida, and in the education of physicians and other health professionals. Part Six discusses the role Johns Hopkins plays in making Maryland a global center for high-quality health care.

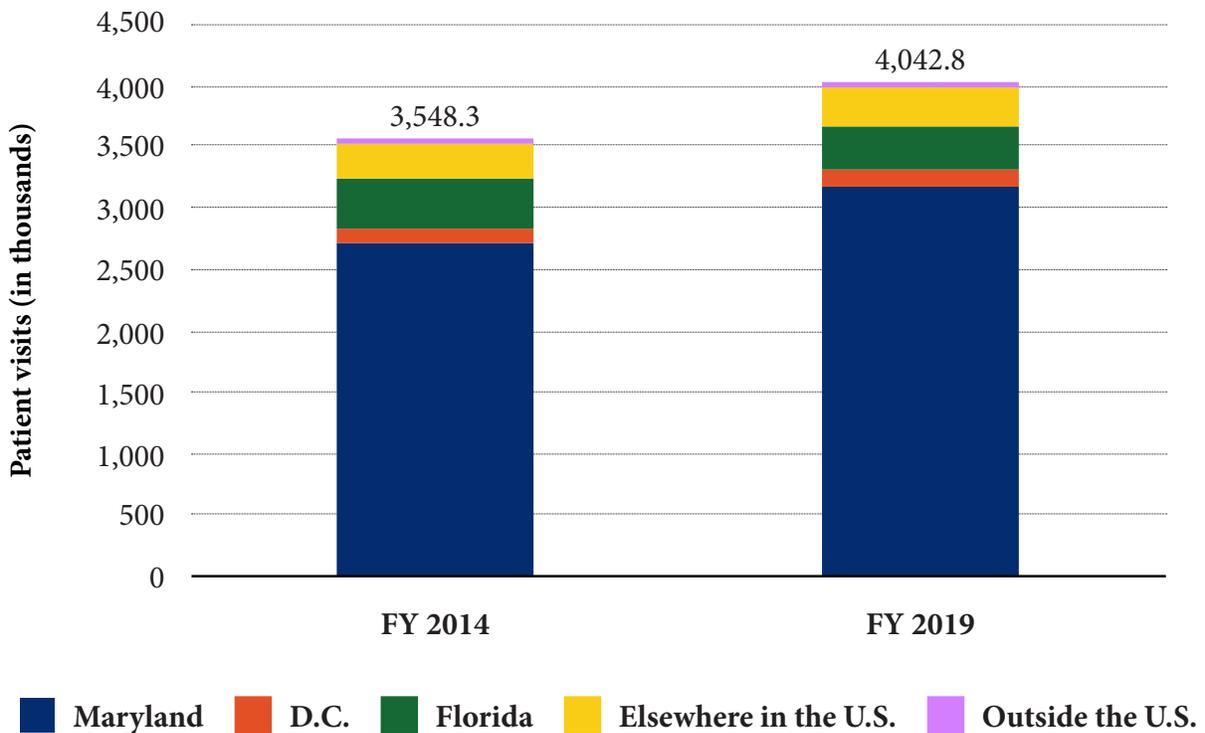
Providing health care to Maryland, D.C. and Florida residents

Johns Hopkins provides health care services to Maryland residents through the hospitals that belong to the Johns Hopkins Health System, through several other subsidiaries of the Johns Hopkins Health System, through Johns Hopkins School of Medicine faculty physicians and Johns Hopkins School of Nursing faculty and nurse practitioners. In fiscal year 2019, the Johns Hopkins Health System handled more than 4.0 million patient visits – an increase of 13.9 percent since fiscal year 2014.

Hospital inpatient and outpatient services

The Johns Hopkins Hospital (JHH) provides a wide range of acute care and specialty services to Maryland residents. It is consistently ranked at or near the top among U.S. hospitals in neurology and neurosurgery, cancer care, eye surgery, gynecology, orthopedics, otolaryngology, psychiatry, pediatrics, rheumatology, urology, the treatment of diabetes and several other areas. Johns Hopkins is also home to the only state-designated level-1 pediatric trauma center in Maryland.

Figure 23: Growth in patient visits by patient’s place of residence, FY 2014 – FY 2019



Of the 45,050 inpatients discharged from the Johns Hopkins Hospital in fiscal year 2019, 37,345 – 82.9 percent of the total – were residents of Maryland, including 14,305 residents of Baltimore (31.8 percent of the total). During the same year, JHH clinics handled 1,035,031 outpatient visits, including 848,885 (82.0 percent of all outpatient visits) that involved Maryland residents, including 316,284 Baltimore residents; and 67,189 emergency department visits, of which 62,796 (93.5 percent of all emergency department visits) involved Maryland residents, including 44,781 Baltimore residents. Whether measured by number of inpatient beds or inpatients and outpatients served, the Johns Hopkins Hospital is Maryland’s largest hospital.¹⁷

Johns Hopkins Bayview Medical Center (JHBMC) is similarly a provider of high-quality health care, with particular strengths in geriatric medicine, alcohol and substance use disorder treatment, and neonatal intensive care. JHBMC is also home to Maryland’s only adult burn center. Of the 20,450 inpatients discharged from Johns Hopkins Bayview Medical Center in fiscal year 2019, 19,328 – 94.5 percent of the total – were Maryland residents, including 7,578 Baltimore residents (37.1 percent of the total). Johns Hopkins Bayview also handled 385,580 outpatient visits in fiscal year 2019, of which 359,567 (93.3 percent) involved Maryland residents, including 163,438 Baltimore residents; and 41,540 emergency department visits, of which 40,179 (96.7 percent) involved Maryland residents, including 19,738 Baltimore residents.

17. Baltimore Business Journal, Book of Lists 2018-2019, p. 120.

Howard County General Hospital (HCGH), the County’s only acute care hospital, provides comprehensive inpatient and outpatient care to residents of Howard County and surrounding communities, with particular strengths in women’s and children’s health, emergency care, cardiology, cancer care and several other areas. Of the 17,601 inpatients discharged from Howard County General Hospital in fiscal year 2019, 17,271 – 98.1 percent of the total – were Maryland residents, including 305 Baltimore residents. Howard County General Hospital also handled 41,148 outpatient visits, of which 40,261 (97.8 percent) involved residents of Maryland, including 718 Baltimore residents; and 60,172 emergency department visits, of which 58,179 (96.7 percent) involved Maryland residents, including 1,424 Baltimore residents.

Suburban Hospital similarly provides acute care for residents of Montgomery County and surrounding areas, with strengths in cardiology, cancer care, orthopedics and other areas. Of the 13,490 inpatients discharged from Suburban Hospital in fiscal year 2019, 12,176 – 90.3 percent of the total – were Maryland residents, including 47 Baltimore residents. Suburban also handled 35,026 outpatient visits – 31,015 of which (88.5 percent) involved residents of Maryland, including 69 Baltimore residents; and 31,945 emergency room visits, of which 28,916 (90.5 percent) involved Maryland residents, including 103 Baltimore residents.

Outside of Maryland, two other Health System facilities also provide essential health services to residents of their respective communities.

Sibley Memorial Hospital is a full-service, acute care community hospital located in Northwest Washington, D.C., with strengths in oncology, orthopedics, obstetrics and gynecology. Of the 16,673 inpatients treated at Sibley in fiscal year 2019, 7,740 were D.C. residents (46.4 percent of all inpatients) and 6,283 (37.7 percent) were residents of Maryland (including 28 Baltimore residents). Sibley also handled 122,802 outpatient visits, of which 45,943 (37.4 percent) involved D.C. residents and 53,153 (43.3 percent) involved residents of Maryland (including 175 Baltimore residents); and 35,352 emergency department visits, of which 21,376 (60.5 percent) involved D.C. residents and 9,965 (28.2 percent) involved Maryland residents (including 76 Baltimore residents).

Johns Hopkins All Children's Hospital (JHACH), located in St. Petersburg, Florida, provides a full range of pediatric health services, with notable strengths in neonatal intensive care and other critical care services, pediatric oncology, pediatric neurology and neurosurgery, pediatric emergency care and child development and rehabilitation services. Of the 6,284 inpatients discharged from JHACH in fiscal year 2019, 6,159 (98.0 percent of the total) were Florida residents. JHACH also handled 178,882 visits to outpatient facilities on its main campus, of which 175,511 (98.1 percent) involved residents of Florida; and 46,087 emergency department visits, of which 45,269 (98.2 percent) involved Florida residents.

Table 23 shows a breakdown of total patient visits to the Johns Hopkins Health System's six hospitals, by hospital, type of patient visits, and patient's place of residence, during fiscal year 2019.

In total (as shown in Figure 24), during fiscal year 2019, the Johns Hopkins Health System's six hospitals:

- Reported a total of 92,403 inpatient discharges by residents of Maryland, including 22,262 by Baltimore residents;
- Handled 1,332,882 outpatient visits by Maryland residents, including 480,685 by Baltimore residents; and
- Received 200,036 emergency department visits by Maryland residents, including 66,122 by Baltimore residents.

In addition, the Johns Hopkins Health System's six hospitals:

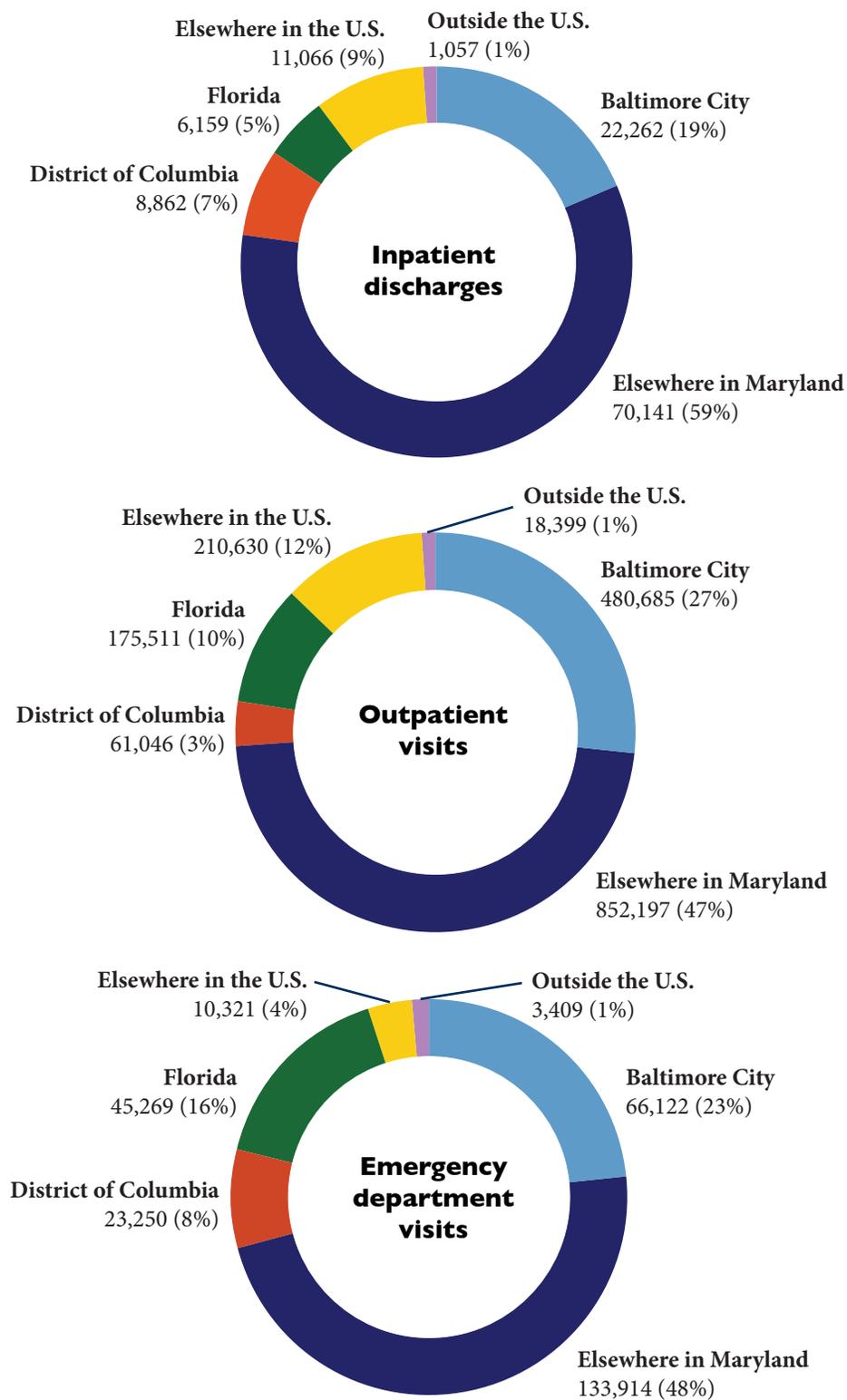
- Reported a total of 8,862 inpatient discharges by residents of D.C.;
- Handled 61,046 outpatient visits by D.C. residents; and
- Received 23,250 emergency department visits by D.C. residents.

In addition to the institutions that are part of the Health System network, Johns Hopkins owns a 50 percent interest in Mount Washington Pediatric Hospital in Baltimore, which is governed by a board that includes representatives of Johns Hopkins and the facility's other co-owner, the University of Maryland Medical System. In fiscal year 2019, the 102-bed hospital provided 21,820 inpatient days of service and 51,826 outpatient visits.

Table 23: Total patient visits at Johns Hopkins Health System hospitals, by hospital, type of patient visit, and patient's place of residence, FY 2019

	JHH	JHBMC	HCGH	Suburban	Sibley	JHACH	Total
Maryland							1,625,321
Inpatient	37,345	19,328	17,271	12,176	6,283	–	92,403
Outpatient	848,885	359,567	40,261	31,015	53,153	–	1,332,882
Emergency	62,796	40,179	58,179	28,916	9,965	–	200,036
District of Columbia							93,158
Inpatient	393	31	31	667	7,740	–	8,862
Outpatient	11,117	1,521	127	2,338	45,943	–	61,046
Emergency	172	42	194	1,466	21,376	–	23,250
Florida							226,939
Inpatient	–	–	–	–	–	6,159	6,159
Outpatient	–	–	–	–	–	175,511	175,511
Emergency	–	–	–	–	–	45,269	45,269
Other U.S.							232,017
Inpatient	6,464	1,008	281	595	2,620	98	11,066
Outpatient	160,810	23,088	624	1,640	23,062	1,405	210,630
Emergency	2,092	739	1,491	1,426	3,828	745	10,321
International							22,865
Inpatient	848	83	18	52	29	27	1,057
Outpatient	14,218	1,403	136	33	643	1,966	18,399
Emergency	2,130	579	308	137	182	73	3,409
TOTAL	1,147,270	447,570	118,921	80,461	174,827	231,253	2,200,302
Inpatient	45,050	20,450	17,601	13,490	16,673	6,284	119,548
Outpatient	1,035,031	385,580	41,148	35,026	122,802	178,882	1,798,469
Emergency	67,189	41,540	60,172	31,945	35,352	46,087	282,285

Figure 24: Inpatient discharges and outpatient and emergency department visits at Johns Hopkins Health System hospitals, by residence of patient, FY 2019



Primary care and home care services

Hospital-based inpatient and outpatient services are not the only means through which Johns Hopkins provides health care to Maryland residents. **Johns Hopkins Community Physicians (JHCP)** operates primary and specialty care centers at 36 locations in Maryland, including four locations in Baltimore City. In fiscal year 2019 these centers reported a total of 905,033 patient visits. JHCP also operates two primary and specialty care centers in the District of Columbia, which in fiscal year 2019 reported a total of 26,531 visits.

In total, in fiscal year 2019, JHCP's 36 primary and specialty care centers reported a total of 931,564 patient visits, of which approximately 872,542 involved residents of Maryland (including 141,422 Baltimore residents), and 27,939 involved D.C. residents.

Johns Hopkins faculty physicians provide additional outpatient services outside these settings. During fiscal year 2019, members of the **Johns Hopkins Clinical Practice Association** handled 688,235 outpatient visits, of which 618,837 (89.9 percent) involved residents of Maryland, including 113,797 Baltimore residents (16.5 percent); and 17,075 (2.5 percent) involved residents from D.C.

Johns Hopkins is also a major provider of home care in Maryland. In fiscal year 2019, **Johns Hopkins Home Care Group** provided a range of in-home health services – including skilled nursing and home health aide services, physical therapy and the provision of medication and medical equipment – to 79,158 patients, including 67,060 residents of Maryland (84.7 percent of all patients), of which 14,333 were Baltimore residents; and 3,037 D.C. residents. **Potomac Home Health Care** – a non-profit joint venture of Suburban Hospital and Sibley Memorial Hospital – also provided home care services 3,536 patients, of which 2,646 were residents of Maryland, and 827 were D.C. residents.

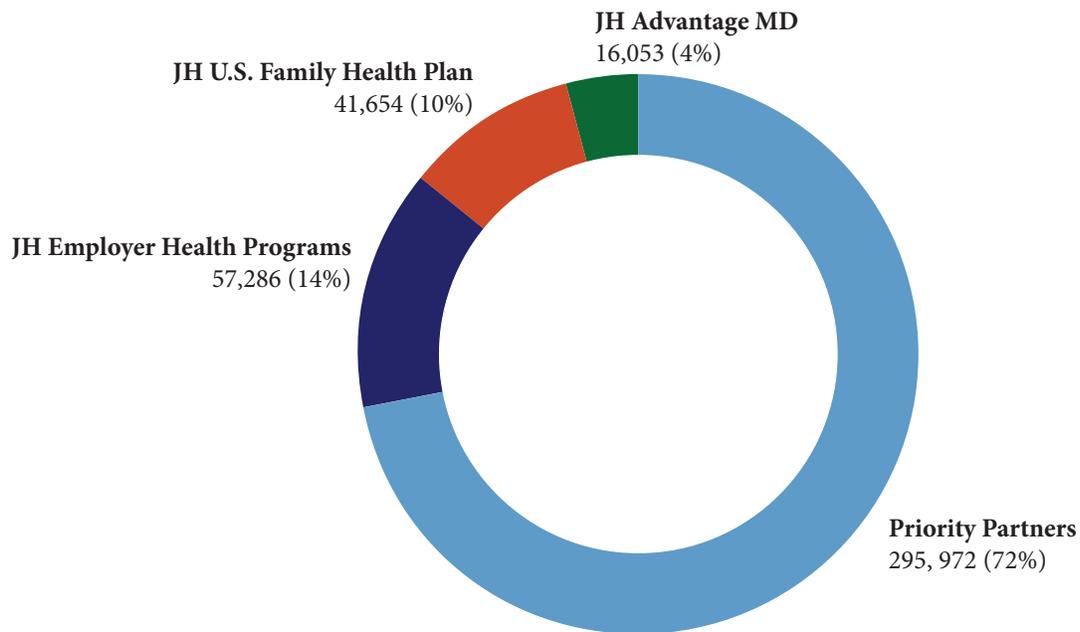
In addition to its hospital-based outpatient services, Johns Hopkins All Children's Hospital operates 10 regional **Outpatient Care Centers**, offering primary care and specialty services for children throughout West Central Florida. In fiscal year 2019 these centers handled a combined total of 126,358 outpatient visits, of which 126,271 (99.9 percent) involved residents of Florida. **Johns Hopkins All Children's Hospital's Home Care** also provided home health services to 13,670 patients during fiscal year 2019, all of whom were residents of Florida.

Providing health care coverage for Maryland residents

As noted in Part One, *Johns Hopkins HealthCare LLC (JHHC)* – a joint venture of the University and the Johns Hopkins Health System created in 1995 – manages four health care plans.

- **Priority Partners Managed Care Organization** provides health care for recipients of Medicaid in Maryland, as well as case management services which provide connections to other social support programs.
- **Johns Hopkins Employer Health Programs** provides health care for employees of the Johns Hopkins Health System and several partner institutions.
- **Johns Hopkins U.S. Family Health Plan** provides health care to military families living in Maryland and in adjoining areas in several other states.
- **Johns Hopkins Advantage MD**, a plan providing basic Medicare coverage plus a variety of additional benefits to Medicare-eligible residents of Maryland.

Figure 25: Johns Hopkins HealthCare LLC enrollment, Maryland residents by plan, FY 2019





Cardiac rehabilitation employees at Howard County Hospital Outpatient Center.

JHHC provides a variety of services for these plans, including member outreach and enrollment, ongoing development of provider networks, management of both provider and customer relations, and claims processing. JHHC also provides a range of health care management services for members. These range from information and assistance to members who want to adopt healthier lifestyles to individualized case management for members with chronic health conditions such as diabetes or shorter-term issues such as a high-risk pregnancy.

In fiscal year 2019, enrollment in JHHC's four plans totaled 422,979, including 74,770 members who were residents of Baltimore – about 12.4 percent of the City's total population in 2018. Statewide (including Baltimore), JHHC provided comprehensive health care coverage to 410,965 residents of Maryland – about 6.8 percent of Maryland's total population in 2018. JHHC also provided health care plans to 865 D.C. residents.

As Figure 25 shows, Priority Partners accounted for 72.0 percent of the four plans' memberships in Maryland.

New and expanded services in Maryland and beyond

During the past several years, Johns Hopkins has undertaken major investments in its hospitals and outpatient clinics.

- At Johns Hopkins Bayview Medical Center, JHHS is developing a new 158-bed inpatient building and modernizing and expanding other facilities, all to be completed in 2024 at a cost of \$469 million.
- The Skip Viragh Outpatient Cancer Building, a \$100 million, 184,000-square-foot cancer diagnostic and treatment facility at the Johns Hopkins Hospital – a unit of the Kimmel Cancer Center – was completed in 2018.
- In 2014, Suburban Hospital broke ground on a 300,000-square-foot, \$230 million expansion of its existing facilities in Bethesda. To be completed in 2020, the project includes new patient rooms, expanded operating suites including some equipped for robotic surgery and hybrid imaging, physicians' offices, a new main entrance, a conference center and a new parking structure.
- In 2018, Johns Hopkins Medicine's Armstrong Institute for Quality and Patient Safety opened a new satellite center at Howard County General Hospital – the first Armstrong Institute center to be located in a community hospital. The new center provides clinicians at HCGH with opportunities to participate more directly in the Institute's efforts to improve quality and patient safety, with a particular emphasis on how research conducted and innovations developed at Armstrong Institute can be applied in a community hospital setting.
- In 2017, Howard County General Hospital also began renovation of several existing spaces, and construction of a 48,000-square-foot, \$45 million addition that includes expanded emergency room facilities, and expanded adult and pediatric behavioral health units. Transition to the new space is planned for January 2020.
- In 2016, Sibley Memorial Hospital completed and opened a new \$242 million, 475,000-square-foot 200-bed tower on its D.C. campus. The building includes expanded facilities for women and infants, including 18 new labor and delivery suites; and a branch of Johns Hopkins Medicine's Sidney Kimmel Comprehensive Cancer Center, offering D.C.-area residents a full range of cancer diagnosis and treatment services. A year later, Sibley completed a \$38 million renovation of its older hospital building.
- Approved by regulators in 2016, the Johns Hopkins National Proton Therapy Center opened in October 2019 at Sibley Memorial Hospital. Proton therapy allows clinicians to target cancer cells more precisely, and causes less damage to the surrounding healthy tissue, than conventional radiation. This makes it especially useful for treating cancer in sensitive areas such as the brain, and for treating pediatric cancer patients. The 80,000-square-foot Center has four treatment rooms, with one earmarked for research. The Center is the only such regional center with a dedicated pediatric team. Its opening will make this important new treatment option more readily available to D.C.-area residents, including those from underserved communities, as well as patients from around the nation and the world.

- In recent years, Johns Hopkins has been moving a widening range of health services out of its hospitals to locations that are more convenient for many of its patients. The largest of these locations is the Johns Hopkins Health Care and Surgery Center at Green Spring Station. The Center offers primary care, a full range of medical specialties and ambulatory surgery, as well as lab services, a pharmacy, a weight management program and a walk-in urgent care center. In September 2019 Johns Hopkins Medicine marked completion of an \$80 million, 110,000-square-foot expansion of its facilities at Green Spring Station with a free community health fair. The new building (Pavilion III) includes a new outpatient surgery center, a musculoskeletal center (including orthopedics, physical medicine and rehabilitation), medical oncology, otolaryngology, facial plastic surgery and urology services, medical imaging facilities and laboratories. This brings Johns Hopkins facilities at the Green Spring Station location to a total of 350,000 square feet, and further expands the range of services it offers. The additional space can accommodate expected growth in the number of patient encounters at the site from 550,000 annually to more than 750,000.
- In 2016, Johns Hopkins All Children's Hospital started construction on its new, \$95 million, 225,000-square-foot Research and Education Building. Completed in 2018, the new building provides space for JHACH's five research institutes and other research programs; graduate medical education programs (with Johns Hopkins and the University of Southern Florida); and JHACH's Center for Medical Simulation and Innovative Education.

These and other investments will help ensure that Johns Hopkins stays at the leading edge of health care quality, access and innovation, in Maryland and beyond.

Improving health care through telemedicine

Health care experts have long recognized the potential of telemedicine to improve patient access to health care, to improve the quality of services provided, and to reduce costs. For many years progress toward realizing that potential was slow; but as technology has improved, and both providers and patients grew more accustomed to interacting online, successful applications began to multiply. In 2016, Johns Hopkins established a systemwide Office of Telemedicine, to help drive integration of telemedicine into the full range of JHM's clinical services.

The Office's work focuses on using technology to more efficiently connect patients to clinicians, to support closer collaboration between and among clinicians, and to extend Johns Hopkins Medicine's reach into the communities it serves. Recent examples have included:

- Reducing emergency room wait times by providing certified nursing assistants in the ER with equipment that allows patients to be seen and examined by off-site physicians
- Connecting ophthalmologists at Howard County General Hospital to experts at the Wilmer Eye Institute in Baltimore
- Providing online, real-time video connections between school nurses (and students) in public schools in Howard County and physicians at Howard County General Hospital
- The Johns Hopkins Child Mobile Treatment Program, which enables the parents of children with serious, persistent mental health problems to quickly connect with psychiatrists at Johns Hopkins Bayview Medical Center

Educating physicians, nurses and other health care professionals

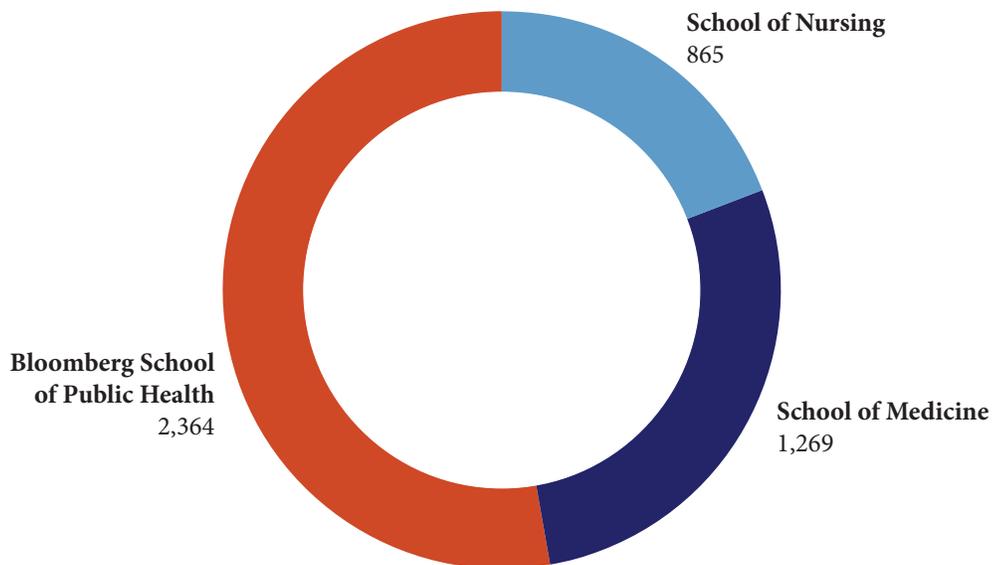
Maryland also benefits from Johns Hopkins University's role in the education of medical professionals. During the spring of 2019, Johns Hopkins University's School of Medicine, School of Nursing, and the Bloomberg School of Public Health together enrolled 4,498 students, of whom 1,279 (28.4 percent of the three schools' total enrollment) were residents of Maryland. As discussed later in Part Eight, student, faculty and staff at all three schools are deeply engaged in efforts to address the health-related needs of Maryland communities.

In fiscal year 2019, 12,283 graduates of the School of Medicine, the School of Nursing and the Bloomberg School of Public Health – 27.2 percent of the three schools' living alumni – also lived in Maryland.

Maryland also benefits from Johns Hopkins Medicine's role in graduate medical education. During the 2016-2017 academic year, 896 residents and 523 fellows were enrolled in graduate medical education at Johns Hopkins, while training at Health System facilities in Baltimore. Residents and fellows represent a valuable addition to Maryland's physician workforce – one that only a major academic medical center can provide.

In 2014, Johns Hopkins All Children's Hospital launched an innovative new residency program in pediatric medicine. The first cohort of twelve graduate medical students began studying and working at JHACH in July 2014. Since then, total enrollment in the program has grown to 34 residents as of the 2016-2017 academic year.

Figure 26: Total for-credit enrollment in the School of Medicine, School of Nursing and Bloomberg School of Public Health, by school, spring 2019





Johns Hopkins Lifeline brings basic and advanced life support and critical care services to patients in need of transport.

Johns Hopkins also contributes to the ongoing development of Maryland's physician workforce through its continuing medical education (CME) programs. These programs seek to help medical professionals develop their skills and provide better outcomes for their patients by providing the most up-to-date information in a variety of formats, including intensive, on-site short courses, online courses and grand rounds. During the 2016-2017 academic year, the School of Medicine offered a total of 570 CME programs and events, with enrollment totaling 53,151.

The Institute for Johns Hopkins Nursing – a partnership between the School of Nursing and the Johns Hopkins Hospital – is also a major provider of continuing education for nurses in Baltimore and elsewhere. Advanced training for nurses is offered in a variety of formats, including one-day workshops, week-long courses, online programs and clinical experience at the Johns Hopkins Hospital.

JHACH also offers a one-year pediatric RN residency program for nurses who have recently earned bachelor's degrees in nursing and are currently licensed. Approximately 15-30 graduate nurses participate in the program each year.

Training technologists for Maryland's health care sector

In addition to its role in the clinical training of physicians and nurses, the Johns Hopkins Hospital is a leading center for education and training in several fields of medical technology. The Hospital's *Schools of Medical Imaging* offer full-time, college-level programs in radiography, nuclear medical technology and diagnostic sonography, as well as more specialized training in CT scanning and MRI technology.

Academic requirements for these programs are rigorous. Admission to the nuclear medical technology and sonography programs requires at least an associate degree in a related allied health field, and the radiology program requires either a two-year degree or enrollment in a college affiliated with the Schools. All three programs require 18 months of full-time study and clinical work. Clinical training is provided at the Johns Hopkins Hospital and other Health System facilities.

In collaboration with the Community College of Baltimore County (CCBC), the Hospital also offers training in *Anesthesia Technology*. The program combines classroom learning in anatomy, physiology, pharmacology and anesthesia with simulations and hands-on clinical training at the Hospital. Students who complete the program earn an associate degree from CCBC and a certificate from Johns Hopkins, and after passing a national certification exam, become Certified Anesthesia Technologists.

Offered in cooperation with several Baltimore-area community colleges, the Johns Hopkins Department of Nursing's *SOARING* program enables entry-level patient care workers such as certified nursing assistants (CNAs) to take on higher-level tasks as Clinical Technicians. After training at a community college, participants complete a 10-week, full-time paid internship (offered three times each year) at Johns Hopkins. Many of those who complete the program are subsequently hired at a Health System hospital.

These and other programs help ensure that all of those who serve patients at Johns Hopkins and other Maryland institutions are well-qualified to do so – and that they have access to rewarding careers as well.

A mainstay of Maryland's economy

The health care sector is one of Maryland's leading employers, and over the past decade has been one of its fastest-growing. But high-quality health care and public health programs are important to the State's economy in other ways as well. Much like improvements in education and the expansion of educational opportunity, improving the health of Maryland's people enhances the quality of the State's human capital and the overall productivity of its economy. High-quality health care also enhances the overall quality of life in Maryland – and thus helps make the State more attractive to the highly-skilled workers on whom its future depends.

Moreover, the impact of Johns Hopkins as a leading system of health care delivery, research and education extends far beyond the borders of Maryland – a topic addressed in the next part of the report.



Part Six: Impacts around the Globe

While it has long ranked among the world's greatest universities and health systems, Johns Hopkins has increasingly impacted every corner of the world – providing leading-edge care for patients and families from nearly 190 countries and working hand in hand with affiliates on six continents to raise the standard of health care. This part of the report highlights the international aspects of Johns Hopkins' work in health care, research and education, and how the University's and the Health System's growing engagement with communities around the world contributes to the vitality of the City's and the State's economy.

Health care as an international enterprise

Health care has traditionally been viewed as a local business, with local providers caring for local residents. But while most services are still delivered locally, health care has in recent years become a global business – a trend that has presented significant opportunities for Johns Hopkins and for Maryland.

The Johns Hopkins Health System attracts patients to Maryland, D.C. and Florida from around the world. In fiscal year 2019, the six Johns Hopkins hospitals provided inpatient care to 1,057 patients from outside the U.S. The six hospitals also reported 21,808 outpatient and emergency room visits involving non-U.S. patients.

◀ Students from the Carey Business School's Global MBA program pose with Rwandan villagers during a project abroad.

Johns Hopkins International (JHI) – a joint venture of the University and the Johns Hopkins Health System, founded in 1999 – manages all aspects of international patients’ engagement with Johns Hopkins, from initial referral and consultations to arranging transportation, making hotel reservations for family members and monitoring follow-up care. JHI also has a growing business in the provision of remote second opinions, with patient records transmitted to Baltimore, and Johns Hopkins physicians providing comments in writing, by telephone or via videoconference.

Johns Hopkins International also provides management, consulting and professional services to health care institutions and organizations overseas. JHI’s current partners and clients (as of 2018) are listed below in Table 24. Past partners and clients have included King Khaled Eye Specialist Hospital in Riyadh, Tan Tock Seng Hospital in Singapore and Tokyo Midtown Medical Center.

Table 24: Johns Hopkins International’s current partners and clients, as of 2018

Institution	Location	Year agreement started
Medcan Clinic	Toronto, Canada	2007
Anadolu Medical Center	Gebze, Turkey	2001
Al Rahba Hospital	Abu Dhabi, UAE	2008
Clemenceau Medical Center	Beirut, Lebanon	2002
Tawam Hospital	Abu Dhabi, UAE	2006
Johns Hopkins Aramco Healthcare	Multiple locations, Saudi Arabia	2014
HCL Healthcare	Multiple locations, India	2012
Southern University of Science & Technology	Shenzhen, China	2016
Asia Pacific Health Care	Multiple locations, China	2017
National Healthcare Group	Singapore	2018
Fundación Santa Fe de Bogotá	Bogotá, Columbia	2011
Hospital Moinhos de Vento	Porto Alegre, Brazil	2013
Pacífica Salud Hospital Punta Pacífica	Panama City, Panama	2002
Instituto Tecnológico y de Estudios Superiores de Monterrey	Monterrey, Mexico	2005
Pacífico Salud	Multiple locations, Peru	2013
Nelson Mandela Children’s Hospital	Johannesburg, South Africa	2016

JHI's recent initiatives have included:

- **Johns Hopkins Aramco Health Care**, a joint venture that combines Johns Hopkins' expertise in clinical care, research and education with the health care system operated by Saudi Aramco (a major oil producer) for its employees in Saudi Arabia and their dependents – a total of 350,000 people. The joint venture's work is closely aligned with the Saudi government's efforts to improve the quality of health care in the Kingdom, and to make health care a key element in its strategy for diversifying the country's economy.
- Collaborating with the **Southern University of Science and Technology** in Shenzhen, China on planning for creation of a new medical school.
- Working with **Asia Pacific Health Care (APHC)** to introduce home health care in China. JHI, along with Johns Hopkins Home Care Group, is working with APHC to develop the infrastructure and training programs needed to support the growth of home care. After initially focusing on postpartum care for mothers and infants, Johns Hopkins and APHC are expanding their effort to include elder care and in-home rehabilitation.
- In partnership with Jhpiego, a three-year educational exchange with **Nelson Mandela Children's Hospital** in Johannesburg, South Africa, focusing on improved training for nurses.
- In the wake of hurricanes Irma and Maria, JHI in September 2017 sent three waves of workers from the JHGo Team (Johns Hopkins Medicine's emergency response team) to the **U.S. Virgin Islands**. Since then JHI (in collaboration with Bloomberg Philanthropies) has continued to work with local agencies and institutions on rebuilding and improving the Territory's health systems.
- After a 20-year collaboration on development and operation of the Johns Hopkins Singapore International Medical Centre – one of Asia's leading centers for cancer research, education and training – in 2018 the National Healthcare Group and JHI established the **NHG-Johns Hopkins Singapore Institute**. The new Institute is focused on expanding the partners' already-extensive program of collaborative research in oncology and other areas.

Improving health care for women and their families worldwide

Johns Hopkins' engagement in the delivery of health care overseas is not limited to its partnerships with major institutions. Founded in 1973 as the Johns Hopkins Program for International Education in Gynecology and Obstetrics, *Jhpiego* (pronounced je-pie-go) is a non-profit organization affiliated with Johns Hopkins that is dedicated to improving the delivery of health care services to women and their families in low-income communities worldwide.

From its headquarters in Baltimore's Fells Point neighborhood and field offices around the world, Jhpiego in the spring of 2018 was overseeing projects in 43 countries in Africa, Asia, the Middle East, the Caribbean and Latin America, as well as the U.S. Jhpiego develops low-cost, practical solutions to health problems that affect some of the most vulnerable communities in these countries, and works to get these solutions into the hands of frontline health workers. Areas in which it is particularly active include maternal and child health, reproductive health, and the prevention and treatment of HIV/AIDS, malaria and cervical cancer.

In recent years Jhpiego has increasingly focused on innovations in health care technology and delivery systems as a critical factor in improving outcomes in low-income communities. For example:

- While cryotherapy has been used for years in treating cervical cancer, problems of cost, mobility and practicality limited its use in low-income countries, especially in remote areas. Jhpiego has pioneered a "single-visit" approach in which women can undergo a quick screening procedure, and if they test positive, be treated immediately, rather than having to wait for test results and then return for treatment at a later date. Jhpiego also worked to make cryotherapy devices more portable and less costly, and has worked with local agencies to train nurses to provide screening and treatment using the single-visit approach.
- During the 2014 Ebola crisis, a team of Jhpiego staff and students from the University's Center for Bioengineering Innovation and Design developed a new protective suit for use by front-line workers that provides enhanced protection against the virus and at the same time allows them to work more comfortably and more efficiently. The design was field-tested in Liberia, and later licensed to DuPont for manufacture and distribution.

Jhpiego's operating budget has increased rapidly during the past fifteen years, growing from \$39.5 million in fiscal year 2003 to \$407.6 million in fiscal year 2018. In 2003 the organization employed 198 people; in 2017 it employed more than 3,900 people worldwide, including 387 in the U.S.

Preparing students for life in a global community

Through the work of its overseas staff, its culture of continuous innovation and its partnerships with local organizations, Jhpiego has achieved some impressive results. From 2014 through 2018, through the work of Jhpiego and its partners:

- 8,556,923 individuals received treatments to prevent malaria
- 5,201,440 pregnant women received insecticide-treated bed nets
- 15,176,822 delivered babies in a health facility
- 2,787,655 women voluntarily initiated post-pregnancy family planning
- 179,177 individuals were newly enrolled in antiretroviral therapy¹⁸

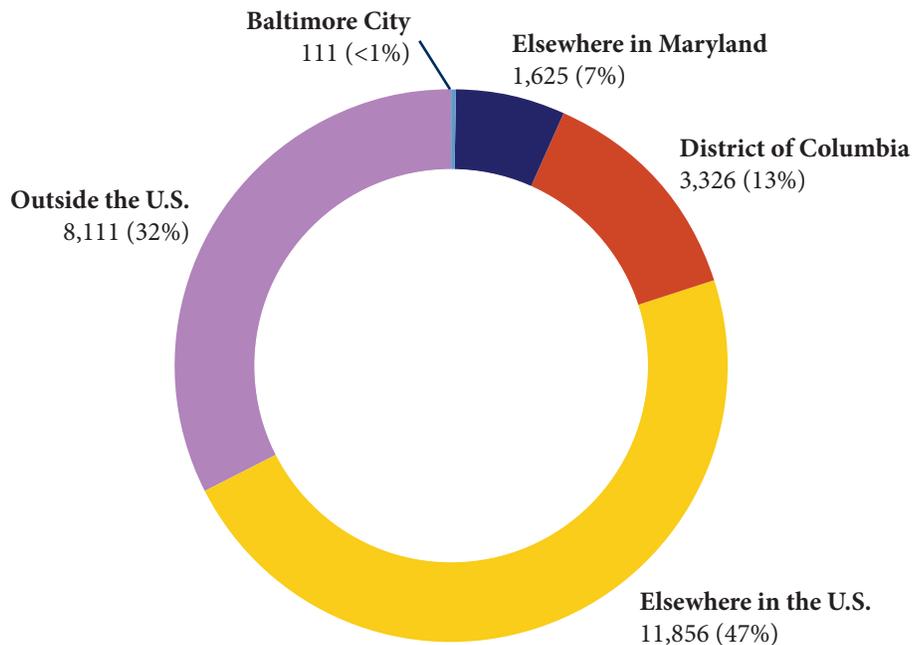
18. Jhpiego Annual Report 2018

Engagement with the world outside the U.S. is an important part of the process of preparing students to live and work in an increasingly integrated global economy. Johns Hopkins provides multiple opportunities for such engagement, at both graduate and undergraduate levels.

The University's Paul H. Nitze School of Advanced International Studies (SAIS), based in Washington, D.C., is one of the nation's leading centers for graduate education in international affairs. In addition to its base in D.C., Johns Hopkins SAIS offers programs in Bologna, Italy and Nanjing, China. The School offers several degree programs.

- The cornerstone of the Johns Hopkins SAIS academic program is a two-year, full-time *Master of Arts* degree. The program emphasizes international economics, global challenges, and regional and language studies. Students have the option to spend their first year at the Hopkins-Nanjing Center, to spend either year at SAIS Europe, or to spend their full two years in D.C.
- In Nanjing, Johns Hopkins SAIS and Nanjing University jointly offer an *MA in international studies* that engages students from China, from the U.S., and from other countries. Enrollment in the program requires proficiency in Mandarin.
- Johns Hopkins SAIS also offers an *MA in international economics and finance*, an 11-month program that focuses on the ways in which international trade and finance affect countries' economic performance. This cohort-based program is recognized as a STEM degree.

Figure 27: Current address of Johns Hopkins SAIS alumni, FY 2019



In addition to its MA programs, Johns Hopkins SAIS offers PhD degrees and several graduate certificate programs. As of the spring of 2019, 826 students were enrolled in Johns Hopkins SAIS at the D.C. campus, including 56 residents of Maryland and 181 residents of D.C.

In fiscal year 2019 (as shown in Figure 27), of the 25,029 Johns Hopkins SAIS alumni (including the Washington, D.C. campus, SAIS Europe and the Hopkins-Nanjing Center), approximately 6.9 percent (1,736) lived in Maryland, and 13.3 percent (3,326) in D.C. About 47.4 percent lived elsewhere in the U.S., and 32.4 percent lived in other countries.

Other schools at Johns Hopkins also offer programs with an international focus. The Carey Business School, for example, offers a **Global MBA** program that is specifically designed to train students to think and work globally.

At the undergraduate level, the Krieger School of Arts and Sciences offers several internationally-oriented interdisciplinary majors, including:

- An **international studies major**, in which students learn to address a wide range of global issues using the tools of economics, history, anthropology, political science and other disciplines.
- **Majors in regional studies**, including East Asian and Latin American studies.



The Johns Hopkins University School of Advanced International Studies based in Washington, D.C., has campuses in Bologna, Italy, and Nanjing, China.

In addition to those who choose internationally-oriented majors, many Johns Hopkins undergraduates earn academic credit through participation in international programs; and some students participate in research or service projects in other countries. The University's Office of Study Abroad estimates that more than 40 percent of all Johns Hopkins undergraduates participate in some type of study outside the U.S before graduation.

The Krieger School also offers a master's degree in *global security studies*. The program focuses on major challenges facing the international community in the areas of military security, economic security, and energy and environmental security.

The center of a global research network

While most of the research work that Johns Hopkins does is concentrated in Maryland, the University's research enterprise extends around the world. Johns Hopkins faculty, students, and post-doctoral fellows are engaged in research in Europe, Asia, the Middle East, Africa and Latin America in fields as diverse as anthropology, archaeology, international studies, national security, environmental science, public health and water resources. The following are just a few examples of the worldwide scope of Johns Hopkins research.

- The ***Johns Hopkins Center for Global Health (CGH)***, established in 2006, harnesses the expertise of the University's School of Medicine, School of Nursing, the Bloomberg School of Public Health and other schools and departments to address global health challenges such as HIV/AIDS, malaria and malnutrition. In 2016 the Center issued a report highlighting some of its achievements in its first ten years.

- > CGH provides grants of \$50,000 to faculty members for up-front research that will enable them to apply for more substantial external funding. In the program's first nine funding cycles, CGH provided 70 grants that by 2016 had resulted in \$29.5 million in external funding being awarded to 43 projects – a ratio of \$9.25 for every dollar invested by CGH.

- > Through 2016, the Center had funded 69 scholarships for graduate students enrolled in the Bloomberg School of Public Health.
- > In 2015 the Center established an interdisciplinary training program for students, faculty and partners called Global Established Multidisciplinary Sites (GEMS). In its first two years the program supported 45 students and 20 faculty members in six countries.
- > CGH also sponsored two global symposia on Zika and Ebola – the latter of which was livestreamed to 45,000 participants worldwide.
- In 2015 the Johns Hopkins Berman Institute of Bioethics and Johns Hopkins SAIS created the ***Global Food Ethics and Policy Program*** to explore the ethical dimensions of food systems and policies around the world. It has conducted research on topics such as conflicts over food and water resources in semi-arid areas in Africa, policies for combating malnutrition, and strategies for reducing consumption of beef.

- The **Johns Hopkins Alliance for a Healthier World (AHW)**, established in 2017, engages University faculty, staff and students, along with partners around the world, in applied research and implementation projects aimed at addressing problems of global health inequities. In 2018 AHW awarded “Impact Grants” of \$250,000 to four cross-divisional teams working to:

- > Eliminate tuberculosis among Tibetan children
- > Improve hypertension care in Ghana
- > Improve indoor air quality and reduce the use of biomass as a domestic fuel through the use of low-cost, highly-efficient gas-powered thermal cookers
- > Improve protection of adolescent Native American girls in Montana and Arizona against physical, sexual and emotional violence

In 2017 and 2018 the Alliance also awarded “Launchpad Grants” of \$20,000 to fourteen teams that were in the early stages of developing new projects; and another round of Launchpad and Impact grants will be awarded in 2019.

- The **Center for Constitutional Studies and Democratic Development**, a partnership of SAIS Europe and the University of Bologna Law School, conducts research and provides training on the development of constitutional law, the development of civil society and legal system reform in countries that are making the transition to democracy.

- Johns Hopkins SAIS’ **China Africa Research Initiative (CARI)** was launched in 2014 to provide rigorous research, data and analysis on issues relating to Chinese investment in Africa. Its research currently focuses on:

- > Chinese investment in commercial agriculture and manufacturing in Africa
- > Creating and continually updating a database on Chinese lending in Africa
- > How Chinese investment practices in Africa compare with those of other investor nations, and how Chinese and other foreign direct investment might be used more effectively to advance the transformation of African economies

CARI has since its founding conducted extensive field research in thirteen African countries. It regularly publishes its findings in working papers, books and policy briefs, hosts roundtable discussions and holds an annual international conference on Chinese-African economic relations.

Through programs such as those described above, Johns Hopkins in fiscal year 2019 spent approximately \$419 million – about 12 percent of total research spending – on research conducted outside the United States.

FASTFORWARD 



Part Seven: Fueling the Growth of Maryland's Innovation Economy

One of the most important ways in which universities contribute to the economic vitality of their home states is by supporting the translation of new knowledge into new products and services, new businesses and new jobs. Their effectiveness in doing so depends on:

- The creation of an overall environment within the institution that encourages members of the university community – students, faculty members, other researchers, staff and alumni – to think and act as innovators and entrepreneurs;
- Providing them with the resources they need to succeed in those roles; and
- Beyond the university itself, the existence of broader networks of support for innovation and entrepreneurship.

During the past 10 years – and especially since 2014 – Johns Hopkins has developed a clearly-stated vision of its role as a source and seedbed for innovation and entrepreneurship, and has committed the resources needed to realize that vision. At the same time, the University has worked closely with a wide range of partners to develop an “innovation ecosystem” that encompasses the entire state – and in particular, Baltimore City.

This part of the report:

- Describes a steadily-growing array of programs and resources – intellectual, physical, professional and financial – through which Johns Hopkins supports aspiring innovators and entrepreneurs
- Examines the University's role in educating the next generation of entrepreneurs
- Documents the University's increasing effectiveness in commercializing the results of research conducted at Johns Hopkins
- Highlights Maryland companies started by Johns Hopkins alumni and faculty members or based on technologies licensed from the University
- Briefly discusses the ongoing development of a broader innovation ecosystem in Maryland, and how Johns Hopkins is contributing to its development

◀ [Left: FastForward innovation hub at 1812 Ashland Avenue.](#)

Creating an innovation ecosystem at Johns Hopkins

In January 2013, the Whiting School of Engineering opened *Johns Hopkins FastForward*, a new-business accelerator occupying 13,000 square feet of space in the Stieff Silver building, a historic building less than a mile from the Homewood campus. In addition to providing space for promising start-ups, FastForward provided its tenants with a variety of business development and supportive services; and also provided accelerator services to other Johns Hopkins start-ups who were not tenants. By the spring of 2014, FastForward was working with 33 companies, including both tenants and outside clients.

In August 2013, Johns Hopkins University President Ron Daniels and School of Medicine Dean Paul Rothman formed a committee to consider creation of a similar facility on the University's East Baltimore campus. In a report issued in May 2014, the committee endorsed creation of such a facility. But it also took the opportunity to address a much broader range of issues, stating "Our emphatic conclusion is that the university needs to take a broad range of steps to strengthen its innovation ecosystem."

The committee cited four reasons why Johns Hopkins needed to make a stronger commitment to innovation and entrepreneurship.

- Such a commitment was needed to ensure that new discoveries by Johns Hopkins researchers would whenever possible be translated into inventions that would benefit the world.
- It was also essential to the University's continued ability to attract the best students, staff and faculty members.

- In the face of continued constraints on federal research funding, more quickly moving new university technologies from the lab to the marketplace would provide a new source of revenue, some of which could then be used to support future research.
- Increasing the rate of commercialization "could have a profound impact on catalyzing economic development in the communities around us."

"Our university has made substantial improvements in the realm of entrepreneurship and commercialization in recent years. And yet there is ample evidence that the university lags behind key peers in this area, and faces significant and enduring challenges." The committee called for action on three fronts:

- Providing the space that University innovators and entrepreneurs need to create and grow new business ventures;
- Providing funding for faculty members, students and other members of the University community who are taking the first steps toward commercialization of their discoveries; and
- Ensuring that University policies and are aligned with the goal of fostering innovation and entrepreneurship.

After the committee submitted its report, Johns Hopkins began to consolidate its technology transfer function and other support for innovation and entrepreneurship under a single University-wide brand – *Johns Hopkins Technology Ventures (JHTV)*. Starting in 2014, JHTV began to move quickly to implement the committee's recommendations.

The University's progress in the three major areas cited above – space, funding and services – is highlighted below.

Space

In summer of 2014, the University announced that it would establish its second FastForward facility on its East Baltimore campus. Initially located in the Rangos Building, FastForward moved in 2017 to its permanent home in a new life sciences R&D building developed by Forest City at 1812 Ashland Avenue. Now known as **FastForward 1812**, the 23,000-square-foot facility includes 8,000 square feet of office, co-working and meeting space, along with 15,000 square feet of wet lab and shared equipment space.

In 2017, JHTV also moved its original FastForward accelerator from the Stieff Building to a 9,000-square-foot space in R. House, a building that the University had acquired on Remington Avenue, a short walk from the Homewood campus. Now known as **FastForward R. House**, this facility (like its counterpart at 1812 Ashland), offers co-working, office and lab space as well as shared equipment.

The University also developed similar spaces on both the East Baltimore and Homewood campuses, dubbed FastForward U, dedicated to supporting the innovative and entrepreneurial efforts of Johns Hopkins undergraduates. **FastForward U East**, located in the Rangos Building in East Baltimore, served as a temporary home for student entrepreneurs. In 2018, **FastForward U Homewood** moved from temporary space on-campus to a 9,000-square-foot space on the second floor of a newly-rehabilitated former industrial building, directly across from R. House.

With more than 44,000 square feet of space for innovators and entrepreneurs as of the fall of 2018, FastForward has already helped to ensure a supply of space that can accommodate the University's aspiring entrepreneurs; and it has begun to make space available for other local entrepreneurs as well. Since opening its first facility in 2013, FastForward had as of June 2018 provided space and services for 149 commercial start-ups, many of which (as discussed below) have attracted substantial private investment.

Services

JHTV also provides an array of services and resources to help faculty, students and other members of the Johns Hopkins community explore the commercial potential of their discoveries. The process typically begins with a report of invention, which gives JHTV's Technology Transfer staff an opportunity to conduct an initial review of an invention's commercial potential and what further work is needed. Based on this initial review, JHTV staff will then work with the inventor(s) to chart out next steps – applying for a patent, securing funding for translational research, exploring licensing opportunities, deciding whether to start a new venture, etc. JHTV staff are available to assist members of the University community through all these steps.

The process of translating Johns Hopkins University research into new products, services and businesses has by several measures accelerated in recent years. As Table 25 shows, between fiscal year 2009 and fiscal year 2019:

- The number of new inventions disclosed by University researchers (including both the East Baltimore and Homewood campuses, but excluding the Applied Physics Laboratory) rose from 352 to 443 – an increase of 25.9 percent;
- The number U.S. patents issued to the University rose from 48 to 148 – an increase of 208.3 percent;
- The number of licensing agreements and options executed rose by 10.5 percent – from 105 to 116; and
- The number of start-up companies based on technologies licensed from the University rose from 10 to 16 – an increase of 60.0 percent.

JHTV also offers a variety of programs designed to help innovators move forward along the path to commercialization. Its *Introduction to I-Corps @ Johns Hopkins*, for example, is a four-week (10 to 15 hours a week) short course that introduces participants (individuals or teams of up to three people) to the concepts and methodologies used in the National Science Foundation’s I-Corps program. The course focuses on the process of “customer discovery,” using feedback from potential customers to refine (and sometimes redirect) the participants’ ideas about their products, services and business models. In 2017-2018, 44 Johns Hopkins teams participated in the four-week course. Those who complete the course are eligible to apply to the NSF’s more intensive, seven-week I-Corps program; and those who are accepted receive a \$50,000 grant.

Table 25: Technology transfer activity, Johns Hopkins University (excluding APL), FY 2009 – FY 2019 (gross licensing income in \$ millions)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Gross licensing income	\$12.4	\$12.4	\$15.3	\$15.9	\$17.9	\$16.5	\$17.9	\$58.0	\$17.1	\$16.5	\$73.5
Invention disclosures	352	355	407	427	444	454	518	504	553	463	443
New patent applications filed	453	481	603	540	404	450	510	433	345	399	342
U.S.-issued patents	48	65	64	78	85	102	123	161	155	151	148
Foreign-issued patents	152	128	113	174	102	199	149	221	222	237	200
Licenses/options executed	105	123	166	160	136	163	174	171	177	138	116
Start-up companies formed	10	13	27	9	8	13	16	22	18	8	16

In addition to the resources made available by Johns Hopkins Technology Ventures, several other divisions within the University and the Johns Hopkins Health System have emerged as important sources of support for innovation and entrepreneurship.

- Johns Hopkins Medicine's **Technology Innovation Center (TIC)**, established in 2014, is "a hub for clinicians to create novel technology-based solutions that span our medical specialties and practice settings." TIC works with practitioners to understand specific clinical problems, and to design technology solutions. Clinical-technical teams that make significant progress toward developing new technology solutions with commercial potential are eligible to participate in Hexcite, TIC's 16-week pre-accelerator program, aimed at bringing participating teams to the point where they are ready to create a company.

Since its founding, the Technology Innovation Center has assisted in the development of approximately 50 new products and services, many of which are now in use within the Johns Hopkins Health System, and some of which have provided a basis for creation of new companies.

TIC has also worked with teams of Johns Hopkins researchers and clinicians to realize the potential of precision medicine, science that combines individual patient data with family history, demographic, environmental and lifestyle data to develop new approaches to diagnosis and treatment that are tailored to each patient's needs. Based on the work of these teams, Johns Hopkins Medicine has established Precision Medicine Centers of Excellence dealing with prostate cancer and multiple sclerosis.

- **Johns Hopkins HealthCare Solutions**, a division of Johns Hopkins HealthCare (JHHC), provides a home for new ventures that have shown potential for contributing to JHHC's goals of expanding access to care, improving its quality, increasing efficiency and reducing costs. For example:
 - > The Johns Hopkins ACG System, first developed and deployed at the Bloomberg School of Public Health, provides tools that providers, insurers, health care policymakers and others can use to analyze clinical, demographic and claims data. ACG's analytics can be used to assess health trends in large populations, to identify risks to individual patients, and more accurately predict health care utilization and spending. The system is now licensed to users throughout the U.S. and in more than 20 other countries.
 - > In 2016, JHHC Solutions and the Technology Innovation Center began to collaborate with Artifact Health of Boulder, Colorado in an effort to improve the completeness and accuracy of clinical records. TIC took the lead in integrating Artifact's mobile technology into the Johns Hopkins Health System's electronic medical records system, conducting a pilot test of the new system at Howard County General Hospital, and then deploying it throughout the Johns Hopkins Health System. The Johns Hopkins-Artifact system is now used in 65 hospitals nationwide.

Funding

During the past ten years, Johns Hopkins has significantly broadened the sources of funding available to members of the University community who are seeking to translate new knowledge, new ideas and new technologies into practically and commercially viable products and services.

- Each year, the **Accelerated Translational Incubator Pilot Program (ATIP)**, an initiative of the Johns Hopkins Institute for Clinical and Translational Research that was started in 2007, provides grants of up to \$100,000 to clinical and non-clinical faculty “to initiate, implement and complete projects designed to develop new therapies, devices or approaches to clinical research.” Recipients are required to complete their projects within twelve months. From 2014 through 2017, ATIP funded 15 translational research projects.
- The Whiting School’s **Cohen Translational Engineering Fund**, founded in 2014, provides short-term support (typically two to three months) to faculty members engaged in the earliest stages of translational work on technologies that have been disclosed to JHTV but not yet licensed. Since 2015 the Fund has provided approximately \$555,000 to 17 translational projects.
- The **Louis B. Thalheimer Fund for Translational Research**, created in 2016, provides grants of \$25,000 to \$100,000 to Johns Hopkins faculty members to conduct up to nine months of proof-of-concept, prototyping and commercial feasibility studies on technologies that have been disclosed to JHTV but have not yet been licensed. Since 2016 the Fund has provided nearly \$670,000 in translational research funding to eight projects.

Johns Hopkins has also entered into new private-sector partnerships aimed at speeding the pace of translational research.

- In 2015 the University signed a five-year agreement with **Bayer HealthCare** aimed at developing and advancing new treatments for diseases of the retina. Johns Hopkins and Bayer have both committed personnel and research infrastructure to the effort, and are now conducting several joint research projects at the Wilmer Eye Institute.
- In 2017, Johns Hopkins and Deerfield Management – a New York City-based venture capital firm – announced creation of **Bluefield Innovations**, a for-profit venture that is investing in the commercialization of therapeutic concepts first developed at Johns Hopkins. Deerfield has invested \$65 million in Bluefield Innovations, and will invest more in individual projects as they progress toward the marketplace.

In January 2018, Bluefield announced its first project – developing treatments aimed at interfering with the workings of an enzyme, RNA polymerase I, that researchers at the Johns Hopkins School of Medicine have identified as playing an important role in the development of several types of cancer.

Preparing the next generation of innovators and entrepreneurs

Both through its formal curriculum and through other programs and services, Johns Hopkins provides multiple opportunities for undergraduate and graduate students to acquire the skills, knowledge and experiences that can help them succeed as innovators and entrepreneurs.

- Through its Center for Leadership Education, the Whiting School of Engineering offers a seven-course **minor in entrepreneurship and management**. The minor is available to all Johns Hopkins undergraduates.
- In partnership with the Department of Biomedical Engineering, the Whiting School's Center for Bioengineering Innovation and Design (CBID) offers a nine-course, 18-month **Undergraduate Design Team Program**. Over the course of the program, 15 or more student design teams work with clinicians, engineers and industry advisors to research, design, build and test devices that meet significant health care needs.
- CBID also offers a one-year, full-time **master's degree in bioengineering and design**.
- The Carey Business School's **Flexible MBA** program offers a concentration in entrepreneurship, available on-campus in Baltimore and Washington, D.C.

In addition to its formal degree programs, Johns Hopkins offers a variety of co-curricular and extra-curricular activities that help students prepare to work as innovators and entrepreneurs.

- The **Johns Hopkins Boot Camp for Technology Entrepreneurs** is an intensive, three-day program for students, faculty, University and Health System staff and others, offered several times each year by JHTV and the Carey Business School. The program provides an introduction to topics such as market research and analysis, intellectual property law, technology licensing, building a start-up team, funding sources and writing a business proposal.
- The University's **Social Innovation Lab (SIL)**, started in 2011, supports innovative non-profit organizations and socially-oriented for-profit companies seeking to create positive change in Baltimore and elsewhere. Each year SIL provides training, space, support services and funding to a cohort that includes both student and community-based social entrepreneurs, and helps them prepare to launch a new venture. Since 2011, SIL has supported 72 new ventures that have cumulatively secured \$37.5 million in funding. SIL has also trained 355 aspiring social entrepreneurs in its annual boot camps.
- The annual **Johns Hopkins Business Plan Competition**, hosted by the Whiting School of Engineering's Center for Leadership Education, provides an opportunity for Johns Hopkins undergraduates and graduate students (and some from other universities) to take a novel idea and develop a business plan aimed at bringing that idea to fruition. In 2017-2018, 50 student teams participated in the program, and competed for \$55,000 in prize money.

The Applied Physics Laboratory: “Defining innovations”

Since its founding in 1942, the Johns Hopkins University Applied Physics Lab has been a source of innovation in national security and related technologies. Notable examples of APL’s “defining innovations” during the past 75 years have included:

- Invention of the radio proximity fuse, which radically improved American air defenses during the second World War
- The first generation of seaborne surface-to-air missiles, developed for the U.S. Navy
- Transit, the first satellite navigation system – the forerunner of today’s GPS systems
- A satellite-based system for tracking the flight of ballistic missiles
- AMFAR, the Navy’s “advanced multiple phased array radar,” designed to detect and defend against multiple, simultaneous aircraft and missile attacks
- Development of the guidance and control systems used in the Tomahawk cruise missile
- Design, building and management of a series of low-cost exploratory spacecraft

Over the years, APL’s mission and the technological realms within which it works have evolved; but its culture of innovation is still strong. Examples of innovations developed at APL in recent years include:

- A framework for the integration of multiple cybersecurity systems (IACD – Integrated Adaptive Cyber Defense); APL is now working with several partners on deployment of IACD in the financial services sector
- Technology for detecting, analyzing and attributing bioweapons attacks
- A heat-shield capable of withstanding the 2,600°F heat of the sun’s corona (developed in conjunction with NASA’s Parker Solar Probe, built and managed by APL)
- An unmanned autonomous vehicle that can operate both underwater and aerially
- A novel cloud-based system for storage, analysis and accessing millions of gigabytes of neurological and anatomical data, for use by scientists engaged in mapping the human brain
- Using additive manufacturing to create “mechanically accurate and biologically viable” substitutes for bone, for use in treating injuries and in regenerative medicine
- Neurally controlled arm and hand prostheses
- An “electronic skin” that when added to a prosthetic device can give the user a sense of touch
- A portable, low-cost, multi-purpose water purification system that can be used both in military applications and to provide clean water in low-income communities in developing countries

APL's "innovation ecosystem" resembles in many respects that which has been developing at the University's Homewood and East Baltimore campuses. Recognizing the need for more agile and more creative responses to the many challenges facing its sponsor agencies, APL's leaders launched *Project Catalyst*, designed to encourage APL staff to take the initiative in developing new ideas on how to meet sponsors' needs.

- APL's *Ignition Grant* program, created in 2013, encourages broad-based participation in the process of conceiving and advancing new ideas related to real-world challenges the Lab's sponsor agencies are facing. Several times each year, APL employees can submit ideas online. Others then get to comment on these ideas and offer suggestions – in effect allowing the submitter to “crowdsource” refinements to the original idea. All those who participate in the process then get to vote on which ideas should receive grants of seed money. These Ignition Grants can be used for further research, to prepare a more formal proposal, to build a prototype, etc. Since its inception, the Ignition Grant program has drawn 750 ideas, and has been credited with increasing the number of inventions disclosed to APL's Technology Transfer Office to a record 355 in fiscal year 2018.

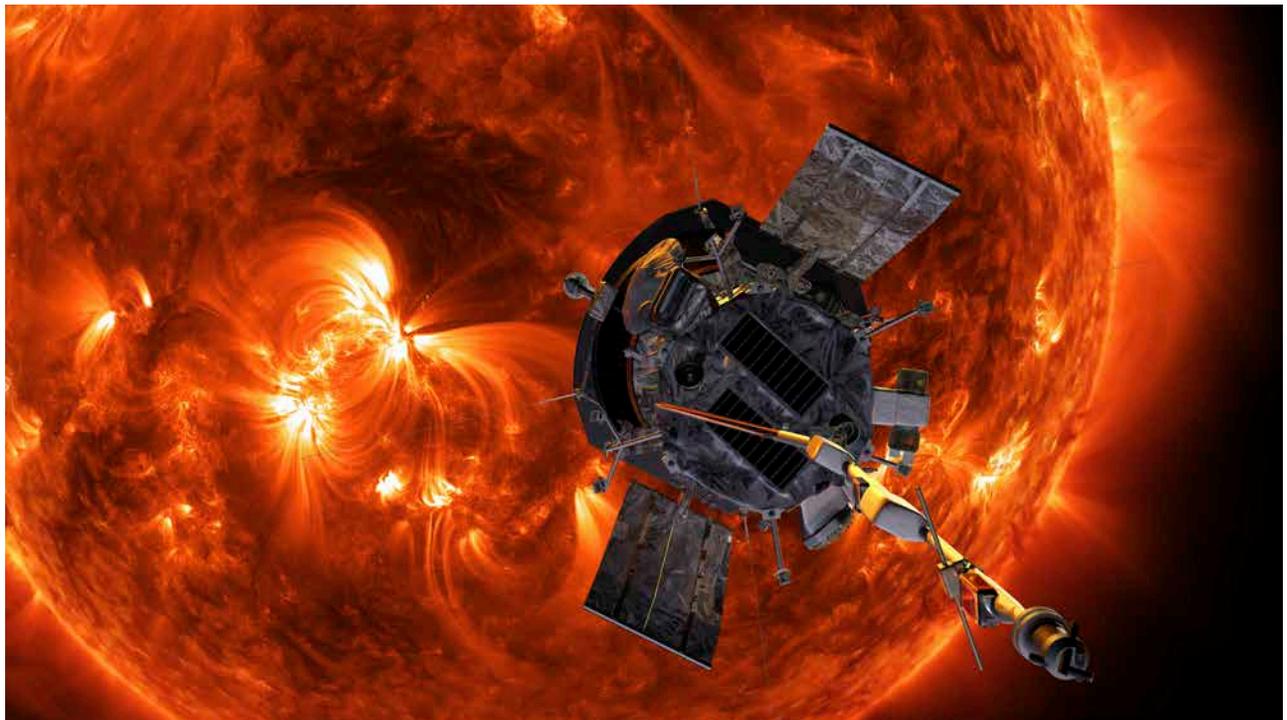


Illustration of NASA's Parker Solar Probe in front of the sun, built and managed by APL.

- In 2016, APL added **Combustion Grants**, which provide more substantial funding for a limited number of particularly promising projects; and in 2017, **Propulsion Grants**, which support innovative projects that are making enough progress to justify an additional year of funding.

In addition to funding promising projects, APL sought to provide settings where employees could work together on the development of new ideas, and access the resources they would need to do so. The result was **Central Spark**, a cluster of spaces, opened in 2014, that are available to APL employees 24/7. They include:

- Spaces for brainstorming, knowledge-sharing and design work
- A “maker space” with equipment (such as 3D printers) for making needed components and building prototypes
- A media space with video equipment
- Training rooms
- Quiet space for individual work
- A large conference room, and a common area for informal meetings and breakout sessions

Each year, about 3,000 APL employees use Central Spark’s space and other resources. It provides space, time and freedom to develop and test new ideas relevant to the Lab’s work – especially ideas that bridge the multiple domains across which the Lab operates.

While its role as a contractor for the Department of Defense and NASA may limit near-term opportunities for commercialization of technologies, APL nevertheless has an active technology transfer program. As Table 26 shows, in fiscal year 2018 the Lab:

- Received 376 invention disclosures
- Filed 18 new patent applications
- Was awarded 30 U.S. patents
- Entered into 63 licensing and patent agreements

Table 27 lists selected examples of Maryland-based companies engaged in the commercialization of technologies first developed at APL, or started by former APL employees.

Table 26: APL technology transfer activity, FY 2014 – FY 2018

	2014	2015	2016	2017	2018
Gross licensing income	\$520,381	\$505,730	\$556,189	\$508,687	\$489,004
Invention disclosures	294	252	273	314	376
New patent applications filed	20	33	38	30	18
U.S.-issued patents	25	37	24	14	30
Foreign-issued patents	–	–	1	–	2
Licenses/options executed	44	35	43	54	63
Start-up companies formed	6	2	3	3	1

Table 27: Examples of Maryland start-ups with ties to APL

Company	Year Founded	Location	Type of Business	Connection to Johns Hopkins
Syntonics	1999	Columbia	RF communications systems for military, civil and industrial use	Licensed APL technology
Sensics	2003	Columbia	High-performance VR equipment	Licensed APL technology
Applied Imagery	2004	Chevy Chase	Terrain modeling software, based on technology developed at APL	Licensed APL Technology
Terbium Labs	2013	Baltimore	Network security services	Founded by a former APL employee
Blackpoint Cyber	2014	Ellicott City	Defense against emerging cyber threats	Founded by a former APL employee
Enveil	2016	Fulton	Technology that protects data while it's being used	Founded by a former APL scientist
TeamWorx Security	2016	Columbia	Defense against asymmetric cyber threats	Licensed APL technology
Gallant Technologies	2016	National Harbor	Technology-based solutions for homeland security and law enforcement	Licensed APL technology
BullFrog AI	2017	Columbia	Using AI to help biopharma companies predict which patients will benefit most from new therapies	Licensed APL technology
MindX	2017	Bethesda	Developing brain-computer interface technology	Licensed APL technology

Other Johns Hopkins centers for innovation and entrepreneurship

In addition to its support for innovation and entrepreneurship in Baltimore and at APL, Johns Hopkins offers similar support at several other locations in Maryland and beyond.

- Sibley Memorial Hospital's ***Innovation Hub***, opened in 2014, provides 6,000 square feet of dedicated space, support staff and equipment, all devoted to helping clinicians, staff and others (including patients' family members and community residents) work through and develop their ideas for new products, new services and new procedures that have the potential to enhance the quality and reduce the cost of health care, especially in community hospital settings.
- The University's ***Montgomery County Campus*** provides space for life sciences and other technology start-ups, small companies and non-profit research organizations. As of mid-2019, the Campus was home to 23 different companies and organizations, including:
 - > ***The J. Craig Venter Institute***, a non-profit research institute that has since 1992 been a world leader in genomics and bioinformatics
 - > ***U.S. Biolab***, a contract research organization with a biorepository containing more than 500,000 human tissue, blood, DNA and RNA samples
 - > ***Insilico Medicine***, a start-up founded in 2014 by a graduate of the University's master's degree program in biotechnology that is using AI to speed the process of drug discovery and development

A growing community of start-ups

As a result of programs such as those described above, Maryland is now home to a growing community of start-up businesses with ties to Johns Hopkins. According to Johns Hopkins Technology Ventures, as of mid-2019 there were 202 active Johns Hopkins start-ups¹⁹, of which half were located in Baltimore. Since 2014, these firms have created 831 jobs in Baltimore.

Increasingly, these local start-ups are attracting attention from both regional and national venture capital and private equity firms; and the pace of that investment appears to be accelerating. From January 2017 through June 2019, venture capital, private equity and other firms invested approximately \$733 million in Maryland-based start-ups with ties to Johns Hopkins, including \$365 million invested in Baltimore-based start-ups. Table 28 lists examples of Maryland firms with ties to Johns Hopkins that have benefited from this surge in private investment.²⁰

Attracting venture capital and other private investments is of course not the only measure of new firms' significance or success. Some start-ups choose instead to forego outside equity investment, relying instead on varying combinations of founders' investments, debt and government grants and contracts to carry them through the early stages of development and growth. Table 29 lists several examples of Maryland firms with ties to Johns Hopkins that are developing promising new technologies without substantial outside private investment.

19. Defined by JHTV as those started with technology licensed from Johns Hopkins, or in which Johns Hopkins has an equity stake.

20. Firms with ties to Johns Hopkins are defined by Appleseed as those started with technology licensed from Johns Hopkins, or in which Johns Hopkins has an equity stake; those founded by Johns Hopkins faculty, staff, students or alumni; tenants in or "graduates" of FastForward spaces; and firms that have participated in other Johns Hopkins programs that support innovation and entrepreneurial development.

Table 28: Recent investment in Maryland start-ups with ties to Johns Hopkins

Company	Year Founded	Location	Type of Business	Connection to Johns Hopkins	Investment, Jan 2017 – Jun 2019 (\$ millions)
AsclepiX Therapeutics	2009	Baltimore	Novel treatments for retinal diseases	Licensed JH technology	\$5.0
Personal Genome Diagnostics	2010	Baltimore	Genomic analysis for cancer diagnosis and treatment	Licensed JH Technology	\$75.0
Precision Medicine Group	2011	Bethesda	Consulting and support services for pharma and life sciences companies	Founded by a JH alum	\$275.0
NexImmune	2011	Gaithersburg	Immunotherapies for cancer and other diseases	Licensed JH technology	\$23.0
Cerecor	2011	Baltimore	Discovery and development of neuroscience drugs	Licensed JH technology	\$5.0
CoolTech	2012	Baltimore	Technology for pre-hospital treatment of cardiac arrest	Licensed JH technology	\$2.0
Terbium Labs	2013	Baltimore	Network security services	Co-founded by former APL engineer	\$8.0
Sonavex	2013	Baltimore	Early detection of blood clotting after surgery	Licensed JH technology	\$4.5
Allovue	2013	Baltimore	Financial management software for K-12 schools	Founded by JH alum	\$6.0
Vasoptic Medical	2013	Baltimore	Low-cost portable retinal imaging technology	Licensed JH technology	\$1.5
Protenus	2014	Baltimore	Using AI to improve security of patient data	Subsidiary of JHHC	\$14.0
Insilico Medicine	2014	Rockville	Use of AI to speed drug discovery and development	Founded by a JH alum	\$12.8
Proscia	2014	Baltimore	Use of “big data” and analytics in pathology	Founded by a JH alum	\$10.3
Blackpoint Cyber	2014	Ellicott City	Defense against emerging cyber threats	Founded by a former APL employee	\$6.0
PathoVax	2014	Baltimore	A new HPV vaccine providing broader coverage at lower cost	Licensed JH technology	\$5.3
Tissue Analytics	2014	Baltimore	Using mobile phones to photograph, analyze and transmit data on wounds, burns and skin conditions	Founded by JH students, licensed JH technology	\$5.0
Vixiar Medical	2014	Baltimore	Non-invasive device for monitoring heart disease	Licensed JH technology	\$4.6
Sisu Global Health	2014	Baltimore	Low-cost medical devices for low-income populations	FastForward R. House tenant	\$1.2

eMocha Mobile Health	2014	Baltimore	Managing drug regimens using mobile technology	Licensed JH technology	\$1.0
Yet Analytics	2014	Baltimore	Analytics for improving the ways organizations learn	Founded by JH alum	\$1.0
WindMIL Therapeutics	2015	Baltimore	Marrow-derived cancer immunotherapy	Licensed JH technology	\$32.5
LifeSprout	2015	Baltimore	Synthetic soft tissue used in reconstructive surgery	Licensed JH technology	\$7.0
Fusiform Medical	2015	Baltimore	Automating fabrication of orthotics and prosthetics	Founded by JH alum	\$5.8
Theraly Fibrosis	2015	Germantown	New treatments for scleroderma	Founded by JU faculty	\$4.9
Factory Four	2015	Baltimore	Software for automated manufacturing	Founded by JH alum	\$5.15
Neuraly	2016	Germantown	Developing new treatments for neurodegenerative diseases	Licensed JH technology	\$36.0
Ready Robotics	2016	Baltimore	Providing “robots as a service” for manufacturers	Licensed JH technology	\$15.0
Enveil	2016	Fulton	Technology that protects data while it's being used	Founded by a former APL scientist	\$4.0
Osmosis	2016	Baltimore	Online learning platform for medical, nursing and other student clinicians	Founded by JH students	\$6.6
Dracen Pharmaceuticals	2017	Baltimore	Developing immunobiological cancer drugs	Licensed JH technology	\$40.0
Thrive Earlier Detection Corp.	2019	Baltimore	Technology for earlier screening for multiple types of cancer	Licensed JH technology	\$110.0

Table 29: Examples of other Maryland start-ups with ties to Johns Hopkins

Company	Year Founded	Location	Type of Business	Connection to Johns Hopkins
Infinite Biomedical Technologies	1998	Baltimore	Using new technologies to improve prosthetics	Co-founded by JH faculty member and JH alum
SmartLogic	2005	Baltimore	Web and mobile app development	Founded by JH students
Vigilant Medical	2009	Baltimore	Secure web-based sharing of medical images	Co-founded by JH faculty member and JH alum
Clear Guide Medical	2010	Baltimore	Guidance systems for ultrasound-based interventions	Founded by JH faculty member
Perceptive Navigation	2012	Baltimore	Image-guided devices for use in interventional radiology	Founded by JH faculty member
CardioSolv	2012	Baltimore	Improved treatment of ventricular tachycardia	Founded by JH faculty member
Multisensor Diagnostics	2014	Pikesville	Developing hand-held device for collecting and analyzing multiple types of individual health data	Co-founded by JH faculty member and JH alum
Longevity Neuro Solutions	2016	Hunt Valley	Individualized implants used in complex brain surgeries	Co-founded by JH faculty member and JH alum
Healytics	2016	Catonsville	“Big data” analytics for health care	Founded by JHTV mentor-in-residence
Galen Robotics	2016	Baltimore	Robotic microsurgical systems	Based on JH technology

A State of innovators and entrepreneurs

As noted above, a university's success in fostering innovation and entrepreneurship depends not only on the creation of a supportive environment within the institution, but also on the existence of a similarly supportive environment at the local or regional level. Just as Maryland has benefited from Johns Hopkins' commitment to the creation of its own entrepreneurial ecosystem, Johns Hopkins is benefiting from the Maryland's emergence as a center of innovation and entrepreneurship.

This trend is seen, for example, in:

- The development of a network of incubators and accelerators across the State, including, for example, the Baltimore Development Corporation's Emerging Technology Center (located near the Johns Hopkins Bayview campus), City Garage in Port Covington and the Howard County Innovation Center in Columbia.
- An increase in State support for innovation and entrepreneurship – for example, through the Maryland Innovation Initiative (MII), a partnership between the Maryland Technology Development Corporation (TEDCO) and Maryland's five research universities that supports commercialization of technologies first developed at the partner institutions. In fiscal year 2018, TEDCO's MII program provided funding for 45 translational research projects, and invested in 10 university-based start-ups.

- The continued growth of university-based programs aimed at developing the next generation of innovators and entrepreneurs, and at expanding opportunities for entrepreneurship, such as the Dingman Center for Entrepreneurship at the University of Maryland and the Entrepreneurial Development and Assistance Center at Morgan State University.
- The increased availability of venture capital, and Maryland firms' success in taking advantage of it. From \$282 million in 2016, venture capital investments in Maryland firms in 2018 rose to \$1.1 billion.

The Baltimore area's emergence as a center of innovation has also caught the attention of leading business publications. In 2018 *Forbes* ranked Baltimore fifth on its list of “the top ten rising cities for start-ups,” 10 cities that rank just below the top tier of U.S. innovation hubs but that based on measures such as growth in venture capital funding “are poised to thrive in the decades ahead.”²¹ Johns Hopkins can play a key role in determining whether the potential that *Forbes* saw in Baltimore is realized.

21. Kurt Badenhusen, “The Top Ten Rising Cities for Start-Ups,” *Forbes*, October 1, 2018.



Part Eight: Building Healthy Communities Together

Since its founding in the late nineteenth century, Johns Hopkins has been committed to investing in and serving the communities in which it operates. This report examines the University's and the Health System's commitment to and engagement with the communities in which they operate, focusing in particular on seven aspects of that engagement:

- Investments in neighboring communities
- Including local residents and businesses in the development and operations of the Johns Hopkins enterprise
- Improving elementary and secondary education and expanding educational opportunity for young residents of Baltimore
- Expanding access to – and improving the quality of – health care
- Supporting local efforts to reduce crime and violence in Baltimore
- Student engagement in community outreach
- The University's role as a cultural resource for local communities

The programs highlighted here are examples of many Johns Hopkins community engagement programs and partnerships. Other activities include after school programs, community recreation center operations and programming support, food pantries and healthy eating programs among many others.

◀ [Playground at Eager Park in East Baltimore.](#)

Investing in neighboring communities

Johns Hopkins University and the Johns Hopkins Health System have invested tens of millions of dollars in Baltimore neighborhoods.

Revitalizing East Baltimore

Since 2003, Johns Hopkins has been collaborating with the City, the State, the Annie E. Casey Foundation, private developers and community organizations in the redevelopment of the Eager Park neighborhood, an 88-acre area adjacent to Johns Hopkins Medicine's East Baltimore campus. As revised in 2012, the master plan for the area provides for the development of more than 1,200 units of new and rehabilitated housing, a six-acre park, a school, a 1.5-million-square-foot Science + Technology Park and 144,000 square feet of retail space.

During its first dozen years – despite being slowed by the financial crisis of 2008 and the recession that followed – the project recorded some notable accomplishments, including:

- In 2009, completion of the first building in the Science + Technology Park – the 300,000-square-foot Rangos Research Building.
- In 2011, renovation of a landmark former police station at 1809 Ashland Avenue; the building now houses the University's Berman Institute of Bioethics.
- 929 Apartments, a privately-developed, 321-unit residential building completed in 2012, that houses Johns Hopkins graduate students, employees and other tenants.
- A total of 249 other units of new housing, including approximately 200 low-income units.
- A 10-story, 1,450-space parking garage with a Walgreen's pharmacy on the building's first floor, completed in 2012.
- The Henderson-Hopkins School, a 90,000-square-foot K-8 school with space for 540 students, completed in 2013. It was developed at a cost of \$43 million through capital contributions from Johns Hopkins and several local and national foundations, without state or city funding, and is managed by the Johns Hopkins School of Education in collaboration with Morgan State University.
- The Harry and Jeanette Weinberg Early Childhood Center, co-located at the Henderson-Hopkins School, opened in September 2014 and is operated by Downtown Baltimore Child Care, Inc. with oversight by the Johns Hopkins Office of Work, Life and Engagement. Currently there are 74 pre-school children enrolled.

During the past several years, the neighborhood's progress has accelerated on several fronts. Major milestones have included:

- The Maryland Department of Health and Mental Hygiene's \$171 million, 235,000-square-foot Public Health Laboratory – the second building in the Science + Technology Park, opened in 2015
- In 2016, completion of 1812 Ashland Avenue – a 170,000-square-foot life sciences building anchored by Johns Hopkins Technology Ventures
- In 2016, the opening of Eager Park, a five-acre park that provides a new focal point for the neighborhood; it includes a playground, a performance space and other amenities
- In 2016, the successful sale of 49 new units of market-rate, owner-occupied housing – the first such units in the neighborhood
- The opening in 2017 of a new 194-room Marriott Residence Inn at Johns Hopkins

Through fiscal year 2019, Johns Hopkins has committed approximately \$51 million to this effort. Support from Johns Hopkins has to date included:

- Direct capital contributions – for construction of the Henderson Hopkins School, development of Eager Park and other projects
- Serving as an anchor tenant for 450,000 square feet of new life sciences research and office space

- Through rents paid by its students, indirectly supporting the development of the 321-unit rental building at 929 North Wolfe
- Supporting development of the neighborhood's first new owner-occupied housing through its Live Near Your Work program (described below)
- Since 2014, providing \$800,000 annually in operating funds to East Baltimore Development Inc. (EBDI)

Johns Hopkins' commitment to the East Baltimore community extends beyond the formal boundaries of the Eager Park redevelopment area. In June 2019 the Southern Baptist Church and its community arm, the Mary Harvin Transformation Center Community Development Corporation (CDC), unveiled plans for development of the *Southern Streams Health and Wellness Center*, a 120,000-square-foot complex to be constructed on North Chester Street in the Broadway East neighborhood, about a mile north of the Johns Hopkins Hospital. The Center will house tenants providing medical, dental, pharmacy and other community services to residents of Broadway East. The Church and the CDC also announced that Johns Hopkins Medicine signed on as the Center's first tenant, leasing 22,000 square feet. JHM is expected to move into the new building in 2021.

Strengthening Homewood

Johns Hopkins' involvement in efforts to strengthen the neighborhoods in which the University and the Health System operate reflects both their longstanding and in recent years, redoubled commitment to community service, and their own institutional interests. In 2012, a report prepared for the University noted that applicants who are accepted at Johns Hopkins but who choose to enroll elsewhere often cite conditions in the surrounding area as being among the reasons for their decision. At the same time, many residents of surrounding neighborhoods believed that Johns Hopkins should be doing more to address problems that affect both the University and the community.

In 2011 the University, in collaboration with other local institutions and neighborhood organizations, launched the Homewood Community Partnership Initiative (HCPI). HCPI covers 10 neighborhoods and one commercial area adjoining the University's Homewood campus. Through a broad-based planning process, the partners in 2012 identified five priorities:

- Maintaining clean and safe neighborhoods
- Eliminating blight and developing new housing
- Strengthening public education
- Commercial and retail development
- Local hiring, purchasing and workforce development

The partners also formulated 29 specific project and program recommendations, with an estimated price tag of \$60 million, aimed at achieving HCPI's objectives during the next five to ten years.

In December 2012, Johns Hopkins committed \$10 million to leverage additional private and public investments toward the implementation of HCPI's recommendations. Since then, the University has undertaken or helped to fund a series of projects in areas such as elementary and secondary education, housing, commercial development and quality-of-life improvements. Examples of projects supported with University funds during HCPI's first five years have included:

- Renovation of, and introduction of new programs at, the Margaret Brent and Barclay schools
- Providing 152 Live Near Your Work Grants to Johns Hopkins employees who have bought homes in the HCPI area
- \$800,000 in operating support for the Central Baltimore Partnership
- Neighborhood commercial revitalization projects, such as the Waverly Main Street and North Avenue improvement strategies

In addition to its cash contributions, Johns Hopkins has used lease agreements to support \$173 million in new private investments in the HCPI area. At Remington Row, for example, a commitment by Johns Hopkins Community Physicians to lease 26,000 square feet for a new ambulatory care center (opened in 2016) helped secure a \$40 million mixed-use project that also includes 108 rental apartments, retail space and parking.

Buying homes in Baltimore

Similarly, Johns Hopkins and the Maryland Institute College of Art (MICA) worked with a non-profit developer, Jubilee Baltimore, to redevelop the long-vacant Centre Theater, located in the Charles North neighborhood, south of the Homewood campus. After a \$19 million renovation, completed in 2015, the theater now houses the Johns Hopkins-MICA Film Center – home to the two institutions’ film programs. Other tenants in the complex include the Baltimore Jewelry Center, Impact Hub (a co-working and innovation space) several local non-profit organizations, and a game development studio.

Johns Hopkins and MICA also worked with the Maryland Film Festival to secure funding for an \$18.5 million renovation of the Parkway Theater, also located in the North Charles neighborhood. The facility now includes a 414-seat main theater, two smaller screening rooms, seminar rooms and a café. Officially named the Stavros Niarchos Foundation Parkway Theater (after the lead donor whose \$5 million gift got the project started), the theater reopened in 2017. It now provides a venue for the Film Festival, the two schools’ film programs, and a year-round program of independent, international, documentary and classic films.

Johns Hopkins also selected a private developer to build a mixed-use project on a University-owned site at 9 East 33rd Street in Charles Village. Completed in the summer of 2016, the 327,000-square-foot project includes 157 student apartments, 31,000 square feet of retail (anchored by a CVS pharmacy) and a 162-car parking garage.

In addition to its investments in the projects described above, Johns Hopkins has also sought to strengthen Baltimore neighborhoods through its *Live Near Your Work (LNYW)* program, which provides grants to employees as an incentive to purchase homes in Baltimore. Grants range from \$5,000 in many parts of the City to \$23,000 in neighborhoods near the Homewood campus to \$36,000 in East Baltimore. In 2019 the geographic boundaries of the program were expanded around the Homewood and East Baltimore campuses to incentivize employees to buy homes in neighborhoods where they currently rent.

From fiscal year 2009 through fiscal year 2019, over 1,100 homebuyers employed by Johns Hopkins received LNYW grants totaling \$11,622,000 – an average of approximately \$10,400 per homebuyer – of which \$8.2 million was contributed by Johns Hopkins, along with \$3.3 million provided by the City and the Rouse Foundation. Eighteen percent of the participants in the last five years moved to Baltimore as a result of the program.

Economic inclusion

As Maryland's largest private employer, Johns Hopkins has long been committed to ensuring that opportunities to participate in its work are available to all, including women, minorities and local residents and businesses. This commitment has shaped the University's and the Health System's employment practices, purchasing policies and construction contracts.

The following are just a few examples of Johns Hopkins' commitment to the expansion of economic opportunity.

- **HopkinsLocal**, launched in 2015 by Johns Hopkins is an initiative aimed at expanding economic opportunity in Baltimore through its purchasing, construction and hiring activities. In fiscal year 2018, Johns Hopkins:
 - > Increased purchasing in targeted categories of goods and services from vendors located in selected Baltimore ZIP codes by \$29 million, to a total of \$118.4 million
 - > Spent \$48.5 million on construction services provided by local minority, women and disadvantaged businesses
 - > Hired 381 new employees in selected job titles from targeted ZIP codes in Baltimore
- The **Johns Hopkins Summer Jobs Program** provides a six-week, paid summer internship for Baltimore high school students. Participants work 30 hours per week in a variety of university and medicine departments, and also take part in a series of career development seminars, focusing on topics such as job readiness, customer service, financial literacy and workplace etiquette. Over the last 25 years, more than 4,000 students participated in the program, including 479 students in 2019 alone.
- **The Johns Hopkins Hospital's Department of General Services** operates an internship program for public assistance recipients. Started in 2013, this 20-week, hands-on training program prepares participants to work in building operations and maintenance. Through the 2019 cohort, 152 participants have been placed in permanent positions, with 98 still employed at the Hospital.
- A partnership between the Johns Hopkins Hospital and Baltimore City Community College, the **Supply Chain Institute** is an eight-week training program that provides young people ages 18 to 25 with an introduction to supply chain management and warehouse operations, along with job-specific training in areas such as operating a fork lift. The program's goal is not just to qualify students for entry-level positions, but to provide a foundation on which they can build careers in supply chain management.

Hiring and training Baltimore residents to work in a changing health system

In 2017, Johns Hopkins joined with three other Baltimore health systems that together operate seven hospitals in the City to create the *Baltimore Population Health Workforce Collaborative*, an effort that seeks to recruit, train and hire residents of low-income neighborhoods in Baltimore for 198 newly created entry-level jobs, such as community health workers, peer recovery specialists and certified nursing assistants. The participating hospitals would also hire 35 higher-level staff (care coordinators, social workers, etc.) to work with the 198 new entry-level employees.

Of the 198 new entry-level positions, 140 are being created at the Johns Hopkins Hospital and 20 at Johns Hopkins Bayview Medical Center. Residents targeted for these jobs include those who are unemployed or underemployed, people with little or no work history and no more than a high school education, those who are in recovery and some who have criminal records.

As of fiscal year 2019, the Johns Hopkins Hospital and the Johns Hopkins Bayview Medical Center had successfully trained and hired 70 individuals in Community Health Worker (CHW), Peer Recovery Specialist (PRS), and Certified Nursing Assistants (CAN and CAN/GNA) positions.

Combating crime and addiction

Baltimore has long ranked among the nation's most violent cities (measured by the number of violent crimes per 100,000 residents). Johns Hopkins is helping to address this problem on several levels. At the community level, Johns Hopkins is an active partner in efforts to reduce crime, such as *Operation PULSE* (People United to Live in a Safe Environment), a church-based program that seeks to reduce the impact of crime and violence in East Baltimore. Since its inception, the program has trained more than 1,000 volunteers and staff in areas such as how to recognize and report patterns of criminal behavior, organizing and managing citizen patrols, conflict management, and designing other neighborhood security initiatives. Johns Hopkins Medicine's Office of Corporate Security Services has worked closely with Operation PULSE to improve safety and security on and around the East Baltimore campus.

At the city level, the University and the City in 2016 launched the *Johns Hopkins-Baltimore Collaborative for Violence Reduction* – an effort to assist the Baltimore Police Department (BPD) in identifying and building upon the most effective approaches to reducing gun violence in the City, while at the same time taking into account community concerns about previous BPD attempts to address the problem. Researchers affiliated with the Bloomberg School of Public Health's Center for Gun Policy and Research have worked with the BPD to:

- Evaluate existing anti-violence programs and recommend ways to strengthen them;
- Develop strategies for reducing illegal gun ownership; and
- Improve police-community relations.

In January 2018, the Center for Gun Policy and Violence released a report detailing its findings on the effectiveness of several existing strategies.²² The report led to a joint BPD-Center initiative aimed at improving evidence-gathering and arrest reporting in illegal gun possession cases; reduction in the number of such cases that result in dismissal or decisions not to prosecute; substantially reducing the incidence of illegal searches; and providing increased recognition for officers with a record of successful, high-quality gun law enforcement.

In April 2019, the Maryland General Assembly approved the **Community Safety and Strengthening Act**, a bill that among other initiatives authorizes Johns Hopkins to establish its own police force. Passage of the new law followed months of discussions involving the University, the Health System, community leaders and neighborhood residents, as well as a comprehensive study of ways to improve safety and security on and around Johns Hopkins campuses, which had been requested by the Maryland House Judiciary Committee. The bill calls for development of a “memorandum of understanding” between Johns Hopkins and the Baltimore Police Department, followed by recruitment and training of up to 100 sworn peace officers, trained and certified to carry firearms. The bill also requires extensive training in community policing, conflict de-escalation and violence prevention, and creation of a police accountability board.

22. Daniel Webster, Shani Buggs and Cassandra Crifasi, *Estimating the Effectiveness of Law Enforcement and Public Health Interventions Intended to Reduce Gun Violence in Baltimore*, Johns Hopkins Center for Gun Policy and Research, Bloomberg School of Public Health, January 2018.

Safe Streets Baltimore is an evidence-based, public health program aimed at reducing gun violence among youth ages 14 to 24. Modeled after Chicago’s CeaseFire program, it employs outreach workers to deescalate and mediate disputes that might otherwise result in serious violence. In addition, staff serve as role models and work to mobilize neighborhood residents to promote nonviolence. The program is overseen by the Baltimore City Health Department (BCHD) and operated by community-based organizations, and is currently being implemented in several neighborhoods in Baltimore.

In 2016 the federal Office of Juvenile Justice and Delinquency Prevention awarded a \$500,000 **Safe and Thriving Communities Grant** to the Baltimore City Health Department. The Johns Hopkins Hospital Emergency Department serves as a subcontractor for implementation of the program, including hiring and training of staff, which will include a program manager, case manager and two hospital responders.

Juvenile Justice Jeopardy is a de-escalation workshop that seeks to improve relations between Baltimore police and the City’s youth through a unique game-playing strategy in partnership with the Johns Hopkins University and Health System faculty and staff and Boston-based Strategies for Youth.

Creating opportunities for “justice-involved persons”

High crime rates are closely linked to the problem of recidivism – the cycle of arrest/conviction/incarceration and release, all too often followed by another offense, another arrest and incarceration yet again. One of the most effective ways to break this cycle is by helping “justice-involved persons” get access to jobs that provide not only a living wage but a path to a better future. Johns Hopkins works with community-based programs such as BUILD’s (Baltimoreans United in Leadership Development) *Turnaround Tuesdays*, which provide life skills, job search assistance and job-readiness training in both East and West Baltimore. Through these community-based programs and recruitment efforts, between fiscal year 2014 and fiscal year 2019, Johns Hopkins hired 811 justice-involved persons.

Treating opioid addiction

Many of the City’s crime problems are related to its high rate of substance abuse. Through its ***Broadway Center for Addiction***, located two blocks from the Johns Hopkins Hospital, Johns Hopkins is one of the City’s leading providers of opioid addiction services. The Center – which serves about 400 patients each year, and which has been cited by the U.S. Office of National Drug Control Policy as a model for improving the quality of and access to opioid treatment – provides initial screening and assessment, referrals to inpatient detox (when needed) at the Hospital, and a comprehensive program of outpatient services that includes:

- Treatment with one of three drugs that block the craving for opioids (methadone, buprenorphine or naltrexone)
- Required individual and group counseling
- Health and social services

Because about 80 percent of its patients are homeless, the Center contracts for 48 beds at Helping Up Mission, a leading provider of transitional housing and services for homeless men. As of October 2019, Helping Up Mission has raised over \$51 million to build a new Center for Women and Children in East Baltimore’s Historic Jonestown area to increase their capacity to serve families in need.

The Johns Hopkins Bayview Medical Center offers one of the few treatment programs for pregnant women, the ***Center for Addiction and Pregnancy (CAP)***, which helps mothers and infants deal with the physical, emotional, and social problems caused by substance use disorders. Services include substance abuse treatment, psychiatry, pediatrics, obstetrics/gynecology and family planning. CAP also offers transportation and methadone maintenance.

Improving schools and expanding ongoing educational opportunity

Of the many factors that contribute to the strength of local communities, none is more important than the quality of elementary and secondary education. Johns Hopkins contributes in multiple ways to the goal of improving Maryland's public schools, and expanding educational opportunity for the State's young and older residents. Below are a few examples.

- Every year, the School of Education places graduate students in teaching, counseling and other internships. During the 2016-2017 academic year, approximately 344 graduate students were placed in 204 schools, institutions and community organizations in Maryland.
- Each of the colleges and universities in Maryland that offer teacher training programs maintains ongoing partnerships with several professional development schools – elementary and secondary schools where the institutions provide professional development services for currently-employed teachers, place undergraduate and graduate students in teaching internships, and collaborate on other school improvement initiatives. In 2016-2017, Johns Hopkins worked with two professional development schools in Baltimore – Patterson Park Public Charter School and Henderson-Hopkins.
- ***STEM Achievement in Baltimore Elementary Schools (SABES)*** began in 2013 as a five-year, NSF-funded pilot project in nine Baltimore elementary schools. Jointly developed by the Whiting School of Engineering, the School of Education and Baltimore City Public Schools (BCPS), SABES uses an innovative, community-oriented approach to STEM education to engage students in grades 3 to 5, their teachers and community residents in learning about science. Based on the success of the pilot project, BCPS announced in the fall of 2017 that it planned to adopt the SABES program in all of the City's elementary schools.
- ***The Henderson Hopkins School*** – a K-8 public school that is a centerpiece of the ongoing revitalization of the Eager Park neighborhood – opened in January 2014. The \$43 million facility, which was built by East Baltimore Development Inc. with capital contributions from Johns Hopkins and several foundations, is jointly managed by Johns Hopkins and Morgan State University. The School shares its seven-acre campus (as well as an auditorium, gymnasium, health services and other resources) with the Harry and Jeanette Weinberg Early Childhood Center, which serves young children from birth through pre-K. The Center is operated by Downtown Baltimore Child Care, Inc. with oversight by the Johns Hopkins Office of Work, Life and Engagement. The School also operates a food-pantry for students and their families; it averages about 300 participants per month.

As of the fall of 2018, there is space for 540 students at Henderson Hopkins, and 74 children are currently enrolled at the Weinberg Center. Johns Hopkins contributes \$750,000 annually to the school for operations.

- In 2014 the Johns Hopkins Center for Talented Youth (CTY) launched its ***Baltimore Emerging Scholars Program***, an after-school enrichment program for “academically promising” first- through third-graders in public elementary schools in West Baltimore and Southeast Baltimore. As of the spring of 2019, the program was serving 500 students in 16 schools; and in the summer of 2019 CTY expanded it to include a six-week summer program serving 180 students.
- ***Vision for Baltimore*** was launched in 2016 by Johns Hopkins, the Baltimore City Health Department, the Baltimore City Public Schools and Vision for Learning. Based in part on research conducted at Johns Hopkins that highlighted the impact of getting eyeglasses on the school performance of second- and third-graders, the project is providing free vision screenings to all K-8 students in the City’s public schools, and free eyeglasses (donated by manufacturer and online retailer Warby Parker) to students who need them. During its first three years, the program provided over 50,000 screenings and 8,886 eye exams to students, and distributed 6,642 pairs of eyeglasses. Johns Hopkins researchers are also evaluating the project’s long-term impact.
- Established in 2014 as a program of the Johns Hopkins Children’s Center, the ***Ruth and Norman Rales Center for the Integration of Health and Education*** “is redesigning school-based health programs to improve the health and thus the academic achievements and lifelong prospects for youth from low-income communities.” In the summer of 2015, the Rales Center launched its fully integrated school-based health model at KIPP Baltimore – a public charter school in Baltimore City serving over 1,500 K-8 students. Weaving comprehensive health services and wellness programming into the school environment, the program breaks down silos between educational and health-related activities helping children thrive and achieve academic success.
- ***Medical Education Resources Initiative for Teens (MERIT)*** is a Baltimore-based nonprofit academic and career mentorship program in which Baltimore high school students from underrepresented backgrounds receive mentoring by undergraduate and medical students and healthcare professionals; participate in paid summer internships focused on clinical and research experiences; and receive college admissions guidance to help them pursue careers in medicine. Johns Hopkins serves as a key institutional partner with MERIT, providing mentors, internship opportunities and volunteer guest speakers and instructors.

- The Johns Hopkins Hospital **SOARING** program is designed to qualify certified nursing assistants (CNAs) for clinical technician positions at the Johns Hopkins Hospital. Through educational opportunities, clinical skills laboratory activities, clinical experiences, simulation and mentoring, SOARING helps prepare CNAs to practice in an advanced direct patient care role. The JHH Department of Nursing runs the program and accepts participants who have completed health profession community college courses.
- **Bond-to-Bond** (Building Our Neighbors Dreams Beyond Our Neighbors' Doors) is a career development and youth mentorship program designed to provide mentor support to students attending high schools in the Baltimore community. The program exposes students to a variety of careers in healthcare via internships throughout the Johns Hopkins Hospital. Participants are required to intern between 8-10 hours weekly throughout the academic year. Not only does the program give high school students experience in a professional healthcare setting, it allows them to earn the volunteer hours required for high school graduation.
- The **Adopt-a-Class/Career Day Program** aims to introduce fourth graders at three local elementary schools to hospital careers and to expand their knowledge of career choices in general. The three schools currently participating are Tench Tilghman, City Springs, and Inner Harbor East Academy. Each year four teams are created, each with three Johns Hopkins volunteers from different departments. Each team is assigned to a fourth-grade classroom. Once a month from October through March the teams visit the same classroom and deliver a one-hour presentation on a special topic. At the end of the presentation, students ask questions and record reflections of their experience in their journals.

Building careers in Baltimore

In partnership with Kaiser Permanente, the University of Maryland, Baltimore and Baltimore City Community College, Johns Hopkins and Paul Laurence Dunbar High School in 2016 launched one of Maryland's first two **P-TECH** (Pathways in Technology Early College High School) programs. P-TECH – an innovative program developed by IBM in New York City – prepares students for careers in science and technology by combining rigorous high school studies with a two-year community college degree and work experience with a corporate partner.

Dunbar's program is focused on preparing students for careers in health information technology. Its first cohort of 50 students was enrolled in September 2016. Total enrollment increased to 150 in 2018-2019, and is projected to reach 250 by 2021. More than 80 percent of participating students have been from low-income families, and 100 percent have been either African-American or Latino.

Johns Hopkins Medicine serves as the program's lead corporate partner, providing work experience, mentors – and ultimately job opportunities – to participating students. As of the fall of 2019, 115 Johns Hopkins Medicine faculty, administrators and students were serving as mentors to Dunbar P-TECH students.

- The *Harriet Lane Tutorial Project*, sponsored by the Harriet Lane Clinic – the Johns Hopkins Hospital’s principal pediatric outpatient service which has been serving East Baltimore residents since the early 1900s – provides after-school tutoring in reading and math to elementary school students in East Baltimore.
- Johns Hopkins is also a leading provider of graduate education for participants in Teach for America (TFA). In 2016-2017, 179 TFA teachers in schools in Baltimore City and Baltimore County were enrolled in master’s degree programs in the School of Education.
- During fiscal year 2017, the Applied Physics Laboratory’s (APL) *Student Program to Inspire, Relate and Enrich (ASPIRE)* placed 255 high school juniors and seniors in one-on-one internships at APL in areas such as computer science, engineering, physics and applied math. During the academic year, 145 student interns worked at APL for at least five hours each week; 110 summer interns worked at the Lab at least 25 hours a week for six weeks.



P-TECH (a school-to-industry pipeline) at Dunbar students with program manager Alexia Smith.

Meeting residents' health needs in Maryland and beyond

- **Maryland MESA** (Mathematics, Engineering, Science Achievement), an extracurricular science program at APL for students in grades 3 to 12, aims to prepare and encourage minority and female students to pursue academic and professional careers in STEM fields. Each year, the program serves approximately 2,500 students and 180 teachers from across central Maryland.
- **Girl Power**, APL's annual STEM expo, each year draws elementary and middle school students and their families to the Lab for a day of activities designed to inform them about and interest them in STEM education and career opportunities. In 2017, 1,100 students and parents attended the event.
- **Medical Explorers**, a program offered by Johns Hopkins All Children's Hospital, Suburban Hospital and Sibley Memorial Hospital, provides high school students with opportunities to meet with and learn from health care professionals about the career opportunities the field offers.
- Johns Hopkins All Children's Hospital is the lead agency for the **Safe Routes to School** program. This is a school-based injury prevention program funded statewide by the Florida Department of Transportation that reaches more than 100,000 students and educators in Florida annually to educate K-8 students on proper biking and pedestrian conduct.

Even as the scale and scope of its operations have grown, Johns Hopkins Medicine has remained deeply rooted in, and committed to meeting the health needs of, the communities in which it operates. The following examples illustrate the many ways in which Johns Hopkins is meeting that commitment.

- **East Baltimore Medical Center (EBMC)**, which first opened in 1975, is one of 36 primary and specialty care centers operated by Johns Hopkins Community Physicians (JHCP). Located on Eager Street, just a few blocks from the Eager Park area, EBMC provides comprehensive health care services to residents of East Baltimore. In fiscal year 2019, EBMC reported 67,021 patient visits, making it one of the busiest facilities in the JHCP network.
- The JHCP network also includes three other sites within the City – one on the Johns Hopkins Bayview campus, one in Canton Crossing and one on Remington Avenue in North Baltimore – a 30,000-square-foot facility providing primary care, pediatric, obstetric and gynecological services that in fiscal year 2019 recorded 53,309 patient visits.
- The School of Nursing operates **Community Nursing Centers** at three locations in East Baltimore, providing basic health and wellness services at no charge to low-income and uninsured neighborhood residents. These centers are staffed by undergraduate and graduate student nurses and clinical faculty, and by other Johns Hopkins physicians and nurses who work on a volunteer basis.

- > The **Lillian Wald Community Nursing Center**, located at 901 North Broadway, provides a variety of health care and wellness services to neighborhood residents.
- > The **Isaiah Wellness Center** provides health education programs for the elderly residents of Apostolic Towers.
- > The health suite at the **House of Ruth** serves victims of domestic violence and their children.
- In 2009, Johns Hopkins Medicine launched **The Access Partnership (TAP)**, an initiative that aims to improve uninsured or under-insured neighborhood residents' access to the full range of specialty care that is available at the Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center. Starting from its initial focus on just two Baltimore ZIP codes, the program is currently open to residents of ten ZIP codes surrounding the East Baltimore and Bayview campuses whose incomes are below 200 percent of the federally-defined poverty level (\$41,560 for a family of three in 2018), who are receiving primary care through the Johns Hopkins Hospital, Bayview Medical Center or other providers in the area.

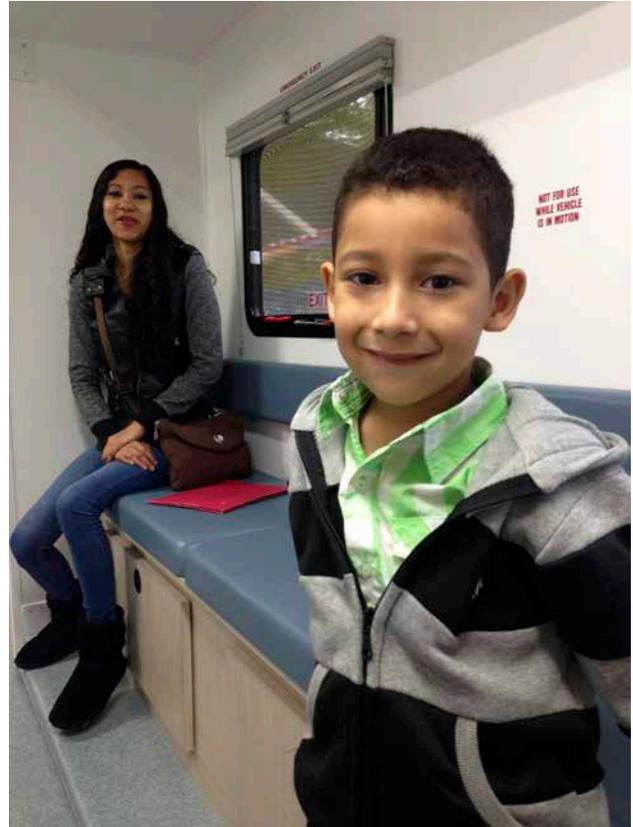
Because participating Johns Hopkins specialists donate their services, TAP is able to minimize the cost of these services to uninsured neighborhood residents. Eligible patients who are referred by their primary care physicians to specialists at Johns Hopkins pay an initial fee of \$20.00, and \$20.00 every three months thereafter and no additional cost for services.

As of June 2019, 1,099 neighborhood residents were enrolled in TAP, of whom about 95 percent were Hispanic. Since its founding in 2009, a cumulative total of 7,411 neighborhood residents have participated. The most common specialties to which TAP patients are referred include gynecology, ophthalmology, cardiology, radiology and physical therapy.

- The **Harriet Lane Clinic** at the Johns Hopkins Hospital is both a center for teaching and research in pediatrics and a major provider of primary care and wraparound services to children and adolescents in East Baltimore and surrounding communities.
- The John Hopkins Hospital's **Case Management Unit in Community Psychiatry** provides intensive case management services for Medicaid recipients in Baltimore age 16 and older who suffer from serious mental illness.
- The Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center, through the Healthy Community Partnership, (an interfaith community outreach program at JHBMC) entered into a partnership with the Southern Baptist church to lease part of the **Mary Harvin Transformation Center** in East Baltimore. The hospitals use the space to offer community outreach services addressing needs identified by the community in the Community Health Needs Assessment (CHNA) including workforce training and health education.

- Spiritual Health is providing a new innovative way to address community trauma through a faith-based leadership program entitled “*Caring for the City.*” The program brings together clergy members and faith leadership in East Baltimore to work together to find ways to best serve and support the members of the East Baltimore communities. In addition, a community Chaplain is on site in the community three days a week.
- Johns Hopkins Bayview Medical Center’s *Care-A-Van* is a fully-equipped mobile medical unit, staffed by health care professionals from Johns Hopkins Bayview. Its services include basic primary care, testing (for pregnancy, HIV and other conditions), referrals to specialists, and patient education. Services are provided free of charge to uninsured children and pregnant women who do not have a regular source of health care. On average, over 2,000 adults and children are served through the Care-A-Van each year.
- The School of Nursing’s *Birth Companions* program trains nursing students to serve as doulas, and provides doula services to women in the Baltimore area. Training is delivered through a two-credit elective course, with each student required to provide doula services to at least one client; services typically include one pre-natal visit, support during childbirth, and at least one postpartum visit. These services – which in the Baltimore area typically cost about \$1,000 per birth – are provided free of charge.

Each year about 60 to 80 student nurses – including many who are studying to be nurse midwives – participate in the Birth Companions program. Since its founding in 1997, the program has trained more than 1,200 students, who have collectively assisted in more than 2,300 births.



Care-A-Van provides free, accessible medical care primarily to women and children in the Hispanic community.

- The *Sickle Cell Center for Adults* provides services for persons with sickle cell disease who live in the greater Baltimore and Washington, D.C. areas. The Center provides comprehensive care including education, screening, regularly scheduled outpatient visits, genetic counseling, pain management, wound care and social services. The advanced practice providers address the acute and chronic needs of their patients on a daily basis and act as a liaison to other medical specialties throughout the hospital.

- The Wilmer Eye Institute's ***Diabetic Retinopathy Screening Program*** provides free eye screening to help prevent vision loss and blindness in patients with diabetes. The program was developed over 25 years ago with the aim of providing free eye screening to individuals with diabetes who otherwise could not afford to have their eyes examined. It is the only free diabetic retinopathy screening program in the Baltimore/Washington, D.C. area. The program is supported in part through funding by the Diabetes Research and Wellness Foundation.
- ***Hopkins Community Connection*** (formerly Health Leads) provides screening, support and linkage to community resources and benefits for individuals and families with essential needs, such as food, childcare, shelter, energy security, and job training. The program operates largely through specially trained undergraduate volunteers in the Johns Hopkins Harriet Lane Clinic, Johns Hopkins Bayview Children's Medical Practice and Johns Hopkins Comprehensive Care Practice, and serves as an important enhancement to the care provided by clinical staff. Since patient outcomes are strongly linked to the social determinants of health, for the past decade, the program has served a critical role to improve the lives of patients and families in the community. In fiscal year 2018, Health Leads assisted 2,813 unique patients at JHH and JHBMC with resource connection and weekly follow up. In fiscal year 2019, Johns Hopkins assumed operations of the Baltimore Health Leads programming, updating the name to Hopkins Community Connection (HCC). Operating in the same locations, HCC continues to provide services to address essential needs as a routine part of the clinics' healthcare delivery – with a renewed focus on deepening relationships with local community-based organizations.
- The ***Moore Clinic for HIV Care*** is an outpatient unit supervised by the Hopkins AIDS Service. The clinic has approximately 20,000 patient visits per year and is staffed by mid-level practitioners (nurse practitioners and physician assistants) and primary care providers primarily from the faculty in the Division of Infectious Diseases. Major specialty services offered are neurology, psychiatry, gynecology, obstetrics, substance use, nutrition, viral hepatitis, pharmacy and adherence.
- The ***Center for Health/Salud and Opportunity for Latinos (Centro SOL)*** was established in 2013 to enhance the health of Latinos in Baltimore and beyond by combining coordinated clinical care with advocacy, education and research. The Center brings together medicine, pediatrics, gynecology and obstetrics and psychiatry in a wide variety of health services and education initiatives.

Helping the homeless – and reducing health care costs

Health care practitioners and policy experts alike have long recognized that the social and economic conditions under which people live can profoundly affect their health – and that people who are homeless are among the most vulnerable. In Baltimore, where about 2,500 City residents are estimated to be homeless, meeting the needs of this population can be especially challenging.

In 2019 the Johns Hopkins Hospital, Johns Hopkins Bayview Medical Center and eight other Baltimore hospitals, building on a pilot project launched by the State and the City in 2017, launched a new initiative that aims to provide stable housing, health care and supportive services for 200 individuals and families who are homeless or at risk of becoming homeless.

In addition to providing supportive housing, the program will teach its clients independent living skills, connect them with community-based health and mental health care, and provide employment services. The program's goals include helping clients avoid a return to homelessness, improving their health and reducing their need for emergency care. (An early study of the City's pilot project found that it reduced participants' emergency room visits by 53 percent, and their overall health care costs by 33 percent.)

Supportive services are being managed by Health Care for the Homeless, a Baltimore-based non-profit that partnered with the City on the original pilot project. The program will be funded in part by the State's Medicaid program, and in part by a two-year commitment of \$2 million from the participating hospitals (including over \$800,000 from the Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center). The program's impact will be tracked through the State's Medicaid system.

- The *Brancati Center for the Advancement of Community Care* – named for the late Johns Hopkins Professor of Medicine Fred Brancati – was established in 2015 with a \$5 million gift from Walgreen's. Its goal is “to improve the health of communities by developing new models of healthcare in partnership with community organizations.” The Center has worked with partners such as Memorial Baptist Church and Zion Baptist Church to identify local health and wellness needs, and to develop and implement programs that address these needs. The Center's initial focus was on diabetes; its scope has since broadened to include HIV, substance abuse and nutrition.

The Center conducts research that supports the development of new approaches to community-based health care, such as a study of alcohol abuse among women in Baltimore, and survey research on health needs in the City's Latino community. It also supports educational programs that promote greater diversity in the healthcare workforce; and provides education in community health care for Johns Hopkins medical and nursing students.

- In partnership with Howard County Public Schools, Howard County General Hospital in 2016 established telemedicine connections with school-based health centers in six elementary schools with relatively high percentages of low-income students. In fiscal year 2017, 1,522 of the six schools' 3,374 students enrolled in the program, through which HCGH health care professionals handled more than 2,000 encounters with participating students.

- The Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center provide funding for a Medical Director at the **Esperanza Center**. The Center provides free medical and dental services to uninsured residents, primarily from the Latino community in neighborhoods located close to the hospitals.
- **Chase Brexton Dental Services Partnership** – In 2019, the Johns Hopkins Hospital entered into a partnership with Chase Brexton to provide same day dental services to residents coming to the emergency room with acute dental needs. Dental care has been a long time need for many in Baltimore due to the lack of coverage for dental services by most insurance plans.
- Howard County General Hospital’s **Rapid Access Program (RAP)**, launched in 1989, is aimed at ensuring prompt evaluation of and services to patients who are referred for adult outpatient behavioral health services. In fiscal year 2017, 589 people were enrolled in the program. A subsequent study showed that from 2016 to 2017, the number of emergency room visits by RAP participants fell by an average of 24 percent.
- In 2017, Sibley Memorial Hospital launched **Ward Infinity**, a program designed to help residents of Wards 7 and 8 in D.C. identify problems affecting the health of their neighborhoods, and to design and implement their own responses. Sibley provided training, technical assistance, work space and grants of \$25,000 to five teams of community health innovators to work in areas such as promoting healthier eating, creating markets that improve access to healthier food and personal products, publishing a community health newsletter and instilling greater trust between health care providers and community residents.
- Sibley has in recent years expanded its efforts to meet the health care needs of LGBTQ residents of the D.C. area, including research, staff training and appointment of a dedicated single point of contact for LGBTQ organizations and individuals.
- Suburban Hospital offers several wellness programs for older adults. For example:
 - > **HeartWell** is a program aimed at helping older adults in Montgomery County who have been diagnosed as having cardiovascular issues monitor and manage their own health more effectively. A team of Suburban nurses conducts screenings at senior centers and other locations, and provides counseling, support groups and community education programs. Suburban has also partnered with Mobile Medical Care Inc. and the National Heart, Lung and Blood Institute to expand patients’ access to specialty care by providing free diagnostic, inpatient and lab services.
 - > Suburban’s **Senior Shape** program offers a variety of fitness activities for older Montgomery County residents, such as Tai Chi and “pilates for seniors,” focused on improving core strength, muscle tone, posture and flexibility.
- **#JustGirlsSocialClub** is a Suburban Hospital initiative aimed at addressing health equity issues affecting girls age 8 through 15 who live in Montgomery County’s historic Scotland neighborhood – the County’s oldest African-American community. The program features a series of monthly workshops for girls on topics such as nutrition, fitness, stress management and personal safety.

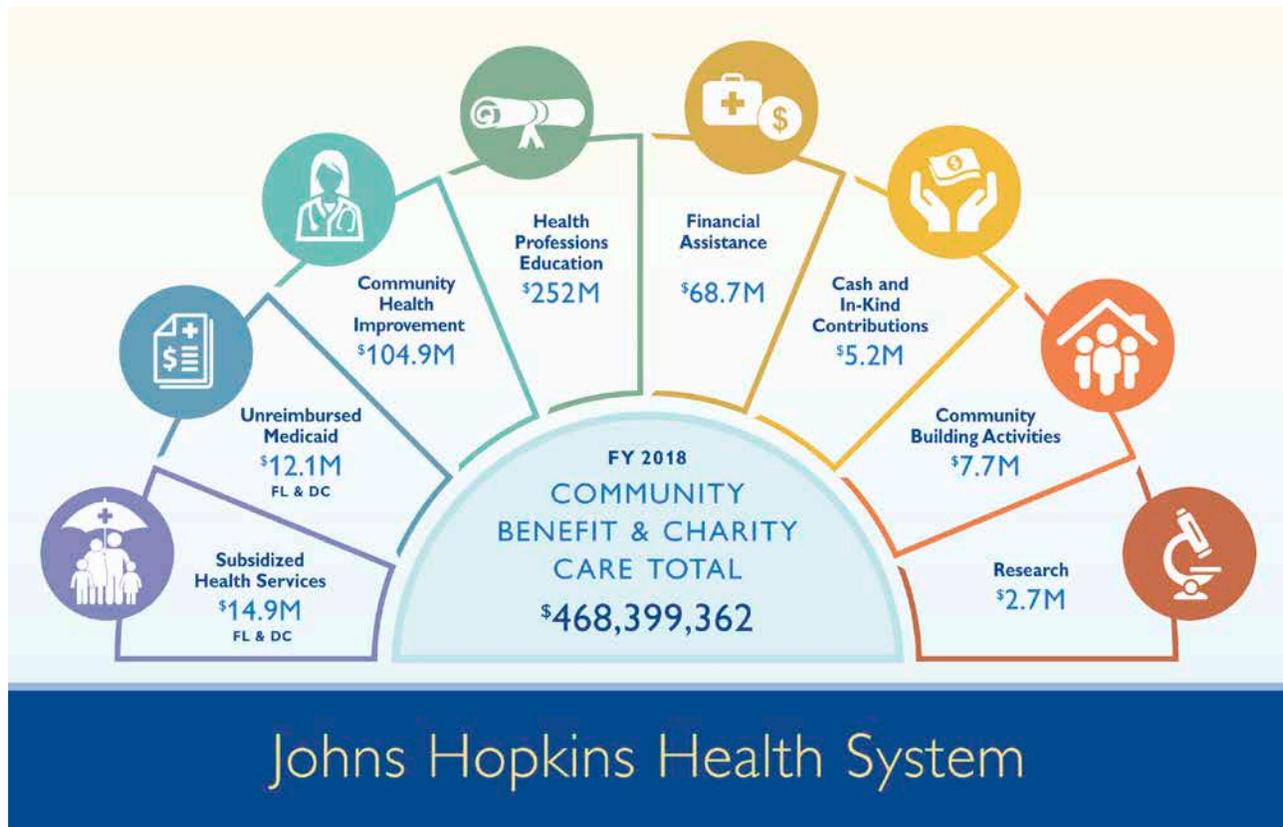
- In 2014, Johns Hopkins All Children’s Hospital became the lead agency in Pinellas County for **Healthy Start**, a federally funded program aimed at reducing disparities in maternal and child health in high-risk communities. In fiscal year 2017, 501 women and infants were enrolled in the program. JHACH program staff work with women to ensure first-trimester prenatal care, post-partum visits, regular-check-ups and immunizations. They also work with program participants and the broader community to address “social determinants of health,” such as poverty, availability of child care, housing and mental health issues.
- JHACH manages **Early Steps** – Florida’s early intervention system for infants and toddlers with developmental delays (or conditions likely to lead to delays). The Hospital contracts with local providers in West Central Florida to provide evaluations and early intervention services.
- Johns Hopkins All Children’s Hospital also sponsors the **Lakewood Health Squad**, a peer-to-peer program at Lakewood High School that seeks to combat obesity by encouraging students to pursue healthier lifestyles, using social media, brown bag lunches with experts from JHACH, after-school fitness bootcamps and other activities.

Quantifying the value of community benefits

Like other not-for-profit hospitals, Johns Hopkins Medicine's hospitals are required by the federal government to track and report annually on the benefits they provide to their community. Table 1 provides information on the dollar value of various community benefits that the six hospitals provided in fiscal year 2018. These benefits include:

- Financial assistance provided to uninsured and under-insured low-income patients
- Community health improvement services
- Education of health professionals – for example, through clinical training of medical and nursing students
- Community-building activities such as workforce development, neighborhood beautification, education outreach and housing programs
- Unreimbursed research costs providing community-based services – for example health information websites
- Contributions to local community organizations

Figure 28: Total value of community benefit and charity care activity, FY 2018



Source: FY 2018 IRS Schedule H (Form 990)

In fiscal year 2018, the value of community benefits provided by the Health System’s four Maryland-based hospitals totaled more than \$404.4 million.

For all Johns Hopkins Health System hospitals – including Sibley Memorial Hospital and Johns Hopkins All Children’s Hospital – the value of community benefits provided in fiscal year 2018 totaled nearly \$468.4 million.

Table 30: Value of community benefit and charity care activity, FY 2018

Community Benefit Activity	The Johns Hopkins Hospital	Johns Hopkins Bayview	Howard County General Hospital	Suburban Hospital	Sibley Memorial Hospital	Johns Hopkins All Children’s Hospital
Financial assistance	\$33,110,189	\$19,514,925	\$4,957,939	\$5,176,153	\$3,012,915	\$2,948,186
Unreimbursed Medicaid	–	–	–	–	\$2,749,569	\$9,386,627
Community health improvement	\$43,824,343	\$14,729,614	\$18,223,227	\$14,453,836	\$5,826,937	\$7,917,500
Education of health professionals	\$187,396,625	\$44,731,249	\$2,012,524	\$4,494,326	\$1,169,067	\$12,252,464
Subsidized health services	–	–	–	–	\$5,708,053	\$9,188,985
Research	\$1,009,290	\$249,764	\$163,628	–	\$1,214,839	\$34,750
Cash and in-kind contributions	\$2,097,730	\$812,676	\$409,618	\$293,941	\$934,165	\$694,128
Community-building activities	\$4,385,734	\$1,348,727	\$462,484	\$542,748	–	\$959,887
Total Community Benefit and Charity Care	\$271,823,911	\$81,386,955	\$26,229,420	\$24,961,004	\$20,615,545	\$43,382,527

Student engagement in community service

Baltimore neighborhoods and their residents also benefit from engagement of Johns Hopkins students in various forms of community service – through volunteer work; through “service-learning” courses, which combine classroom learning with practical experience in the provision of community services; and through internships and other forms of on-the-job learning.

On the Homewood campus

The *Center for Social Concern (CSC)* is the primary focal point on the Homewood campus for student engagement with and service to Baltimore communities. One of CSC’s oldest and largest initiatives is the *Johns Hopkins Tutorial Project*. Every year during the fall and spring semesters, the program brings approximately 100 Baltimore elementary school students to the Homewood campus for two one-on-one, hour-long tutoring sessions each week. The assistance provided is tailored to each student’s needs in reading and math, based on individual assessments conducted at the beginning of the semester. In 2016-2017, the 226 Johns Hopkins student volunteers participating in the program contributed 13,362 hours.

The Center also organizes the *President’s Day of Service (PDOS)*, an annual one-day community service event that unites Johns Hopkins faculty, staff and students and community members on projects in Baltimore neighborhoods. Since 2009, PDOS has grown to have 1,300 volunteers working with community partners at over 40 sites in Baltimore City.

The Center also provides a home for approximately 65 student groups who provide a wide variety of services. For example:

- *Thread*, founded in 2004 by a Johns Hopkins graduate student and her husband, provides mentoring, assistance in day-to-day activities and access to community resources for at-risk students attending three Baltimore high schools. In 2016-2017, 300 Homewood campus students devoted 7,500 hours to working with Thread students attending the City’s Academy for College and Career Exploration (ACCE).
- *Salud* is a Johns Hopkins student organization that seeks to improve the health of Baltimore’s Hispanic community. Student volunteers work with several community organizations to organize health fairs and other educational programs, provide translation services, and help community residents get access to health insurance, pharmacy services, financial assistance and other services. In 2016-2017, 80 students provided 5,000 hours of volunteer work.

- The **Johns Hopkins Jail Tutorial Project** provides GED preparation and conducts reading groups with inmates at the Chesapeake Detention Center and the Jessup Correctional Institution in Baltimore. In 2016-2017, 75 students provided 5,800 hours of volunteer work.
- The Johns Hopkins Chapter of **Habitat for Humanity** works with local affiliates to build housing for Baltimore families. In 2016-2017, 70 students performed 2,424 hours of volunteer work on Habitat projects.

In 2016-2017, Homewood students performed more than 124,500 hours of community service. Over 3,600 students performed nearly 100,600 hours of community service work in programs based at CSC.

CSC also administers the **Community Impact Internship Program (CIIP)**. Each summer, CIIP places 50 undergraduates in eight-week, full-time, paid internships with local community organizations and agencies to work in areas such as education, immigrant and refugee services, and services for the homeless. All CIIP interns are paid a salary of \$4,000 for the summer.

In East Baltimore

At the East Baltimore campus, **SOURCE** – the Student Outreach Research Center – provides a focal point for community engagement among students in the School of Medicine, the School of Nursing and the Bloomberg School of Public Health. SOURCE partners with over 100 Community Based Organizations in Baltimore and supports a wide range of engagement opportunities that respond to community identified needs. The following are examples of SOURCE's programs:

- The **Connection Community Consultants Program** assists community organizations with a variety of short-term projects. In 2016-2017, 43 student volunteers provided 2,150 hours of volunteer consulting work.
- **The Identity Clinic**, a joint collaboration between SOURCE and the Living Classrooms Foundation, aims “to be the vital records concierge for returning citizens.” Launched in 2017 through a grant from the University’s Idea Lab, the clinic is staffed with a team of Johns Hopkins students, faculty and staff volunteers, along with case managers from Living Classrooms, who work with returning citizens to help determine what forms of identification they need, and the related supporting documentation required to complete the application. Between January 2017 and June 2017, approximately 750 community participants visited The Identity Clinic for support.
- The **SOURCE Service Scholars Program**, launched in 2012, trains a select group of medical, nursing and public health students in service-learning methods and in working collaboratively with community partners. In 2016-2017, 11 SOURCE scholars and 75 other student recruits worked a total of 2,623 hours on community-identified projects.

Johns Hopkins as a cultural resource

During 2016-2017, SOURCE estimates that between its volunteer programs and service-learning programs such as those described below, 1,296 students at the three schools provided more than 63,950 hours of service to the community – primarily but not exclusively in East Baltimore.

In addition to SOURCE's programs, all three schools on the East Baltimore campus offer a variety of service-learning courses. In 2016-2017, for example:

- 76 student nurses participated in practicum and service-learning courses, recording a total 9,968 hours of service. In addition, the School of Nursing's Public Health Nursing Clinical course added a service-learning component to its curriculum during the 2016-2017 academic year. Student nurses enrolled in this course recorded a total of 32,256 hours of service.
- 105 students who participated in the Bloomberg School of Public Health's service-learning courses performed 6,243 hours of work in the community.
- Through the School of Medicine's TIME: Health Care and Disparities service-learning course, 120 medical students performed approximately 480 hours of service.

The Schools of Medicine, Nursing and Public Health are not the only schools at Johns Hopkins offering service-learning courses. At the Carey Business School, for example, MBA students are required to complete a "capstone" project, in which teams of students work as consultants to a company or a non-profit organization, helping its leaders address a real-world business problem.

Johns Hopkins also contributes to the life of Maryland communities through its role as a major cultural institution, with music, dance and theater performances, museums and lectures that are open to members of the University community and to local residents as well.

The Peabody Institute – the oldest school of music in the U.S., and one of the core institutions in the City's Mount Vernon cultural district – offers a range of cultural opportunities to community residents that few institutions can match. In fiscal year 2017, Peabody had more than 6,700 attendees at ticketed concerts. In partnership with 23 local community organizations, Peabody Institute students in 2017-2018 presented 175 "community performances" in neighborhoods across the City. More than 5,000 Baltimore-area residents attended these free community performances.

Through its *Peabody Prep* division, the Institute provides opportunities for promising children and adolescents to develop their talents; and also offers lessons, classes and programs to community residents of all ages and all skill levels. In addition to the programs it offers in Baltimore, Peabody Prep provides music lessons, classes and other programs for children and adults, at all levels of proficiency, at its locations in Towson, Annapolis and Columbia. In the fall of 2018, 1,914 students were enrolled in Prep courses and programs, including 708 who lived in Baltimore and 1,167 who lived elsewhere in Maryland.

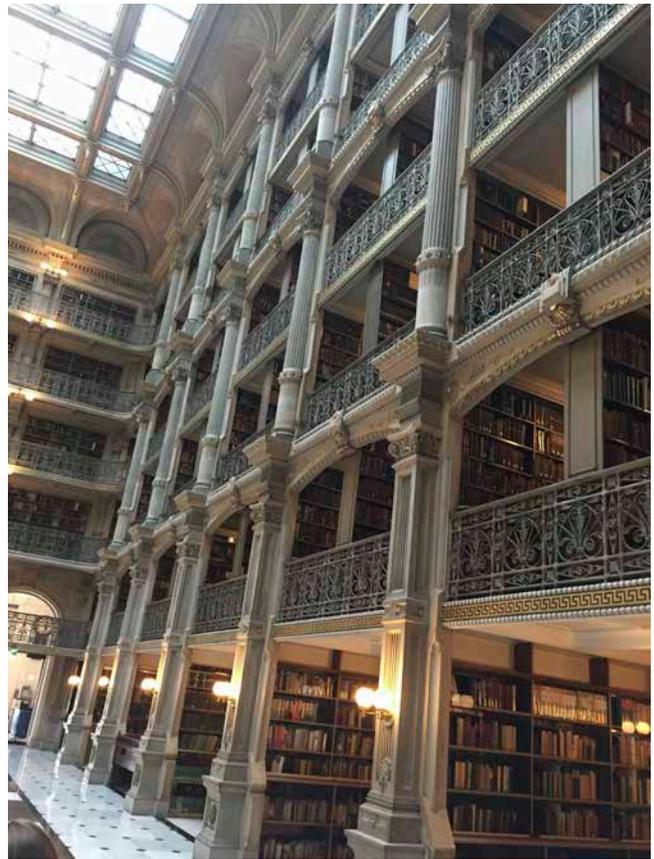
Several of the programs Peabody offers are of particular relevance to young residents of Baltimore.

- The Institute’s *Music Teacher Mentoring Program (MTMP)*, founded in 1998, provides mentoring and support for music teachers in more than 70 public schools in Baltimore. The program assists teachers not only with music pedagogy, but also with practical matters such as writing grant proposals.
 - Each year, MTMP participants nominate promising low-income Baltimore middle and high school students to participate in Peabody Prep’s *Tuned-In* program. Tuned-In provides instruments, weekly individual lessons with Prep faculty members, opportunities to work with other musicians, and free attendance at concerts and other cultural events in Baltimore.
 - Started by a Peabody Conservatory composition student in 2007, Peabody’s *Junior Bach* program gives students at a nearby middle school (St. Ignatius Loyola Academy) an opportunity to learn about and express themselves through music composition. Peabody composition students provide one-on-one lessons to Loyola students, and work with them on developing their own original compositions. The students’ work is then presented at an end-of-semester concert.
 - Each year during spring break, Peabody students can participate in *Creative Leadership Immersion*, a week-long program in which Peabody students and faculty, musicians from the Baltimore Symphony Orchestra and students from Baltimore City Public Schools collaborate in creating, developing, rehearsing and finally performing an original, large-scale musical composition.
 - Each year the *Estelle Dennis/Peabody Dance Training Program* provides tuition-free dance training to about 20 Baltimore boys ages 9 through 15.
- In addition to these on-campus events, a Peabody Conservatory student organization, *The Creative Access*, brings about 80 concerts and individual performances each year to hospitals, nursing homes, senior housing and other Baltimore community venues.
- In addition to those offered by the Peabody Institute, Johns Hopkins offers a variety of other cultural opportunities to local residents.
- The *Hopkins Symphony Orchestra (HSO)* is a 150-member community orchestra, founded in 1981. Its members – who include Johns Hopkins students, faculty members and staff, as well as other community residents – are chosen through annual open auditions. In addition to full orchestral and chamber music performances, HSO offers mentoring for public school students, lectures and demonstrations.
 - The annual *Shriver Hall Concert Series (SHCS)* – one of the leading chamber music programs in the U.S. – started in 1965 as a university-sponsored concert series. SHCS became an independent non-profit organization in 1970 – but continues to present its concerts on the Homewood campus. (The concerts were moved off-campus in 2018 while Shriver Hall was being renovated.) SHCS presents 11 concerts each year, including three free “discovery concerts” featuring up-and-coming young performers.

Strong neighborhoods, strong cities

- Johns Hopkins is the home of three museums. The *Homewood Museum* and the *Archaeological Museum* are located on the University's Homewood campus and the *Evergreen Museum* which is slightly north of the Homewood campus. All are open to the public and offer various programs throughout the year for general audiences.
- The University is also home to several libraries. Perhaps most notable is the *George Peabody Library*, founded in 1857 by philanthropist George Peabody, and often cited as one of the world's most beautiful libraries. The Library's collection today includes more than 300,000 volumes, most of which date to the eighteenth and nineteenth centuries. In keeping with the wishes of its founder, it remains free and open to the public.
- The University's Montgomery County Campus hosts an ongoing series of art exhibits, many including the work of local artists. The Campus also hosts an annual juried show of works by Montgomery County high school students.

In an era when the strength of local and regional economies depends on their ability to attract, develop and retain talent, cities and states are in the long run only as strong as their neighborhoods. Through the programs described here and many others, Johns Hopkins is helping to improve the communities in which it operates, and others throughout Maryland and beyond; and to expand both educational and economic opportunity for their residents.



The George Peabody Library, known as Baltimore's "Cathedral of Books," is consistently ranked amongst the most beautiful libraries in the world.



Kennedy Krieger



Kennedy Krieger Institute



Part Nine: The Impact of Affiliated Institutions

Beyond the impact of Johns Hopkins itself, Baltimore's and Maryland's economy is strengthened by the presence of institutions which have chosen to locate on or near Johns Hopkins' campuses. While all of these institutions are legally separate entities, with their own governance structures, leadership and funding streams, were it not for the presence of Johns Hopkins they might not have located in Baltimore. Several such institutions were identified in Part One.

This part of the report highlights the contributions of seven affiliated institutions – the Kennedy Krieger Institute, the Space Telescope Science Institute, the Lieber Institute for Brain Development, the Howard Hughes Medical Institute, the Carnegie Institution for Science, the Mount Washington Pediatric Hospital and the Johns Hopkins Federal Credit Union – to the vitality of the City's and the State's economy.

Seven diverse institutions

The institutions cited above differ significantly in the scale and scope of their activities, in the length of their tenure in Maryland, and in the nature of their relationship with Johns Hopkins.

◀ **Left:** Kennedy Krieger Institute on North Broadway.

Kennedy Krieger Institute

The oldest and largest of the affiliated institutions is the Kennedy Krieger Institute. Founded in 1937, the Institute serves children and adolescents suffering from disorders of the brain, spinal cord and musculoskeletal system. Kennedy Krieger provides health care, rehabilitation and educational services; conducts research on childhood disabilities; and provides training in caring for disabled children.

Kennedy Krieger's principal facilities are adjacent to the Johns Hopkins East Baltimore campus. The Institute also operates a private school for disabled children (grades K through 8) in East Baltimore; a high school for disabled students in the City's Greenspring neighborhood; and a school for grades 2 through 8 in Montgomery County. The Institute also operates several clinics in Columbia; and a program for military families in Odenton. In addition to its own educational programs, Kennedy Krieger supports special education through partnerships with public schools in Baltimore City and in 12 other counties in Maryland.

With research expenditures totaling nearly \$35.8 million in fiscal year 2017, Kennedy Krieger is a leading center for research on the causes, prevention and treatment of neuro-developmental disabilities. A significant portion of the Institute's research funding comes from sources outside Maryland. The Institute also provides specialized training for hundreds of medical, education and other professionals who come to Baltimore each year for specialized training in caring for disabled children. Many of the Institute's senior faculty members hold joint appointments at Johns Hopkins.

In the spring of 2017, the Kennedy Krieger Institute employed 2,640 people, with a payroll of \$143.6 million in fiscal year 2017.

Space Telescope Science Institute

The Space Telescope Science Institute (STScI) manages scientific research, education and public outreach programs for two NASA observatories:

- The Hubble Space Telescope (HST) was launched in 1990 and is still in use today. During that time, it has revolutionized diverse fields spanning the full gamut of astronomical research.
- Its successor, the James Webb Space Telescope (JWST), is scheduled for launch in 2021. JWST's science goals include answering some of our most fundamental questions about the universe – how galaxies and other objects formed in the wake of the Big Bang, how they evolve, etc.

STScI is also a partner with the NASA Ames Laboratory, the Jet Propulsion Laboratory and several other organizations in NASA's Kepler Mission, which is searching the galaxy for planets that are potentially capable of supporting life.

Founded in 1981, STScI – which is located adjacent to the Johns Hopkins Homewood campus – is managed by the Association of Universities for Research in Astronomy (AURA), a consortium of leading space research institutions, under a contract with NASA. Research spending at the Institute in fiscal year 2017 totaled \$156.6 million.

From the spring of 2014 through the spring of 2017, employment at STScI rose from 468 to 661 people – an increase of 44.2 percent. In fiscal year 2017, salaries and wages paid to STScI employees (94.5 percent of whom work full-time) totaled \$65.9 million.

Mount Washington Pediatric Hospital

Mount Washington Pediatric Hospital (MWPH) is a 102-bed hospital, located in northwest Baltimore, that provides inpatient and outpatient rehabilitation and other specialty services for children. MWPH was founded in 1922 as a children's convalescent home, and gained Joint Commission certification as a hospital in 1979.

Since 2006, MWPH has been jointly owned by and affiliated with the University of Maryland Medical System (UMMS) and Johns Hopkins. Along with its services in East Baltimore, the Johns Hopkins Pediatric Sleep Center operates a four-bed sleep testing center at MWPH.

In addition to its facilities in Baltimore, MWPH operates a 15-bed inpatient unit and provides outpatient services at Prince George's Hospital Center in Cheverly, Maryland (a member of the UMMS network). In the spring of 2017, MWPH employed 585 people, and had an annual payroll totaling nearly \$31.1 million in fiscal year 2017.

Lieber Institute for Brain Development

The Lieber Institute for Brain Development is a non-profit research foundation, founded in 2010, that focuses on abnormalities in brain development and their role in schizophrenia and other diseases. Its work includes:

- Basic research on the development of the human brain
- Clinical research aimed at developing new treatments for schizophrenia and related disorders that are rooted in a better understanding of the brain
- Development of new drugs to treat these diseases

The Institute's research spending in fiscal year 2017 totaled \$19.1 million.

The Lieber Institute's decision to locate in the City and its subsequent growth provide a notable example of the role that Johns Hopkins can play in attracting other not-for-profit research organizations to Maryland, and in supporting their growth. From a staff of 11 in 2010, the Lieber Institute has grown to a staff of 99 in the spring of 2017, with a payroll of more than \$9.9 million in fiscal year 2017.

Johns Hopkins Federal Credit Union

The Johns Hopkins Federal Credit Union (JHFCU) is a full-service financial institution founded in 1971. Membership is open to employees of Johns Hopkins University and the Johns Hopkins Health System, University students and alumni, employees of several Johns Hopkins affiliates (including the Kennedy Krieger Institute and the Carnegie Institution) and employees of several Johns Hopkins contractors, such as Broadway Services. Membership is also open to employees of several other Maryland educational institutions, including the Maryland Institute College of Art, Mount St. Mary's and Washington College; and to residents of certain Baltimore neighborhoods.

In addition to traditional credit union services, JHFCU partners with the University's Office of Work, Life and Engagement to provide emergency loans to employees, and with the School of Nursing and the Johns Hopkins Hospital to cover the up-front cost of tuition for Johns Hopkins nurses who receive tuition remission at the end of the semester.

As of the third quarter of 2018, JHFCU had 43,038 members, and assets totaling more than \$452 million. In the spring of 2017, JHFCU had 79 employees and a payroll of more than \$5.1 million in fiscal year 2017.

Carnegie Institution for Science, Department of Embryology

The Carnegie Institution of Washington, also known as the Carnegie Institution for Science, founded by Andrew Carnegie in 1902, is a Washington, D.C.-based independent non-profit research institute. Its Department of Embryology has long been affiliated with Johns Hopkins and has since 1960 been located on the University's Homewood campus. Today, Johns Hopkins graduate students in biology conduct research in Carnegie labs; Johns Hopkins and Carnegie faculty collaborate; and Carnegie scientists teach courses at the University. Many advances in developmental biology and genetics have emerged from this relationship.

In fiscal year 2017, the Department of Embryology spent \$11.0 million on research, and employed 75 people in Baltimore, with an annual payroll of nearly \$4.2 million.

Howard Hughes Medical Institute

The Howard Hughes Medical Institute, with headquarters in Chevy Chase, Maryland, is one of the country's leading independent, non-profit biomedical research foundations. Founded in 1953 by its namesake, industrialist Howard Hughes, the Institute seeks to develop a better understanding of some of society's most serious health problems, including heart disease, cancer, AIDS and diabetes. The Institute employs teams of senior scientists, post-doctoral researchers and graduate students in labs that are typically located on the campuses of leading U.S. research universities, including the Johns Hopkins campus in East Baltimore.

In fiscal year 2017, the Institute spent \$4.8 million on research conducted in East Baltimore, where it employed 46 people, with an annual payroll of \$4.1 million.

The impact of affiliated institutions

The seven institutions profiled above contribute substantially to Maryland's role as a leading center for health care, education, research and innovation. Collectively these institutions employed 4,185 people in the spring of 2017, with a combined payroll of nearly \$264.0 million and research expenditures totaling nearly \$227.4 million in fiscal year 2017.

Based on data provided by the institutions, we estimate that of these 4,185 employees, 4,042 – approximately 96.6 percent of the total – were residents of Maryland, including 1,914 (45.7 percent) who were Baltimore residents. We further estimate that approximately \$253.1 million in wages and salaries was paid to residents of Maryland by these institutions, including \$113.8 million paid to residents of Baltimore.

Table 31: Selected Johns Hopkins affiliates in Maryland: jobs, payroll and research spending, FY 2017 (payroll and research spending in \$000s)

Institution	Employees	Payroll	Research spending
Kennedy Krieger Institute	2,640	\$143,609.9	\$35,766.5
Space Telescope Science Institute	661	\$65,910.9	\$156,618.2
Mount Washington Pediatric Hospital	585	\$31,079.2	–
Lieber Institute for Brain Development	99	\$9,950.1	\$19,123.3
Johns Hopkins Federal Credit Union	79	\$5,132.2	–
Carnegie Institution/Embryology	75	\$4,187.5	\$11,052.0
Howard Hughes Medical Institute	46	\$4,107.3	\$4,833.2
TOTAL	4,185	\$263,977.1	\$227,393.2

Impact of spending by affiliated institutions

As with Johns Hopkins itself, the impact of the affiliate institutions' spending on payroll and purchasing goes beyond their role as major employers.

Using data provided by the institutions, we estimate that they spent nearly \$132.5 million on purchases of goods, services and construction in fiscal year 2017, of which nearly \$74.1 million was spent with Maryland-based vendors and contractors, including \$47.0 million with Baltimore-based vendors and contractors. Using IMPLAN, we estimate that this spending directly generated 423 jobs in Maryland (including 257 jobs in Baltimore) in fiscal year 2017.

In addition to the direct spending impact cited above, spending by the affiliates also generated indirect and induced impacts in Baltimore. As shown in Table 32, through the multiplier effect, we estimate that in fiscal year 2017, the seven affiliates' spending on payroll, purchasing and construction indirectly generated 1,583 jobs and \$304.3 million in economic output in Maryland, including 644 jobs and \$129.9 million in economic output in Baltimore.

In total (as shown in Table 32), we estimate that in fiscal year 2017, spending by the seven affiliates directly and indirectly generated:

- 5,087 jobs in Baltimore, with earnings totaling \$318.1 million
- Nearly \$440.9 million in citywide economic output

Statewide (including Baltimore), we estimate that in fiscal year 2017, spending by the seven affiliates directly and indirectly generated:

- 6,192 jobs in Maryland, with earnings totaling nearly \$376.4 million
- Nearly \$642.4 million in statewide economic output

Table 32: Direct, indirect and induced impacts of affiliated institutions' spending in Baltimore and Maryland, FY 2017 (earnings and output in \$000s)*

	BALTIMORE			MARYLAND		
	Jobs	Wages	Output	Jobs	Wages	Output
Direct spending impact						
Payroll	4,185	\$263,977.1	\$263,977.1	4,185	\$263,977.1	\$263,977.1
Purchasing/construction	257	\$17,796.4	\$46,967.9	423	\$28,293.9	\$74,093.3
<i>Subtotal, direct impact</i>	4,442	\$281,773.5	\$310,945.0	4,608	\$292,271.0	\$338,070.4
Indirect and induced effects						
Employee spending	529	\$29,239.6	\$110,943.2	1,352	\$70,587.2	\$266,916.1
Contractor and vendor spending	115	\$7,092.7	\$19,001.2	232	\$13,512.2	\$37,408.5
<i>Subtotal, indirect/induced impact</i>	644	\$36,332.3	\$129,944.4	1,583	\$84,099.4	\$304,324.7
TOTAL	5,087	\$318,105.7	\$440,889.5	6,192	\$376,370.4	\$642,395.1

*Most recent comparative financial data available for affiliated institutions.



Part Ten: Johns Hopkins' Future Economic and Community Impact

During the next five to ten years, changes in the environments in which Johns Hopkins operates are likely to provide multiple opportunities to expand the University's and the Health System's contributions to the economic vitality of the communities where they operate, both in Maryland and beyond. At the same time, the University and the Health System are likely to confront a number of challenges that could constrain their ability to contribute to the process of building a better future for the residents of these communities.

- Consistently ranked among the world's leading universities and health care institutions,²³ Johns Hopkins is well-positioned to keep attracting and developing the talented faculty, undergraduates, graduate and professional students, post-docs, residents, researchers and clinicians on whom the continued growth of an increasingly knowledge-based economy depends.
- The University's position as one of the world's leading research centers, the diversity of its research enterprise and its growing strength in cross-disciplinary research mean that it is similarly well-positioned to increase its external research funding. Johns Hopkins is particularly strong in several areas in which research spending is likely to keep growing during the next five to ten years, including biomedical, national security, energy, environmental, cybersecurity, space and autonomous systems research.

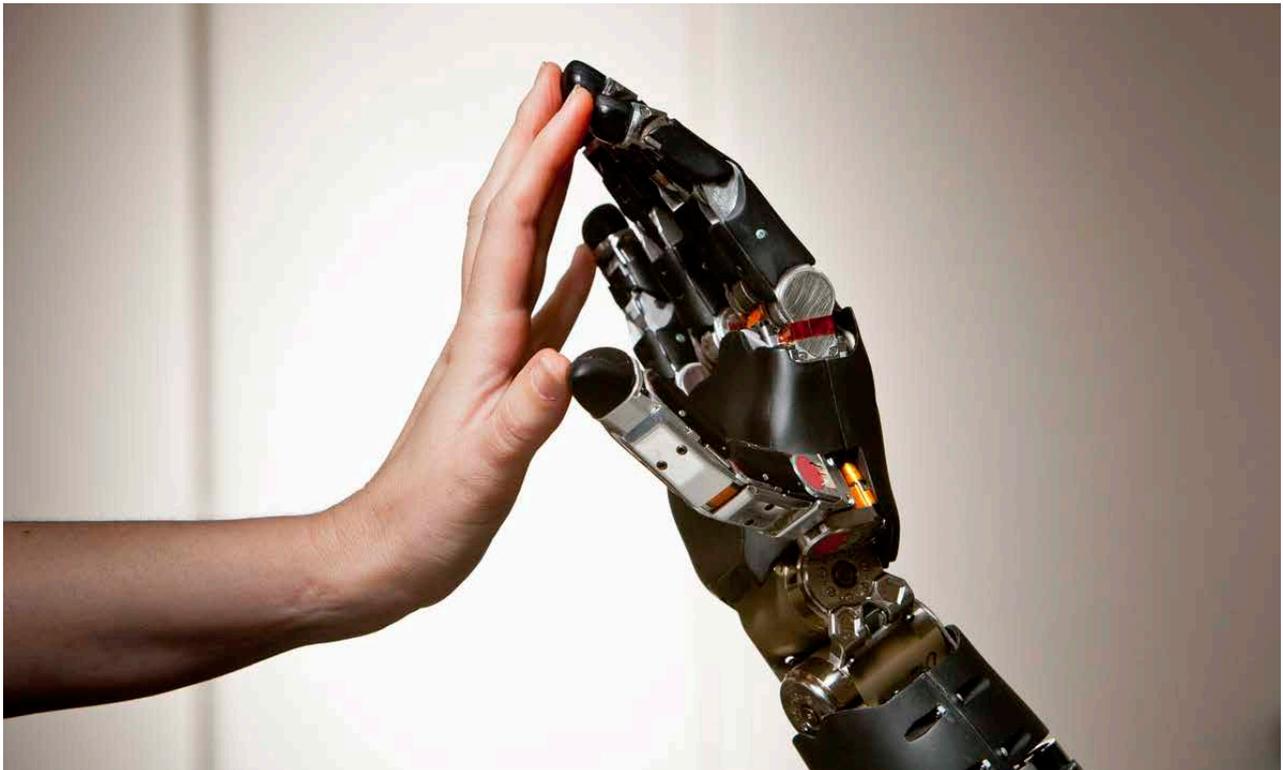
23. See, for example, The Times Higher Education World University Rankings 2019; and U.S. News and World Report, The Best Hospitals, 2018-19.

◀ [The Johns Hopkins Tutorial Project is an after-school tutoring program that provides academic support for elementary school students \(grades 1-5\).](#)

At the same time, however, the University's historic and continuing success in attracting federal and other external research support makes it particularly vulnerable to across-the-board cutbacks in federal funding. Such cutbacks could have a devastating effect on state and local economies.

The risk is not just that the federal government will reduce its direct spending on university research. Congress might be tempted to save money by reducing federal reimbursement for the "indirect" portion of university research costs – the cost of the buildings where federally-funded research is conducted, administrative overhead costs, etc. Johns Hopkins already absorbs some of these costs from its own resources; but it relies on the federal government to cover a portion of indirect costs as well.

If Congress were to reduce sharply the share of such costs that are covered by federal funds (as was proposed by the administration in 2017 and 2018), Johns Hopkins would have to scale back significantly on its overall research spending. Local communities, the State and the University have a shared interest in conveying to Congress the critical importance of maintaining federal support for university research.



A prosthetic hand and arm developed by APL can not only grab objects as a single movement but can wiggle fingers individually and independently of one another.

- Even as it remains firmly rooted in its local communities, Johns Hopkins' growing global role (described in Part Six) makes it one of the nation's most connected institutions. This combination of local roots and global reach means that both the University and the Health System are especially well-positioned to help residents, businesses and communities in Maryland, D.C. and Florida address the challenges posed (and the opportunities presented) by a process of global integration that, while under stress, is by no means exhausted. From Jhpiego, the Center for Global Health and Johns Hopkins Medicine International to the Applied Physics Lab to the School of Advanced International Studies, the Global MBA program and the Agora Institute, the resources Johns Hopkins offers can help its home communities play a leading role in addressing global problems and opportunities.
- As noted in Part Seven, Johns Hopkins has in the past five years greatly broadened and deepened its support for innovation and entrepreneurship. This effort is already paying off, both for the University and for Maryland; and over the next five years the payoff is almost certain to increase. The challenge now for both the University and the State is to build on the progress they have made, and to solidify Maryland's place as one of America's leading centers of innovation. Johns Hopkins can contribute to this process by:
 - > Increasing over time the funding it provides for translational research – the additional work that is often needed before even the most promising concepts and technologies can begin to attract outside funding
 - > Expanding alliances such as those it has forged with Bayer Health and Deerfield Management, aimed at accelerating the commercialization of promising new treatments and technologies
 - > As it has already done with its Social Innovation Lab, at Sibley Memorial Hospital's Innovation Hub, and on the University's Montgomery County Campus, gradually making the resources of the expanding Johns Hopkins entrepreneurial ecosystem more widely available to innovators and entrepreneurs from its local communities
- Despite some real progress during the past decade, the U.S. has still not succeeded in balancing the goals of expanding access to health care, improving its quality and reducing its costs. While there is no easy answer, it has become clear that innovation – in health care technology, delivery, management and financing – is probably the one essential requirement for achieving all three of these goals.

Few if any U.S. health care systems are as well-positioned as Johns Hopkins to address this challenge.

 - > Johns Hopkins HealthCare has already shown that innovations in how health care is financed and delivered can be used both to improve quality and reduce costs
 - > Services such as those provided by the Health System's Technology Innovation Center have made it possible for front-line clinicians and administrators to become actively engaged in the process of transforming the system from the bottom up
 - > Sibley Memorial Hospital's Innovation Hub and its Ward Infinity project have broken new ground in making residents of the communities the Hospital serves active participants in the process of reinventing health care

- > With world-leading schools of medicine, nursing, and public health, and leading programs in biomedical engineering and health systems management, the University can play a central role in preparing the next generation of leaders in health care innovation

To the extent that Johns Hopkins can succeed in simultaneously achieving greater efficiency, higher quality and lower cost, the communities it serves – in Maryland, D.C., Florida and beyond – will benefit.

- Investments by Johns Hopkins such as those described in Part Eight will make the neighborhoods in which it operates more attractive places to live, work and do business, and will create new opportunities for residents of those neighborhoods. To maximize its return on those investments, Johns Hopkins should continue to broaden and deepen its local partnerships – with local governments, with local institutions and organizations, with the business community and with neighborhood residents.

Especially important will be partnerships aimed at addressing problems of crime and drug abuse; improving the quality of local schools; and expanding educational, workforce development and job opportunities for neighborhood residents – especially those (such as justice-involved persons) who face serious barriers to employment.

- The \$1.8 billion gift from Michael Bloomberg described in Part Three, which has enabled the University to adopt a policy of need-blind admissions, is already helping to make a Johns Hopkins education accessible to many more low- and lower-middle-income students. However, the barriers that these students face are often not just financial. Johns Hopkins can use its adoption of need-blind admissions as an opportunity to address the full range of problems that lower-income students so often confront in their pursuit of a high-quality education. This could, for example, entail:

- > Stepping up efforts to recruit qualified students from low-income families – both in Maryland and elsewhere
- > Providing a full range of support services aimed at helping students adjust to the demands of college life
- > Providing on-campus or near-campus jobs to students who need them
- > Raising funds to help ensure that lower-income students are able to take advantage of all the opportunities that Johns Hopkins offers – from internships to summer research projects to studying abroad

Efforts such as these can help Johns Hopkins increase significantly the number of lower-income students who attend and succeed at the University – and in doing so, set a standard for other leading universities.

While the challenges outlined above may seem daunting, there are very few institutions – in the U.S. or elsewhere – that are as well-equipped and as willing to take them on as is Johns Hopkins. The unmatched combination of human, intellectual, institutional and economic resources that the University and the Health System offer – and their commitment to using those resources to serve the common good – bode well for the future of the communities they call home.



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