

**Fiscal Year 2020
Budget Submission to the
Office of Management and Budget
November 2018**

njit.edu



**NEW JERSEY INSTITUTE OF TECHNOLOGY
FY 2020 BUDGET REQUEST**

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SECTION 1

PRESIDENT'S STATEMENT

NEW JERSEY INSTITUTE OF TECHNOLOGY
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PRESIDENT'S STATEMENT



New Jersey Institute of Technology (NJIT) is our state's public STEM university and is one of only 32 polytechnic universities in the United States. We presently are ranked by *U.S. News and World Report* as a top-50 public national university and are the #1 school in the nation for the upward economic mobility of its low-income students, according to *Forbes* and the Equality of Opportunity Project. NJIT pursues a four-pronged mission that includes education, research, economic development, and service. We enroll more than 11,500 students annually in bachelor's, master's, and doctoral degree programs; conduct approximately \$162 million in research activity; and generate an economic impact of more than \$1.74 billion on the State of New Jersey each year. Our academic and research programs are closely aligned with the computing, engineering, and life sciences clusters identified in the *State Strategic Job Growth Plan*, and our research recognizes the need to bring technology and the sciences to bear on in ways that will improve quality of life and spur economic growth. Below are just a few examples of NJIT's success in pursuing each pillar of its mission.

Education

- NJIT saw its undergraduate applications increase by 12 percent between 2017 and 2018. Applications also grew by 33 percent among out-of-state students. The average SAT score for 2018 applicants was 1289 out of 1600. Applications for NJIT's Albert Dorman Honors College increased by 16 percent during the same period, and applicants had an average SAT score of 1476 out of 1600.
- NJIT has hired approximately 130 new faculty during the past 7 years.
- NJIT's undergraduate student population is 35% white/Caucasian, 22% Asian, 21% Hispanic, 8% black/African American, 5% international, and 3% multi-racial. The gender distribution of undergraduates is 26% female and 74% male, and about 95% of undergraduate students are from New Jersey.
- Retention rate currently is 88%, up 4% since 2014
- Graduation rate currently is 64%, up 5% since 2014
- NJIT's Educational Opportunity Program (EOP) educates and graduates more than 100 engineers each year from underrepresented populations. NJIT's graduation rate for EOP students in the STEM majors exceeds the national average and ranks NJIT among the top universities for graduating minority engineers in the nation.
- There is tremendous demand for employees in the STEM fields. In fact, the *Wall Street Journal* noted that there are 1.3 million STEM jobs available each year and only 600,000 new graduates in the STEM fields.
 - NJIT students continue to be in great demand, averaging nearly three job offers in hand by graduation with starting salaries that exceed the national average by almost 20%.

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Research

- NJIT conducts approximately \$162 million of research activity annually.
- NJIT is a global leader in such fields as critical infrastructure, pharmaceutical manufacturing, data analytics, solar research, nanotechnology, resilient design, tissue engineering, exoskeleton development, and cybersecurity, among others.
- NJIT is a major producer of intellectual property with 220 unexpired patents, 60 pending US non-provisional patent applications, and 37 pending US provisional patent applications.
- Four NJIT faculty members received NSF CAREER Awards during the 2017-2018 academic year.
- NJIT developed the world's leading solar telescope at its facility in Big Bear, CA.
- NJIT has more than 50 research centers.
- In recent years NJIT has placed in the top 20 nationally for industrial contract dollars per federal research dollar and fourth in the country for disclosures per dollar of federally sponsored research, the only New Jersey University in the top 20 for either designation.

Economic Development

- NJIT generates an economic impact of more than \$1.74 billion on the State of New Jersey each year.
- The New Jersey Innovation Institute (NJII) was incorporated to serve as the focal point for NJIT's technology and economic development initiatives. NJII is organized around i-Labs that overlay the State's target industrial clusters: Healthcare Systems, Biotechnology and Pharmaceutical Production, Defense & Homeland Security, Civil Infrastructure and Financial Services. Since its inception, NJII has grown its annual revenues to more than \$80 million and secured multi-million-dollar contracts with the Department of Defense, JP Morgan Chase, Osler Health IPA, and has funded corporate support from Panasonic, AECOM, Berger International, Cisco, and Torcon.
- NJIT is home to the largest technology and life science incubator in the State of New Jersey. The Enterprise Development Center (EDC) helps start-up and expansion companies commercialize and grow their innovative ideas by providing office and lab space, access to scientific and technological equipment, financial guidance and extensive technical/coaching advisory services, ultimately creating businesses that generate jobs and bolster the state's economy.
- With support from the State of New Jersey, Makerspace at NJIT was launched in 2018. Makerspaces are a significant educational, research and economic development tool, and the NJIT Makerspace is the largest one serving the State of New Jersey. Makerspaces enable hands-on, project-based learning complemented by training on industrial equipment, development of prototyping skills and experience with modern manufacturing technology. Students learn real world, tangible skills that prepare them to enter the workplace and take leading roles in manufacturing and product

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development. NJIT's Makerspace also is available to NJIT's industry partners and incubator companies.

- NJIT has provided corporate training and professional development programs for more than 76,500 employees and residents at 665 New Jersey companies since 1990.
- We are in the midst of a \$400+ million campus transformation, having added 1 million square feet.

Service

- NJIT's Center for Pre-College Programs builds New Jersey's STEM pipeline by annually working to encourage and prepare 4,000 pre-college students who are predominantly underrepresented females and minorities from greater Newark area and northern New Jersey to pursue education and careers in the STEM disciplines.
- Volunteerism is a mainstay at NJIT, with students and faculty engaged in a range of initiatives to better the community. Such efforts, amounting to more than 60,000 hours of community service over the past year alone, have been recognized both nationally and locally.
- The university has made the President's Higher Education Community Service Honor Roll, "one of the highest recognitions a university can receive for its commitment to volunteering, service-learning and civic engagement," six times.

Fiscal Year 2020 State Budget Requests

NJIT submits this annual budget request in support of its efforts to provide STEM (science, technology, engineering, math) as well as design and other educational programs that produce the workforce necessary to sustain and grow New Jersey's economy and to pursue innovations that improve the quality of life by addressing our most challenging problems. Aware of New Jersey's financial demands, we limit our FY 2020 budget requests to three priorities that will increase STEM enrollments, support innovation, and drive economic and workforce expansion.

- NJIT is requesting 126 additional State Authorized FTEs to provide the proper support services for our growing and evolving student body. We also ask for the State to recognize and include our UCAN Teaching/Research Graduate Assistants, which currently total 340 and equate to 195 FTEs. Fulfillment of these requests would bring NJIT's State Authorized FTE count to 1,508, an increase of 321 above its current total.
- NJIT is requesting \$1,030,000 to address an identified gap in need-based aid for undergraduate, in-state students as well as transfer students. These are students with financial hardships requiring additional aid to close the gap between unmet tuition and fees greater than \$500 but less than \$5,000 after federal, state and institutional aid. Analysis has shown that such funding likely will increase retention rates by 5 percent (regular admits) and 7 percent (transfer students), with similar increases to follow in the four- and six-year graduation rates of this student population.

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- NJIT requests \$9,000,000 in funding for Phase-2 of a medical devices innovation cluster and technology development ecosystem for New Jersey's life sciences industry. Phase-2 of this initiative will expand a newly renovated basic infrastructure facility to include system integration and testing facilities with critically needed advanced equipment to complete the development of the medical devices innovation cluster.

Justification for New Jersey Institute of Technology FY 2020 Budget Requests

Increase in State Authorized FTE Positions

In FY 2009, after a detailed review of NJIT authorized positions by the New Jersey Office of Management and Budget, the State increased NJIT's state-authorized FTE count to 1,246 (95% of 1,313 requested). During the FY 2011 State budget process, the authorized FTE count was reduced to 1,187, a decrease of 59, or 4.7%. Since that time, NJIT has realized significant growth in enrollment, research activity, and economic development activity. Total operations have grown from \$281.9 million in FY 2011 to \$545.2 million in FY 2019, an increase of \$263.3 million, or 93.4%. Total student headcount has increased from 11,812 in FY 2011 to 14,522 for FY 2019, a growth of 23%.

In order to provide the proper support services for our growing and diverse student body, NJIT's FY 2020 budget request includes 126 additional professional staff FTEs, many of which will be rolled out as academic advisors, financial aid specialists, counseling center staff, disability services professionals, lecturers and student life staff. The ability to provide the right support for our students will continue to improve retention and graduation rates, which are key metrics for both NJIT and the State's higher education system as a whole. Additionally, supplemental staff positions are required to support NJIT's robust industry partnerships and to enable the expansion of such efforts that create research and development opportunities for technological solutions to our society's most pressing challenges.

NJIT also is requesting recognition of our UCAN Teaching/Research Graduate Assistants, which currently total 340. These doctoral students work 20 hours per week and would equate to an additional 195 FTEs. Therefore, NJIT asks that its State Authorized FTE count be increased to 1,508, an expansion of 321 above our current 1,187 FTE count.

<u>Priority Request</u>	<u>FTE</u>
Professional Staff FTEs	126
UCAN TA/RA Grad Assistant FTEs	195
Total State Authorized FTE Increase	321

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Need-Based Retention Awards

There is an unmet obligation at NJIT for need-based aid for undergraduate, in-state students and transfer students. These are students with financial hardships requiring additional aid to close the gap between unmet tuition and fees greater than \$500 but less than \$5,000 after federal, state and institutional aid. An analysis of the entering freshman class data revealed that, for students with a remaining need greater than \$500 but less than \$5,000, the first-year retention rate was five percentage points below that of freshmen with a remaining need of less than \$500. Consequently, this gap persisted and, in fact, grew by those students' junior year. The earlier we are able to provide financial assistance to this population, the greater the impact of those dollars in improving the likelihood of retention and timely graduation from NJIT with reduced student debt. For this reason, NJIT is requesting funding to support need-based retention scholarships totaling \$750,000 to meet the identified student need. A similar but larger persistence gap has been identified among entering transfer students. On average, students with a remaining need gap of between \$500 and \$5,000 have a 1-year retention rate of seven percentage points below their peers. This gap remains consistent when 2-year retention rates are considered. The cost of filling the need gap for this population of transfer students is estimated at \$280,000.

With a total cost of \$1,030,000 to support all students (regular and transfer admits) in their first and second year of studies, this request aims to increase retention rates by 5 percent (regular admits) and 7 percent (transfer students), with similar increases to follow in the four- and six-year graduation rates of this student population.

<u>Priority Request (\$000's)</u>	<u>Total \$</u>
Regular Admitted Students	\$750
Transfer Admitted Students	\$280
<u>Total</u>	<u>\$1,030</u>

Medical Devices Innovation Cluster: A Technology Development Ecosystem for New Jersey's Life Sciences Industry (Phase 2)

NJIT received partial funding support from the State of New Jersey in FY 2019 to develop a medical devices innovation cluster as Phase-1 of the Technology Development Ecosystem for New Jersey's Life Sciences Industry. The Phase-1 funding has enabled the ongoing renovation and repurposing of NJIT's Microelectronics Research Center (MRC) to provide the necessary

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basic infrastructure facility for fabrication of microelectronic and microfluidic devices and sensors.

This Phase-2 proposal, submitted by New Jersey Institute of Technology, is to further expand the newly renovated basic infrastructure facility to include system integration and testing facilities with critically needed advanced equipment to complete the development of the medical devices innovation cluster. The proposed innovation cluster as a model for economic growth will yield a transformative solution addressing a two-part problem:

1. The need for the New Jersey medical device industry to innovate in order to grow;
2. The need to develop point-of-care technologies for high risk patients and the elderly in order to improve care and lower costs.

New Jersey's Life Sciences Industrial cluster has a total economic impact of nearly \$110 billion, representing a quarter of New Jersey's gross domestic product. The Medical Device sub-sector includes 700 companies responsible for 65,000 direct and indirect jobs in the state. Big pharmaceutical companies that market directly to consumers may be better known, but New Jersey's med-tech firms are no less dominant in global markets. Johnson & Johnson, founded in New Brunswick in 1886, and Becton Dickinson, established in East Rutherford in 1897, launched med-tech as a US industry, and their annual revenues are among the top five in the world. Other major brands now in New Jersey include: Abbott Laboratories, Honeywell International, Inc., Integra Life Sciences, Micro Corp., Oticon, Inc., Roche Molecular Systems, Inc., SafiloUSA, Inc., Sivantos, Inc., and Stryker Orthopaedics. The medical device industry is diverse, spanning medical electronics and equipment, surgical supplies, prosthetics, and diagnostics. Comprised of primarily manufacturing firms, the medical device industry provides employment across a wide range of skill levels, with jobs in this sector paying twice the statewide average.

New Jersey's Life Sciences sector has long been the envy of other states and is increasingly the target of their business attraction efforts. Changing business models and the emergence of disruptive technologies dilute some factors that have kept this industry rooted in New Jersey for over a century. States seeking to poach New Jersey companies have recognized these trends and are creating conditions for business success that will prove to be attractive. New Jersey needs to respond in kind to anchor this industry and all of the positive contributions it makes to the state economy.

Some of the most exciting and challenging recent developments in medical devices are the point-of-care technologies that provide monitoring and specific diagnostic testing at home to improve patient care, therapeutic intervention, and rehabilitation, specifically for high-risk patients and elderly individuals living alone. Using devices networked with electronic healthcare record (EHR) systems, point-of-care technologies can alert healthcare providers in real time regarding changes in a patient's condition, allowing for immediate interventions and follow-up to reduce hospitalization, improve patient outcomes, and deliver precision medicine for maximal efficacy¹. This is of particular concern for New Jersey, where healthcare is a critical issue that carries with it a high societal and economic impact. According to the NJ Department of Labor

¹ <https://allofus.nih.gov/>

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and Workforce Development's recent study ², the elderly population (65 & over) in New Jersey is projected to grow by 62% between 2010 and 2030, accounting for 19.9% of the state's total population in 2030 (up from 13.5% in 2010). At the same time, a recent study on healthcare costs published by the *Journal of the American Medical Association* finds that healthcare spending in the United States rose nearly \$1 trillion between 1996 and 2013³. The leading factor in this increase was the growing elderly population.

The task of keeping Life Sciences companies rooted in New Jersey while also addressing the state's increasing health care needs is a complex problem. One solution is the development of a medical devices innovation ecosystem that would facilitate the efforts of both large and small companies in innovating, developing, and commercializing technologies in the medical device sub-sector. Such an ecosystem would serve to anchor existing Life Sciences companies in the State of New Jersey, attract small to medium enterprises from other states, and support startup companies seeking to enter the medical device and technology market (see Appendix A for additional details).

However, there are three significant barriers to building a corporate-driven innovation ecosystem for the medical device industry. The first *barrier* is generic to any cluster – it is difficult to assemble a critical mass of new businesses in any technology area such that a given original equipment manufacturer (OEM) will find a useful and willing partner. The second *barrier* reflects the expense of any proposition seeking to nurture new companies from inspiration to profitability. While the first barrier makes it difficult for even large companies to sustain captive incubator programs, the second has caused many of the state's incubators to fold under the cost of operating a facility as a public good. The third *barrier* is specific to technology-rich product sectors. Fabrication of working prototypes and early stage commercial products, particularly medical devices, takes a daunting investment in specialized equipment that is beyond the capacity of a start-up or small company to bear.

For example, many OEMs have tried to solve the innovation pipeline by creating their own start-up clusters. Johnson & Johnson started multiple J-Labs across the country, Celgene plans an incubator in Summit, Wells Fargo launched its fin-tech Startup Accelerator in San Francisco, and Barclay's announced a similar venture in New York. All of these companies recognize the value of co-location and densification around a common end market. What they are learning, however, is that even with a single application focus, the cost of running such an enterprise is greater than the value of deal flow for the single company running the incubator/accelerator. At the same time, the traditional supply chain model is rapidly changing as large firms find themselves without the internal resources to master emerging technologies. New advances such as nano-systems, materials, sensors, machine learning, and advanced robotics are revolutionizing medical devices of all types; however, these technological advances fall outside the core competency base upon which most companies have relied over the last century. In order to embrace change without bearing all of the developmental risks, large companies increasingly rely on small companies to mature new technologies to readiness for

² <http://lwd.dol.state.nj.us/labor/lpa/content/njsdc/2013WU%20PopLFProj2030.pdf>

³ <https://jamanetwork.com/journals/jama/article-abstract/2661579?redirect=true>

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commercialization. Thus, the old supply chain model is giving way to a new innovation network model that relies on increased intimacy between technology developers and commercializing firms in the form of partnerships formed at the earliest stages of ideation.

On the other hand, the small to medium enterprises (SMEs) upon which large companies rely for innovations consist of companies of fewer than 500 employees, representing 99.7% of US employer firms and accounting for more than 60% of all employment. New Jersey's medical device sector reflects those statistics. Even with the presence of so many global leaders in the state, the average company size is less than 50 employees, and companies of this scale and orientation have never possessed the resources to maintain and equip dedicated R&D facilities, let alone the advanced material synthesis and characterization, nano-structuring, and micro electro-mechanical device fabrication equipment that is required for medical device innovation – expensive, specialized equipment. Such demands are beyond the capabilities of most SMEs, making them particularly vulnerable to dramatic shifts in the technology base for their sector and creating a tension between the need to innovate and the tools required to do so.

The public-private model proposed here addresses these difficulties by using the target market focus to attract a critical mass of related small to medium sized enterprises (SMEs), but offers them to all the companies of a sector, not just a single enterprise. As such models are in their infancy, there is an opportunity for New Jersey to take a lead in pro-actively forming and sustaining public-private innovation clusters that secure the state's Life Sciences industrial base – this proposal addresses an approach to accomplish that end.

With its expertise and history in the Life Sciences industry, New Jersey is well positioned to take the initiative in developing a public-private medical devices innovation cluster with the New Jersey Institute of Technology (NJIT), the state's premier public polytechnic institution, as its partner. NJIT is uniquely qualified to work with the state in developing the medical devices innovation cluster, particularly given the university's mission of economic development. NJIT will focus its full array of technology business services to expedite the nucleation, acceleration and maturation of medical technologies. It will provide access to advanced prototype fabrication, characterization and analytic equipment to support innovators. Finally, it will make available its talent pool of faculty researchers and well-trained students to support the needs of this sector, a sector that will become a hub in NJIT's Enterprise Development Center, a motivation for expanding university investment in analytic and fabrication equipment, and a theme for new faculty recruitment and for creation of related instructional programs addressing workforce needs.

NJIT has a long history of supporting technology business incubation. Its Enterprise Development Center (EDC), opened in 1989, is the state's oldest and largest such operation, having grown to 95 companies in residence that generate \$145 million in total output for the state, supporting roughly 910 jobs and creating \$3.4 million in tax revenues for New Jersey. The business initiation and growth services provided by the EDC result in a 5-year post-graduation persistence rate of over 85% - significantly higher than the national average of under 50%.

In 2014, NJIT formed the New Jersey Innovation Institute (NJII) to execute the university's technology based economic development mission. NJII has developed cluster

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formation and growth services as part of its “innovation as a service” suite. These services are designed to build and grow business clusters around NJIT’s core market verticals and connect these clusters to anchor industries through agile strategy sessions, open innovation challenges, shared technology development partnerships and supply chain initiatives. As an example, a JP Morgan Chase \$3M Small Business Forward grant supported the NJIT Health IT Connections program that guided over 100 companies in the last three years to achieve 46% annual revenue growth and over 40% annual employee growth as a result of the cluster building activities.

The proposed medical devices innovation cluster will be supported by an NJIT-NJII-EDC Technology Translation Ecosystem (TTE), a hub that will facilitate innovation by providing expertise and resources in advanced materials, sensors, communications, and machine intelligence – that is, technologies that stand to revolutionize medical devices of all types. NJIT would provide companies in the cluster with expertise in related research areas, drawing on the more than 50 faculty and researchers from at least ten NJIT departments already engaged in ongoing research projects in the following areas:

- Biomaterials, Scaffolds and Tissue Engineering
- Biosensors and Labs on a Chip
- Biosensors, Wearable Biosensors, and Point-of-Care Technologies for Monitoring and Therapeutic Intervention
- Polymers and Membrane Technologies
- Particle Engineering and Particulate Composites
- Advanced Materials and Nanotechnologies
- Artificial Intelligence (AI) and the Internet of Things (IoT)

Equipment providing advanced research and technology development capabilities focused in the fields of biomedical engineering and materials science and engineering would be available to member companies of the medical devices innovation cluster through NJIT’s new Life Sciences and Engineering Center (LSE) that features state-of-the-art materials-characterization equipment including a Scanning Electron Microscope (SEM), a Tunnel Electron Microscope (TEM) and an X-ray Diffraction (XRD) Spectroscopy. The laboratory space in the LSE Center is further designed to foster collaborative research in biomaterial, biosensor and tissue engineering through its open lab design. (The first and second floors of the LSE have wet lab-based open research space. An additional unfinished laboratory space of over 10,000 square feet is available on the third and fourth floors.) With the current Phase-1 and new Phase-2 funding, renovations to the former NJIT Microfabrication Research Center would additionally provide micro- and nano-fabrication facilities for the development of semiconductor and microfluidic sensors and devices.

In summary, through the development of a Medical Devices Innovation Cluster and the NJIT-NJII-EDC Technology Translation Ecosystem (TTE) Center, NJIT would lead New Jersey’s efforts to accelerate the innovation and translation of point-of-care medical devices and healthcare applications. The TTE Center would provide infrastructure support, foster the development of interdisciplinary clusters of research expertise, and promote collaborations among the stakeholder groups including innovators, developers, entrepreneurs, investors and

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users. The TTE Center will foster a new model of innovative translational research that will leverage technological expertise from academia, industry, and federal and regulatory agencies to target unmet healthcare needs with a high societal impact. The ecosystem will target transformative improvements in diagnostics and treatments for complex diseases and medical conditions that could not be met by researchers working alone, but instead require close collaborations among innovative engineers, scientists, clinicians, and implementation experts. In the long run, the Medical Devices Innovation Cluster and TTE Center will provide not only improved healthcare outcomes and reduced healthcare costs but also rapid growth in New Jersey's economy, opportunities to attract students and researchers to the state through cutting-edge healthcare expertise, and the generation of new healthcare-related STEM jobs in the state.

Phase-1 Funding Report for the Development of Medical Devices Innovation Cluster

NJIT submitted the original proposal for the development of a Medical Devices Innovation Cluster and Technology Translation Ecosystem (TTE) Center in February 2018 with a total budget request of \$12.5 million. The original proposal was well received but partially funded for \$3.7 million. The Phase-1 funding has enabled NJIT to support ongoing renovation and repurposing of the previously decommissioned Microelectronics Research Center to provide a state-of-the-art cleanroom class 1000 facility for the fabrication of micro- and nano-electronic devices along with a basic microfluidic sensor fabrication facility. This renovation was budgeted for \$3 million in the original proposal. With the current Phase-1 funding of \$3.7 million, NJIT is completing the renovation with the purchase of basic photolithography equipment required to develop micro- and nano-electronic devices and sensors. The following table shows the assignment of \$3.7 million Phase-1 funds.

Summary of Phase-1 Funding for Infrastructure for
Prototype & Manufacturing Technology

<u>Phase-1 Funding Received (\$000's)</u>	<u>Total \$</u>
Microelectronics Research Center Renovation for Medical Device Fabrication	\$3,000
Medical Device Fabrication Infrastructure: Phot-Lithography Equipment	\$700
<u>Total</u>	<u>\$3,700</u>

Budget Justification for Phase-2 Medical Device Fabrication Infrastructure

Micro & Nano Device Fabrication

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The use of micro-electronic cleanroom technology to fabricate functioning micro-electro-mechanical systems (MEMS) has increased in sophistication, facilitating its applicability to med-tech. Even more recently, researchers at NJIT have demonstrated practical applications of nano-technology to assemble implantable fuel cells deriving power from the sugars metabolized in the blood stream, and probes making measurements on single cells. Work like this requires access to highly specialized equipment in sterile facilities that are expensive to maintain. NJIT has maintained a class-10 cleanroom since 1990 that needs a technology boost to support technologists working on the forefronts of device technology.

Such new micro- and nano-fabrication technologies would be enablers for the development of medical sensors and devices. These sensors and devices include MEMS (Micro-Electro-Mechanical Systems) and Microfluidics systems such as Lab-on-a-Chip. Smart medical devices with specific biomarkers can sense, monitor and control physiological processes with embedded communications connected to medical information systems and servers to support point-of-care diagnostics and therapeutic intervention. Such smart connected sensors and devices with advanced data analytics and artificial intelligence (AI) algorithms are expected to transform medical device industry and the practice of medicine. With the proposed TTE Center, medical sensors and devices will be prototyped, tested and characterized with data communication protocols through advanced IT and Internet of Things (IoT) technologies. The ability to design and build prototype smart medical sensors and devices that reflect the latest technologies in each of these areas is critical to rapidly growing the medical devices startup industry from concept to commercial operation. The proposed prototype building facility will also reduce the risk to investors when considering early stage med-tech companies.

This Phase-2 proposal therefore requests funds to complete the renovation the current Microelectronics Research Center to develop advanced micro- and nano-device fabrication technologies and build a new Microfluidics Sensor Fabrication Laboratory to develop biomarkers-based medical sensors such as Lab-on-a-Chip for detection of HIV and other infectious diseases as well as specific types of cancers. An itemized budget for fabrication infrastructure for micro/nano electronic and microfluidic sensors and devices is attached in Appendix B.

Advanced Prototyping, Machining & Additive Manufacturing

Small companies do not have the resources to equip, maintain and operate prototyping centers that can take an idea from blueprint to execution. Leveraging university investments in such resources to support instructional and scientific research needs is the proposed solution to this problem. NJIT's recently opened Makerspace is designed to support academic and commercial use. The current suite of metal-working and additive manufacturing technologies includes a spectrum of advanced 3-D printing and machining technologies suitable for building small to micro-scale prototype devices efficiently and economically.

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Summary of Phase-2 Budget Needs for Infrastructure for Prototype & Manufacturing
Technology

<u>Priority Requests (\$000's)</u>	<u>Total \$</u>
Medical Device Fabrication Infrastructure Requirements	\$3,500
<u>Total</u>	<u>\$3,500</u>

Medical Device Characterization, Testing and Analytics Infrastructure

As medical device technology moves from the macro- to micro- and even nanoscales, it is necessary to be able to view both the device and its performance in situ using various forms of advanced imaging equipment. NJIT's new Integrated Life Sciences and Engineering Center expands the university's complement of leading-edge analytical tools to include a High-Resolution Tunnel Electronic Microscope, a Scanning Electron Microscope (SEM), an Atomic Force Microscope (AFM), a 2-Photon Fluorescence Microscope, an NMR Spectroscope, and a Raman Spectroscope for advanced material characterization. However, additional equipment including an FTIR Spectroscope, a Confocal Microscope, an Epifluorescent Imaging Microscope System and an Electrochemical Microprobes necessary for testing and characterization of micro/nano electronic and microfluidic sensors and devices are requested. The proposed set of tools would be critical for the validation and translation of medical sensor and device technologies that address unmet needs for the robust growth of medical device companies in New Jersey. An itemized budget for medical device characterization and analytics infrastructure is attached in Appendix B.

Summary of Budget Needs for Infrastructure for Medical Device Characterization and
Analytics Infrastructure

<u>Priority Requests (\$000's)</u>	<u>Total \$</u>
Medical Device Characterization and Analytics Infrastructure Requirements	\$1,500
Life Sciences and Engineering Building 3rd Floor Renovation for Medical Device Characterization and Analytics	\$3,000
<u>Total</u>	<u>\$4,500</u>

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Faculty Seed Grants for Technology Translation to Market and Acceleration to Commercialization

The proposed medical devices innovation cluster and TTE will help identify and facilitate interdisciplinary collaborative teams fostering a path of technology translation along the healthcare innovation cycle. As the NJIT-NJII-EDC ecosystem brings these groups of researchers, developers and stakeholders together, the following types of collaborative projects would be promoted and funded in acceleration of the innovation cycle:

- **Early Innovation Translation and Proof-of Value Projects** will include collaborative pilot projects to demonstrate proof-of-concept/principle for improving patient care that typically involves devices, procedures, and diagnostic systems for existing medical fields and practices. The objective is to scientifically explore a novel idea by showing early-stage proof of concept, thereby justifying advancement to the proof-of-value stage to generate a viable candidate for further pre-commercial development. At this stage, all risks associated with the target device must be recognized and addressed directly. The collaborative project will investigate existing medical fields and practices, and show the clinical value for the unmet healthcare need in order to license the technology or to receive additional funding for prototyping, technical de-risking, or early-stage clinical studies. This would be pursued through technology research clusters at NJIT working with market research clusters and stakeholder groups.
- **Commercial Accelerator Projects** will focus on business plan development and technology transfer to an existing company or forming a new start-up company establishing market channels. These projects, often called incubation stage, include advanced clinical studies and trials for validation of potential impact on patient care. The projects typically require investment and/or business development expertise to attract interest from an entrepreneur or commercial entity for licensing and commercialization. This will be pursued with the resources available at NJIT, NJII, partner institutions, EDC, and NJIT Highlander and other angel investor groups.
- **Advanced Translation and Commercial Growth Projects** will involve technical, medical, and business development experts in the development and implementation of regulatory, random clinical trials, and medical practice adoption plans to demonstrate potential transformational changes in healthcare for further investment funding and large-scale commercialization. This will be pursued with the resources available at NJIT, NJII, partner institutions, EDC, and NJIT Highlander and other angel investor groups.

NEW JERSEY INSTITUTE OF TECHNOLOGY
FY 2020 BUDGET REQUEST

PRESIDENT'S STATEMENT

Summary of Budget Needs for Faculty Seed Grants for Technology Translation to Market and Acceleration to Commercialization

<u>Priority Requests (\$000's)</u>	<u>Total \$</u>
Early Innovation Translation and Proof-of Value Projects	\$250
Commercial Accelerator Projects	\$250
Advanced Translation and Commercial Growth Projects	\$500
<u>Total</u>	<u>\$1,000</u>

Infrastructure for Acceleration of Technology Translation for New Start-Ups and Workforce Development

The most critical aspect of training future leaders and innovators in establishing new startup companies as well as growing new startups is to provide them an accelerated translation to market experience. The proposed TTE Center will provide an integrated experience to owners of potential new or recently established startups to help them navigate through the translation pathway from innovation to market. NJIT has effective graduate courses and certificate programs in entrepreneurship and business and risk management. A cohort of applicants would be provided entrepreneurship training with the objective of scientifically de-risking a novel idea showing early-stage proof of concept, and then proceeding on to the proof-of-value stage to establish a viable start-up for further pre-commercial development with investment funding.

NEW JERSEY INSTITUTE OF TECHNOLOGY
FY 2020 BUDGET REQUEST

PRESIDENT'S STATEMENT

Full Request

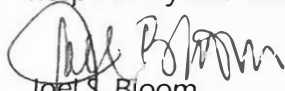
In total, NJIT requests \$9,000,000 in funding from the New Jersey FY19 Budget to support the creation of a regional medical devices innovation cluster.

<u>Priority Requests (\$000's)</u>	<u>Total \$</u>
Medical Device Fabrication Infrastructure Requirements	\$3,500
Medical Device Characterization and Analytics Infrastructure Requirements	\$4,500
Faculty Seed Grants for Technology Translation to Market and Acceleration to Commercialization	\$1,000
<u>Total</u>	<u>\$9,000</u>

On the Rise

NJIT embraces its position as New Jersey's public STEM university and recognizes its important role in addressing New Jersey's economic and workforce development needs. That has enabled NJIT to consistently graduate students who are primed for success in a technology-driven economy, to partner with business and industry while serving as a catalyst for economic growth, and to yield research and innovation that has dramatic impacts on people's lives and the welfare of our state, our nation, and our world. NJIT has earned numerous accolades for its success in these endeavors and is poised to expand its impact on New Jersey's economy and the quality of life enjoyed by its citizenry. With the support requested of the State in FY 2020, we will be able, directly and dramatically, to improve healthcare, stimulate economic growth, and prepare even more graduates who are prepared to fill the current talent gaps faced by industry and become the leaders who drive growth and innovation in the STEM fields. NJIT has a well-established record of success in turning State investment into positive results, and we have done so rapidly. We are ready to do so again, so I encourage you to invest in NJIT's FY 2020 budget requests.

Respectfully submitted,



Joel S. Bloom
President
NJIT

NEW JERSEY INSTITUTE OF TECHNOLOGY
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Appendix A – Technology Development Ecosystem: Transitioning Technology Innovation to Market

NJIT will form a hub with its Life Sciences and Engineering Center, Microelectronic Research Center, the New Jersey Innovation Institute, and Enterprise Development Center for expanding university investment in innovative device fabrication and data analytics. This initiative is well aligned with NJIT's *2020 Vision* strategic plan for new faculty recruitment, translational research clusters, and creation of related instructional programs addressing workforce needs.

The technology innovation, acceleration, and translation process includes identifying and understanding the unmet market needs of stakeholder groups, developing an innovative idea, brainstorming feasibility with expert stakeholders, building prototypes, and developing resources to facilitate and accelerate translation towards technology validation. For identifying market needs, stakeholder groups include domain experts and users (for example, healthcare providers, clinicians, and patients for healthcare applications), researchers, industry leaders, innovators, and entrepreneurs. In the later stages of the innovation and translation cycle, other stakeholders, such as policymakers, regulatory agency providers, and environment and infrastructure experts will be added.

To help investigators navigate the translation process, customized Key Performance Indicators will be used in collaboration with assigned stakeholder groups in the following areas:

- **Market/Business Need Assessment:** This area determines if there is a significant unmet need with enough buyers willing to acquire the innovation at a sustainable price. Market needs will be defined with respective stakeholder groups for healthcare technologies and applications.
- **Innovation:** This area determines whether an innovation will be accepted and adopted in the healthcare market based on improved outcomes or lowered costs.
- **Technology Development and Integration:** This area determines if the technology is feasible and will work better and at lower cost than the alternatives.
- **Regulatory Compliance:** This area determines standards and regulations to be followed and proven, the best pathway to gain regulatory approval, and how long it will take/how much it will cost.

Each of the above areas will have review panels of stakeholder groups for the respective application area (clinical/industry/business) to assess and mentor technology translation from research to commercialization with the development of necessary resources for the following stages of the healthcare innovation cycle:

1. **Need and Market Assessment:** Insights into unmet clinical or market needs and available solutions.
2. **Ideation:** Potential solution described to meet the need.
3. **Proof of Concept:** Key component concepts validated in models and value proposition articulated.

NEW JERSEY INSTITUTE OF TECHNOLOGY
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4. **Proof of Feasibility:** Feasibility of whole solution demonstrated in models and feedback from stakeholders.
5. **Proof of Value:** The potential of the solution to work and create value for all stakeholders is demonstrated.
6. **Initial Clinical/Market Assessment:** Development of prototypes and collection of clinical and impact data.
7. **Validation of Solution:** The solution is shown to be effective, and its value to all stakeholders is validated.
8. **Approval and Launch:** Institutional and regulatory approval for pre-commercial entity.
9. **Commercialization and Use:** The technology is produced and used in practice.

NEW JERSEY INSTITUTE OF TECHNOLOGY
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Appendix B – Itemized Budget

The itemized requested budget for the creation of a Medical Devices Innovation Cluster, including Medical Device Fabrication Infrastructure and Medical Device Characterization and Analytics Infrastructure Requirements, is provided below.

Micro-Nano Fabrication Laboratory

E-Beam Lithography (partially funded from Phase-1 Grant)	\$500,000
Photolithography Mask Aligner	\$450,000
Thin-Film Deposition (PVCVD/LPCVD)	\$300,000
Deep Reactive Ion Etching (DRIE) Dry Etching Processer	\$500,000
Oxidation/Diffusion Furnaces	\$150,000
Metallization (evaporation and sputtering)	\$150,000
Packaging (polishing, bonding, dicing, etc.)	\$150,000

Microfluidic Sensor Fabrication Laboratory

Sputter Coater	\$150,000
High Resolution Ion Beam and Sputter Coater	\$300,000
Nanomill	\$100,000
Wet Benches with Acid, Solvent and Electroplating Fumehoods	\$500,000
Sample Preparation Ovens and Probes	\$250,000
Ellipsometer (available from ELF-LSE)	

Total Medical Device Fabrication Infrastructure	\$3,500,000
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Medical Device Characterization and Analytics Infrastructure

FTIR Spectroscope	\$200,000
Table Top SEM	\$150,000
Confocal Microscope System	\$250,000
Epifluorescent Imaging Microscope System	\$250,000
High Speed Camera	\$50,000
Micro PIV System, Probe Station and Electrical Characterization	\$200,000
Non-contact Profilors	\$150,000
Electrochemical Analyzer System	\$250,000
Raman Spectroscope (available from ELF-LSE)	
Atomic Force Microscope (available from ELF-LSE)	

Total Medical Device Characterization and Analytics Infrastructure	\$1,500,000
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NEW JERSEY INSTITUTE OF TECHNOLOGY
FY 2020 BUDGET REQUEST

PRESIDENT'S STATEMENT

Faculty Seed Grants for Technology Translation to Market and Acceleration to Commercialization	\$1,000,000
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Life Sciences and Engineering Building 3rd Floor Renovation for Medical Device Characterization and Analytics	\$3,000,000
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Budget Request Summary:

Total Equipment	\$5,000,000
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Total Renovation and Facility Upgrade	\$3,000,000
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Faculty Seed Grants for Technology Translation to Market <u>and Acceleration to Commercialization</u>	<u>\$1,000,000</u>
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Grand Total	\$9,000,000
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SECTION 2

EVALUATION DATA/ENROLLMENT/ ORGANIZATION CHART

NEW JERSEY INSTITUTE OF TECHNOLOGY
FY 2020 BUDGET REQUEST
EVALUATION DATA

PROGRAM DATA	Actual FY2017	Actual FY 2018	Original FY 2019	Revised FY 2019	Budget Request FY 2020
Institutional Support					
Enrollment total (headcount)	14,517	14,556	14,803	14,522	15,003
Enrollment total FTE's (a)	9,779	9,408	9,937	9,755	9,577
Undergraduate total (headcount)	8,293	8,551	8,748	8,628	9,140
Undergraduate total FTE's (a)	6,868	7,064	7,234	7,173	7,456
Full-time (headcount)	6,591	6,766	6,923	7,058	7,229
Full-time FTE's (a)	6,282	6,450	6,598	6,608	6,768
Part-time (headcount)	1,702	1,785	1,825	1,570	1,911
Part-time FTE's (a)	586	614	636	566	688
Graduate total (headcount)	3,153	3,001	2,855	2,932	2,871
Graduate total FTE's (a)	1,924	1,360	1,772	1,701	1,231
Full-time (headcount)	1,873	1,830	1,741	1,737	435
Full-time FTE's (a)	1,436	1,032	1,350	1,251	313
Part-time (headcount)	1,280	1,171	1,114	1,195	2,436
Part-time FTE's (a)	488	328	422	450	918
Extension and Public Service					
Enrollment (headcount) (a)	3,071	3,004	3,200	2,962	2,992
Enrollment total FTE's (a)	987	984	931	881	890
Undergraduate (headcount)	2,293	2,302	2,500	2,294	2,317
Undergraduate FTE's (a)	720	732	700	646	652
Graduate (headcount)	778	702	700	668	675
Graduate FTE's (a)	267	252	231	235	238
Degree programs offered - All	130	112	130	132	132
Courses Offered - Academic Year	3,871	3,920	3,939	3,939	4,069
Student credit hours produced	269,263	266,315	272,931	267,163	275,980
Degrees and Certificates					
Granted - Total	2,852	2,773	2,900	2,756	2,884
Ratio: Student/faculty (b)	17/1	17/1	17/1	17/1	17/1
Full-time, First-Time, Degree-Seeking Freshmen who are Regular Admission Students	1,097	1,125	1,150	1,296	1,400
Average SAT Score - Math	640	659	640	662	662
Average SAT Score - Reading/Writing	578	626	578	625	625
Average SAT Score - Total (e)	1,218	1,285	1,218	1,287	1,287
Outcomes Data (c)					
Third Semester Retention Rates	88.0	88.0	89.0	88.0	88.0
Seven Year Graduation Rates	64.0	66.0	65.0	65.0	65.0
Student Tuition and Fees					
Total Cost of Attendance (d)	35,130	35,498	35,498	36,438	36,438
Full-Time Undergraduate Tuition State Residents	13,602	13,906	13,906	14,174	14,174
Full-Time Undergraduate Tuition Non - State Residents	28,206	28,926	28,926	29,586	29,586
Full-Time Undergraduate Fees	2,828	2,992	2,992	3,164	3,164
Operating Data					
Institutional Support					
Institutional Expenditures					
Instruction	118,745,000	123,703,000		129,478,000	
Sponsored programs and research	80,326,000	88,125,000		86,747,000	
Extension and public service	2,022,000	2,220,000		2,293,000	
Academic support	31,328,000	33,395,000		34,511,000	
Student services	25,837,000	28,870,000		28,818,000	
Institutional support	56,990,000	59,537,000		61,190,000	
Physical plant and support services	25,155,000	29,827,000		27,137,000	
Personnel Data					
Position Data					
State-funded positions	1,187	1,187		1,187	

(a) Equated on the basis of 32 equivalent credit hours per undergraduate student and 24 equivalent credit hours per graduate student.

(b) Calculated on the number of teaching positions (including adjunct faculty) and equated full-time (weighted) students.

(c) The data of record is the 10th day of the semester.

(d) As reported to the Higher Education Student Assistance Authority. Includes tuition, fees, room and board, transportation, and supplies.

(e) SAT scores in FY17, FY18 and FY19 reflect the new format.

**NEW JERSEY INSTITUTE OF TECHNOLOGY
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ENROLLMENT NARRATIVE

In order for the economy in New Jersey to flourish and create jobs, a vibrant, highly qualified workforce is necessary to meet the needs of business and industry. Despite a national and regional decline in those intending to major in science and technology fields, NJIT is providing the state with a steadily increasing number of highly skilled graduates in engineering, computer science, information technology, mathematics, chemistry, physics, biology, architecture and management.

Robust undergraduate enrollment trends indicate that initiatives designed to enlarge the applicant pool have been successful in attracting a greater number of highly qualified students seeking to enroll at NJIT. The increased enrollment is attributable to new program offerings and our solid reputation for academics. Total enrollment for Fall 2017, including undergraduate and graduate students reached 11,551, which is an all-time high for NJIT. Our efforts with student success have resulted in higher graduation numbers over the past six years (from 54% to 64%). Our rigorous curriculum, in conjunction with internships, co-operative programs and a student culture that places a high value on academic achievement, has had remarkable results.

Annually, Career Development Services produces an employment and graduate school report for the entire graduating class. For the Class of 2017, data collection began as early as fall 2016 as employment offers were submitted and is still ongoing. Currently, Career Development Services has knowledge of the plans of over 1,500 of our 2017 graduates, representing an increase of nearly 35% from last year. In line with our results from last year, 75% of our baccalaureate degree recipients and 55% of our master's graduates have secured employment or full-time continuing education within 3 months of graduation.

The class of 2017 continued to fill the pipeline that has earned NJIT top spots in the U.S. for students' return on their tuition investment. The combined average starting salary for all NJIT BS/BA graduates of \$60,440 continues to exceed those of all 2017 U.S. graduates by 20%. NJIT graduates on average earn starting salaries that are \$10,000 more than the BS graduates nationwide.

Among the highest paid majors this year are chemical, electrical, and industrial engineering; computer technology; and mathematical sciences. Each reported starting salaries that exceeded \$67,000. Our Computer Science (\$63,314) and Business Management (\$62,428) starting salaries were also well above the national averages. NJIT master's degree recipients also fared extremely well with the average starting salaries for 10 different majors exceeding \$70,000, including 34 MSCS graduates averaging over \$90,000 per year.

May 2017 graduates who reported that they had obtained full time employment were asked to indicate the source of how they found their positions. Fifty percent (50.5%) of the 533 undergraduate respondents and 35.9% of the 289 graduate student respondents reported that they found full time employment through their participation in one or more NJIT Career Development Services administered programs. It is for results such as these that NJIT was named by MONEY Magazine this year as one of the top 10 colleges in the nation with great career services. NJIT ranked fourth among public institutions, with a

**NEW JERSEY INSTITUTE OF TECHNOLOGY
FY 2020 BUDGET REQUEST**

ENROLLMENT NARRATIVE

strong combination of a well-staffed career center and young alumni who go on to earn higher-than-average early salaries.

Career Development Services arranged for 513 organizations to conduct on-campus recruitment through our career fairs and on-campus interview programs. The fall and spring career fairs filled to capacity with 200 employers each and over 5,100 students. Our on-campus interview programs increased this year as well. Over 170 employers held over 2,400 interviews for more than 1,000 students. Eight-seven (87%) of the employers rated NJIT students' interview preparation as excellent or good. More than 29,000 technology full time, co-op, and internship job listings were posted to the CDS electronic database, an increase of 3,500 from last year. Moreover, nearly 58,000 student and alumni resumes were referred to employers.

Cooperative education and internship learning experiences provided credit-bearing hands-on real world opportunities and exposure to industry for 873 undergraduate and graduate students. Moreover, our student co-ops' and interns' earnings exceeded \$6.8 million this year. The companies involved in these NJIT programs employ approximately 60% of these students after they graduate.

Top New Jersey based employers of our students and graduates this year include AT&T, Johnson & Johnson, L'Oréal, Optum, ADP, Prudential, PSEG, TATA, Turner Construction, Mott MacDonald, Cognizant, NJ Transit and UPS.

While increasing the number of graduates entering our workforce is paramount to meet business and industry demands, we must not only enroll but also graduate as many students as possible. Increasing the number of students who graduate is therefore as critical to workforce demand as is recruitment. In order to achieve our goal of graduating each and every student we enroll, we must provide the infrastructure and support necessary to do so. If we continue to grow our enrollment at the present rate, we will soon reach capacity to deliver quality instruction and essential services, both in facilities and personnel. Indeed, we have already reached capacity in a number of science and engineering fields. Our laboratories, technology and learning facilities must provide 21st century experiences for our students for them to be competitive, nay superior, to those of other states.

We will, of course, continue our efforts to recruit highly qualified students on all levels, but will especially seek to recruit additional graduate students and set more modest, manageable goals for the recruitment of first year students by selecting those who are better prepared for the rigors of the challenging curriculum. We will focus our efforts on growing our undergraduate enrollment through retention and persistence, leading more to graduate. As such, we are engaging in vigorous and intentional efforts to graduate as many continuing students as possible.

Highlights of retention efforts that have been initiated or expanded in the current year:

- The Learning Communities initiative involves twenty-one (21) discipline-focused student cohorts, each of which include linked courses, organized to foster and encourage collaboration. While the program initially aims to address students'

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transitional needs, the over-arching goal is much greater. By way of active and collaborative learning students will harness a greater understanding of their major and recognize the daily functions associated with their career aspirations.

- Through the instrumental support of upper classmen, better known as Peer Mentors, students gain the necessary confidence to express themselves actively in the campus community and throughout various professional networks. Peer Mentors are dynamic members on campus who are readily available to provide resourceful insight, based on their personal experience. They connect first year students with a variety of services, while highly encouraging them to network throughout NJIT.
- Revising institutional procedures, practices and policies to make our procedures more student friendly, enhancing student satisfaction.
- Focusing more support to students who need academic support through tutoring centers in departments, with The Learning Center offering supplemental instruction in certain math classrooms and assistance with improving learning strategies.
- Engaging students by increasing the number of clubs and organizations.
- Continuing to expand the number of activities and events on campus, including adding Signature Events to this year's mix of activities to build community.
- Enriching the new student orientation programs to encourage incoming students to participate in high-impact educational activities, such as undergraduate research, internships and co-ops, and study abroad opportunities. The program is further enhanced by including sessions tailored to supporting specific populations, including first-generation college students, women in STEM, and military veterans.
- Creating a Highlander Handbook to serve as a convenient reference for all students to know their campus resources, summarize policies and procedures, and familiarize themselves with NJIT and the surrounding community.
- Implementing the Student Success Collaborative web platform to maximize retention and increase tracking of student touchpoints and academic risk through student demographic profiles, advisement, tutoring, and faculty feedback.

Highlights of the recruitment efforts that have been initiated or expanded in the current year:

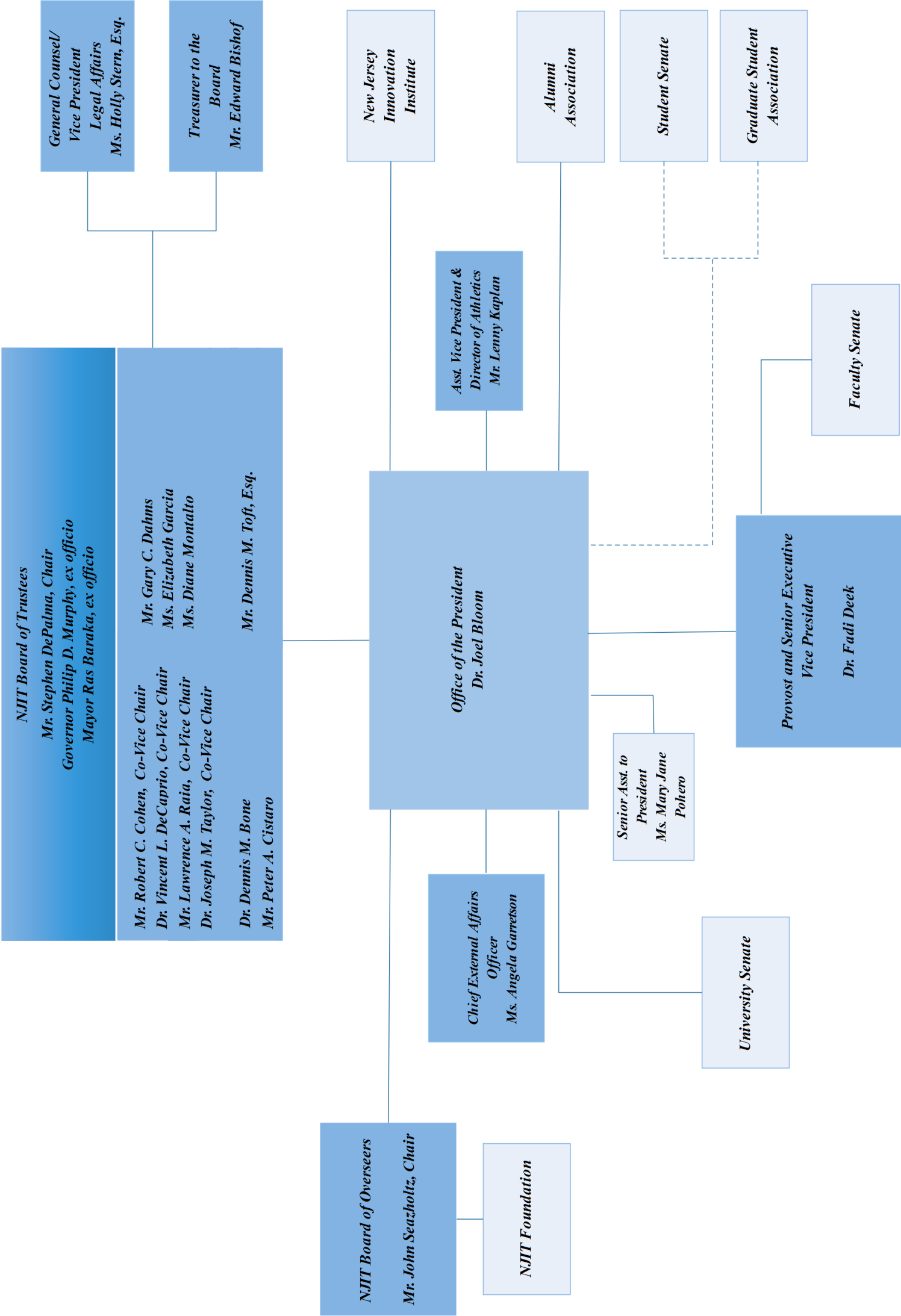
- Enhanced and expanded on-campus and online Open House events for prospective undergraduate students and their parents as well as prospective graduate students.
- Attended recruiting events at over 500 high schools throughout New Jersey and the region.
- Refined our competitive scholarship program to attract highly qualified students and added funds to expand scholarship programs to transfer students as well as added assistance to those students approaching graduation but are in need of financial help to complete their studies.

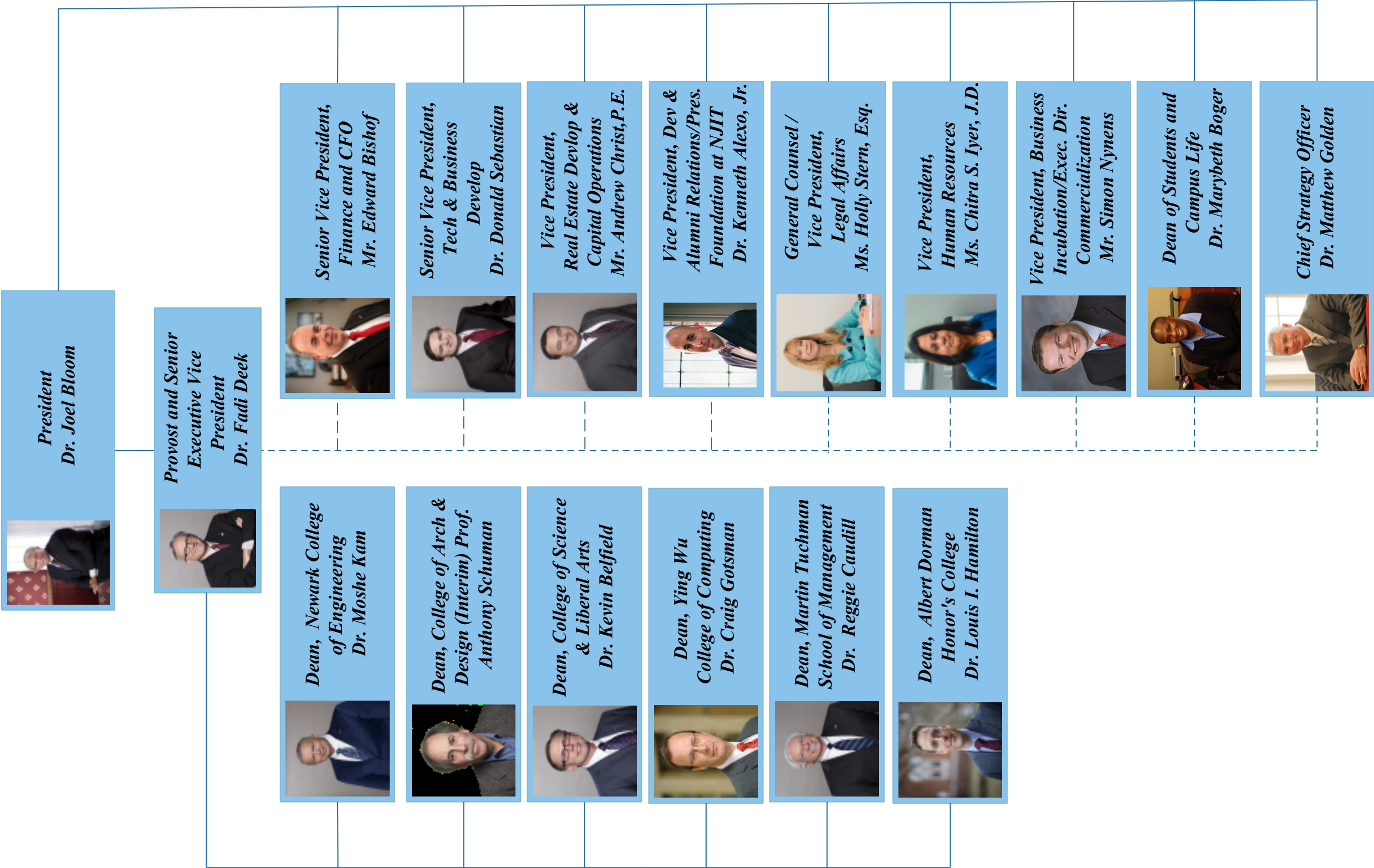
**NEW JERSEY INSTITUTE OF TECHNOLOGY
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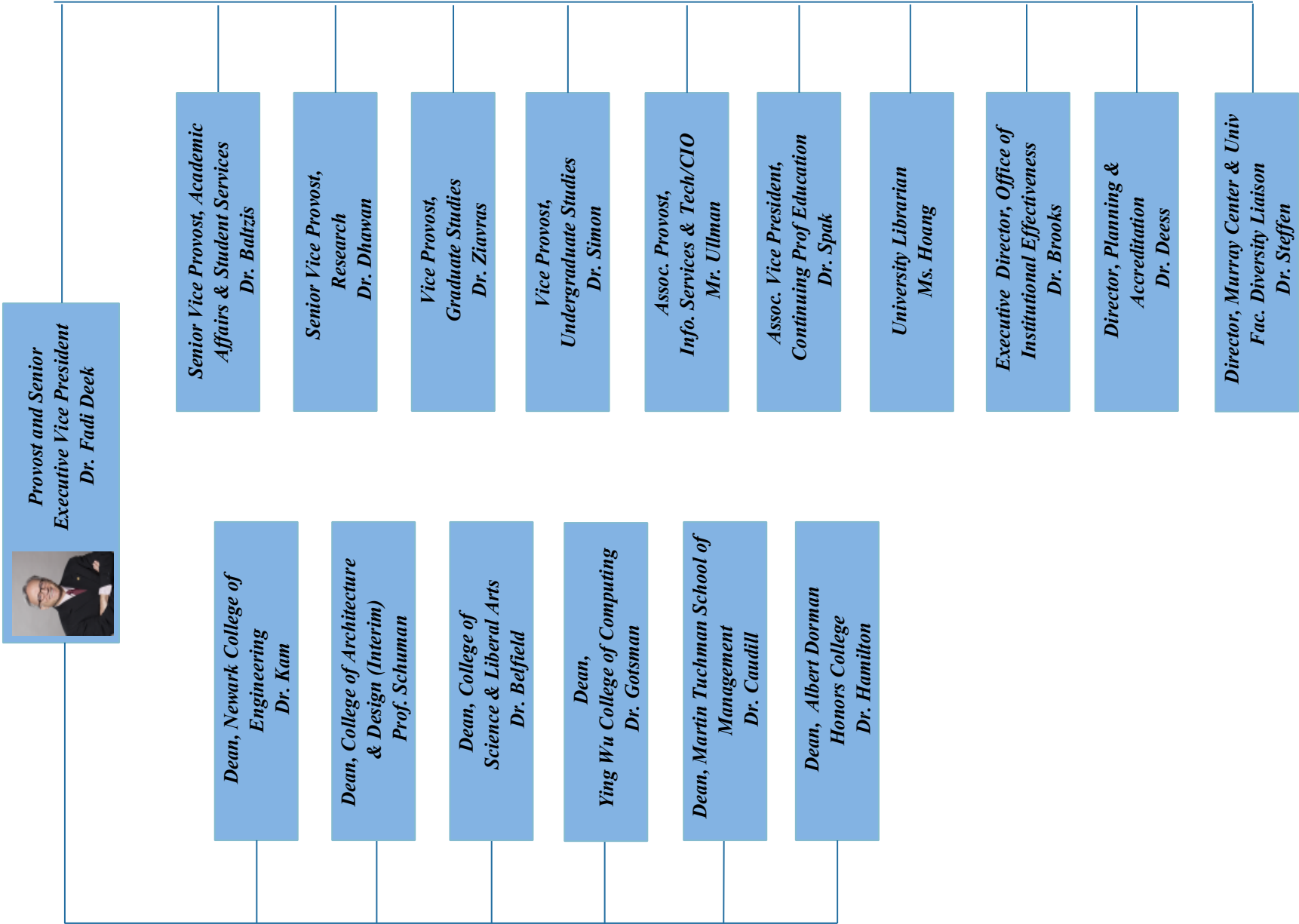
ENROLLMENT NARRATIVE

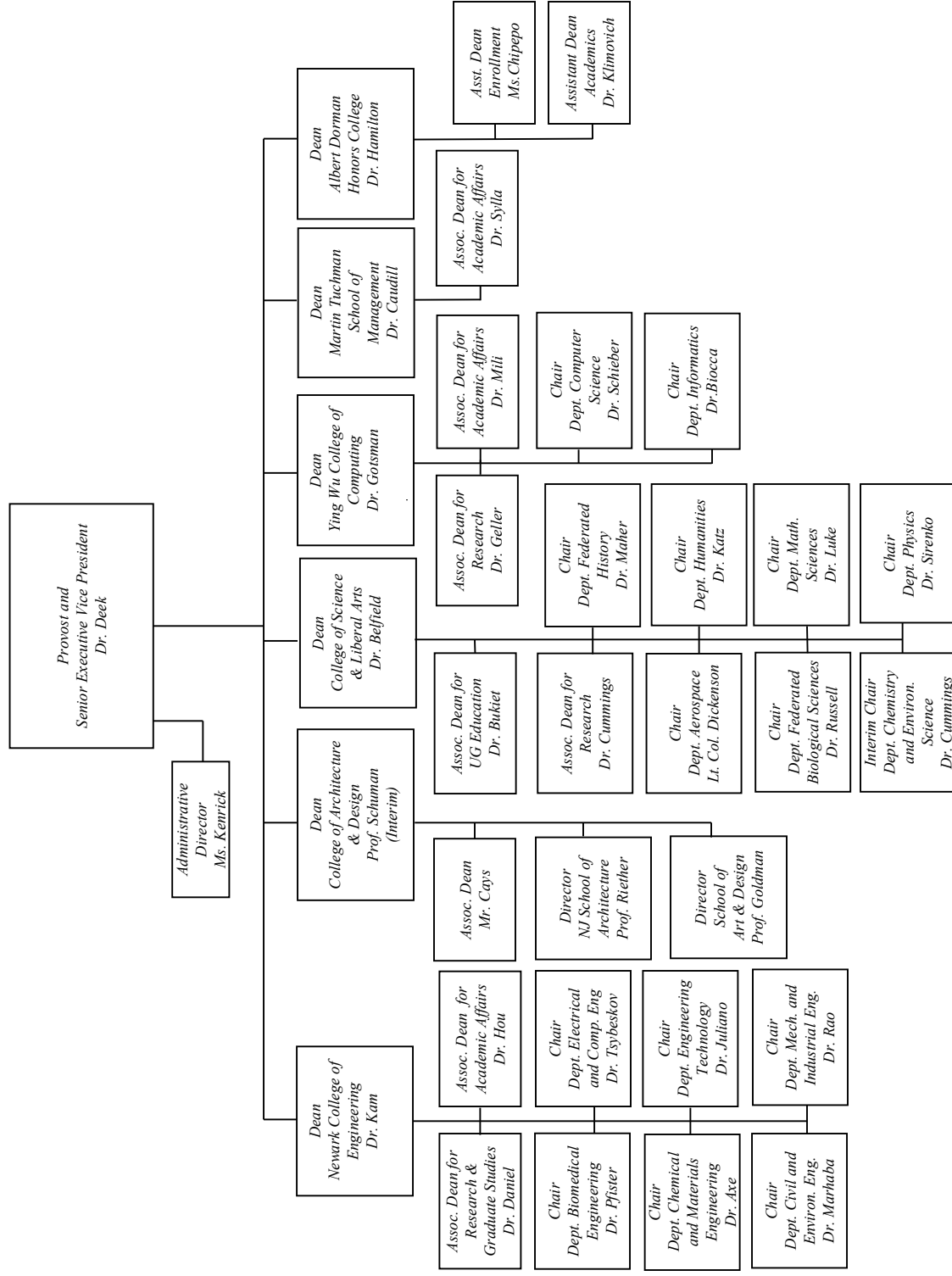
- Increased enrollment opportunities in the Albert Dorman Honors College.
- Expanded on-line degree programs and offerings.
- Added the PhD in Business Data Science and MS in Data Science to the graduate program inventory.
- The total anticipated student enrollment in programs sponsored by the Center for Pre-College Programs in FY19 is 4,262 which includes Academy, Options, Early College Preparatory Programs, Bernard Harris Summer STEM Camp (BHSSC), BHSSC Reunion, Talent Search, Upward Bound I, Upward Bound II, Upward Bound for English Language Learners, NJ GEAR UP/College Bound, Panasonic Creative Design Challenge, NJIT Regional NJ Science Olympiad, TSA/TEAMS Competition, REAP, Open Houses, Red Bank Charter School student program, and Newark Public Schools STEM Day.
- In addition, the total anticipated enrollment of educators and parents in Center for Pre-College Programs sponsored events in FY19 is 490 which includes Open Houses, school consultations, Newark Public Schools STEM Day, STEM School Leadership Forum, Try Engineering! Workshops, STEM Family Workshops, Physics Teacher Workshop, and Teacher Workshop for Panasonic Creative Design Challenge.
- Continuing collaboration with NJ community colleges to increase transfer enrollment.
- Expanded the BS/MS programs with four-year institutions.
- Increased the number of applicants and enrollment of women in our undergraduate and graduate programs.
- Continued partnerships with the National Action Council for Minorities in Engineering, corporate and other science association programs to boost minority enrollments, NSF CUNY MAGNET Alliance, New Jersey Minority action Careers Program, Project 1000 and the GEM Program.

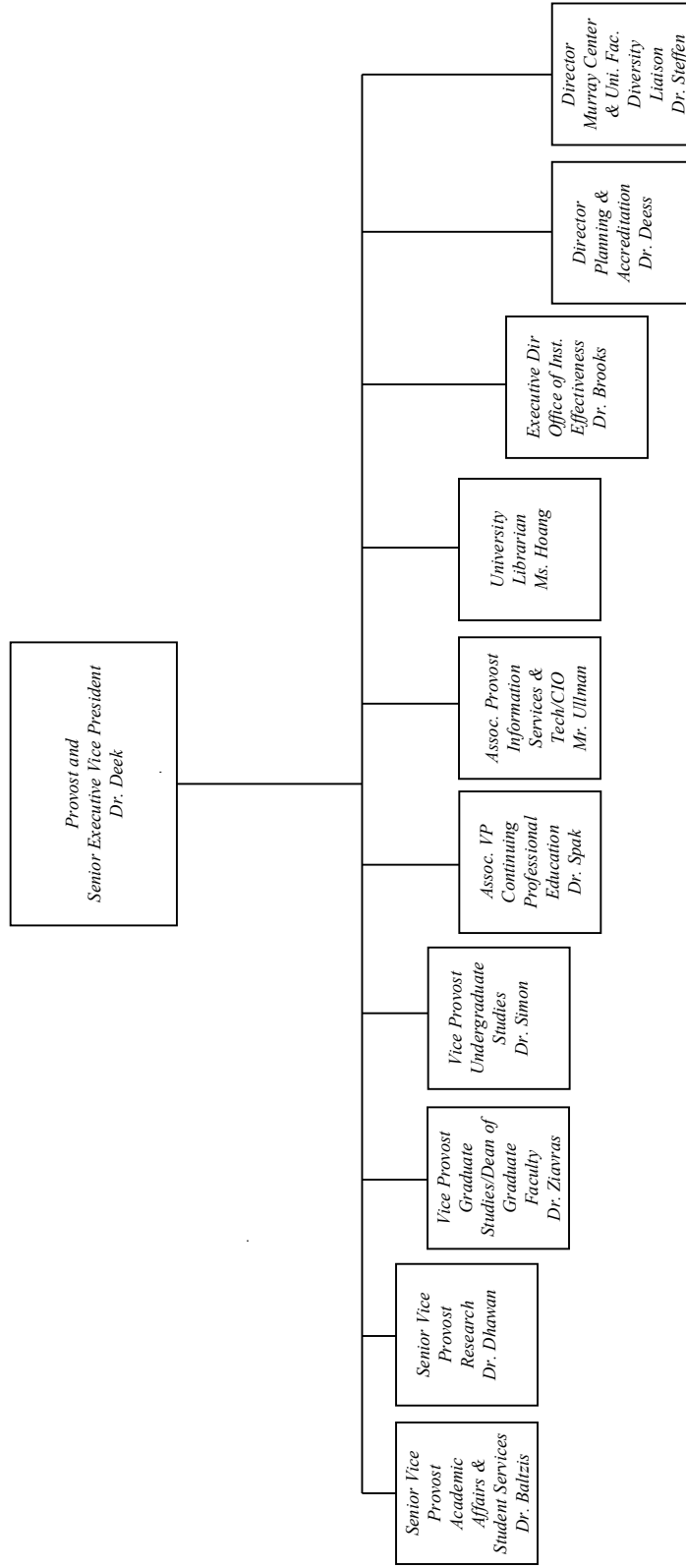
All of these efforts have contributed significantly to NJIT's appreciating national reputation for providing a quality education to those seeking careers in science, technology, engineering and mathematics. NJIT will continue to provide an increasing number of highly qualified graduates to serve New Jersey businesses and industry in the years to come.

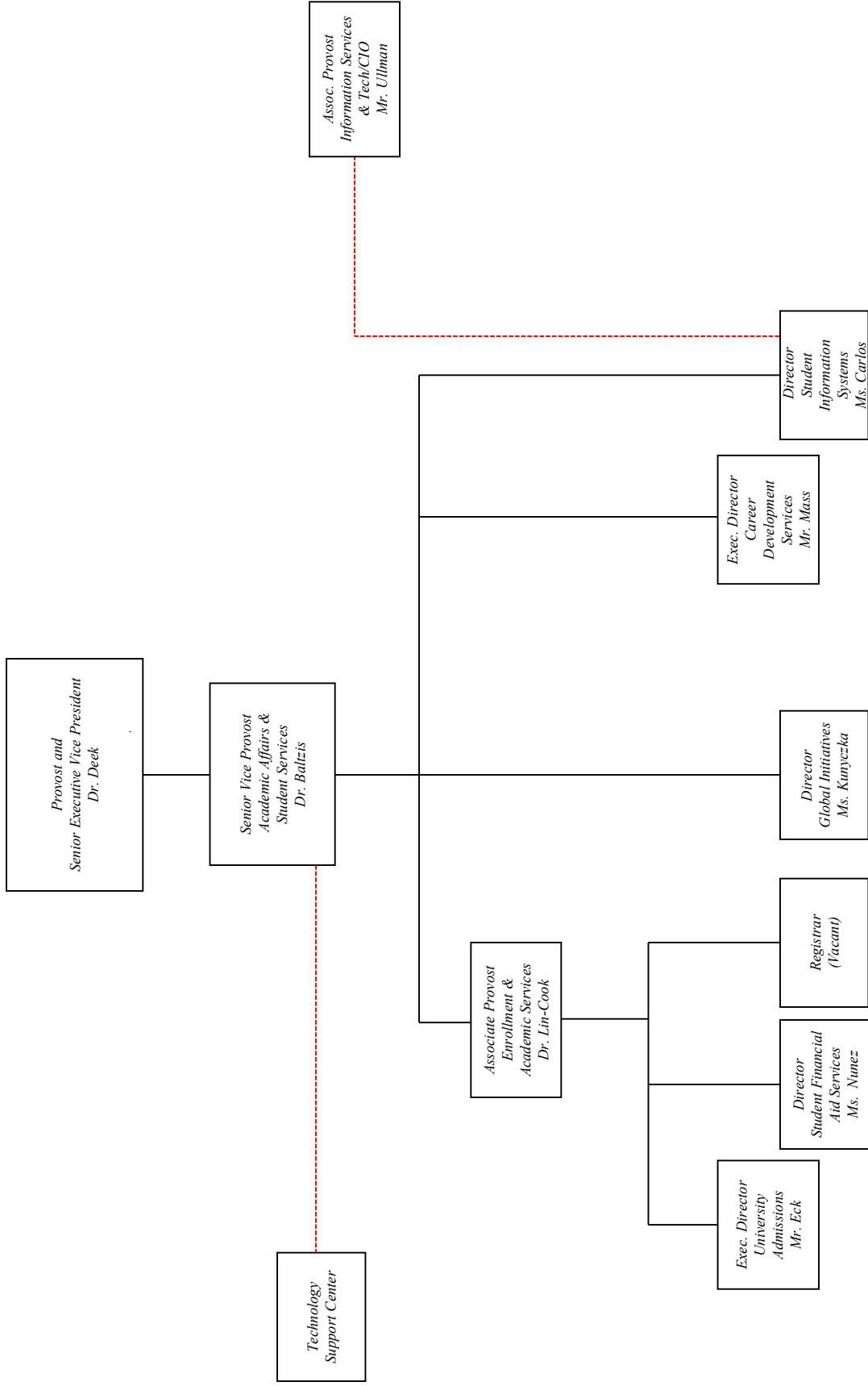


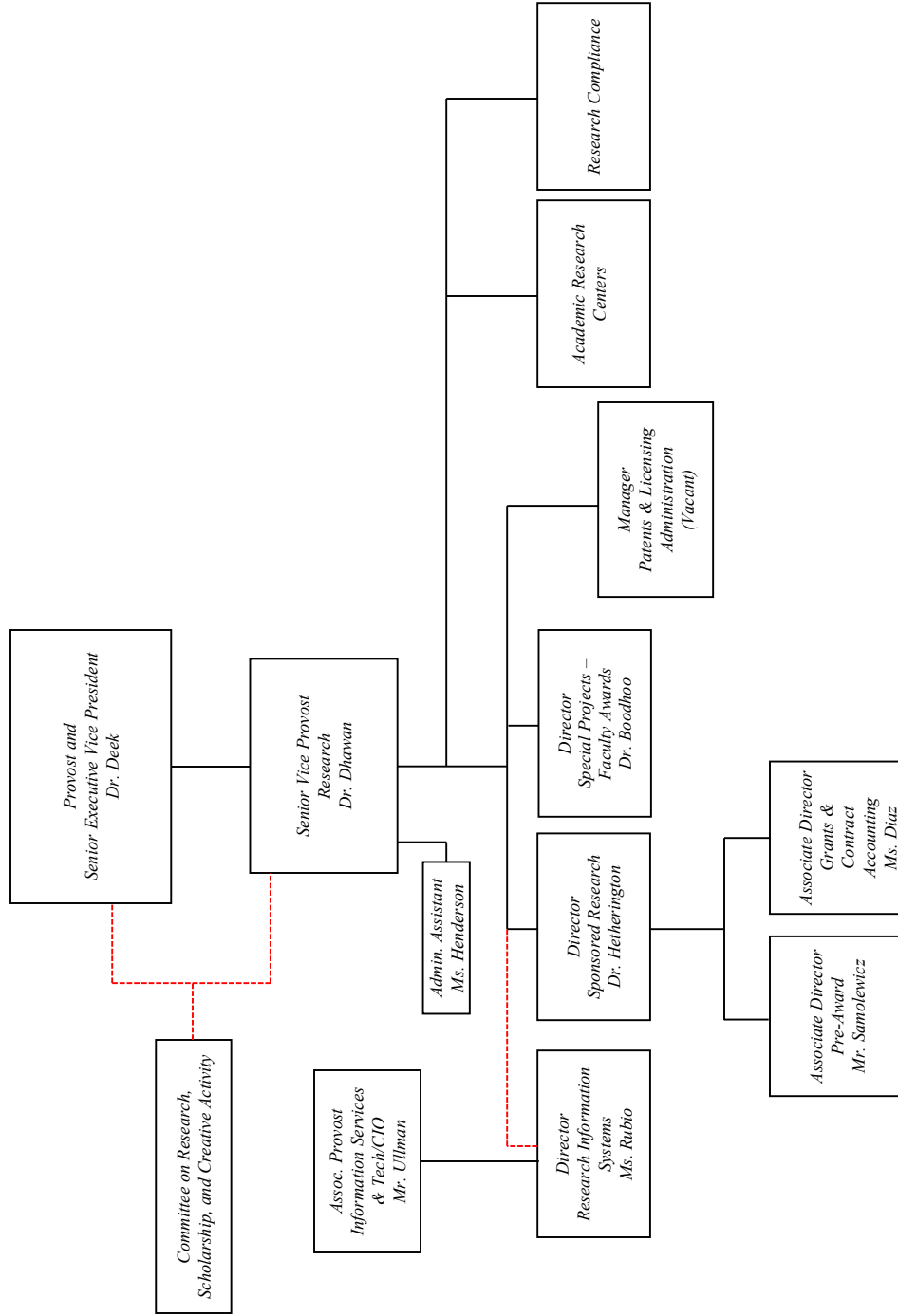


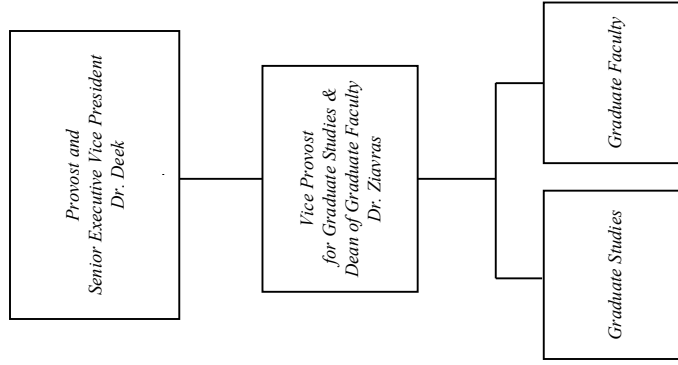


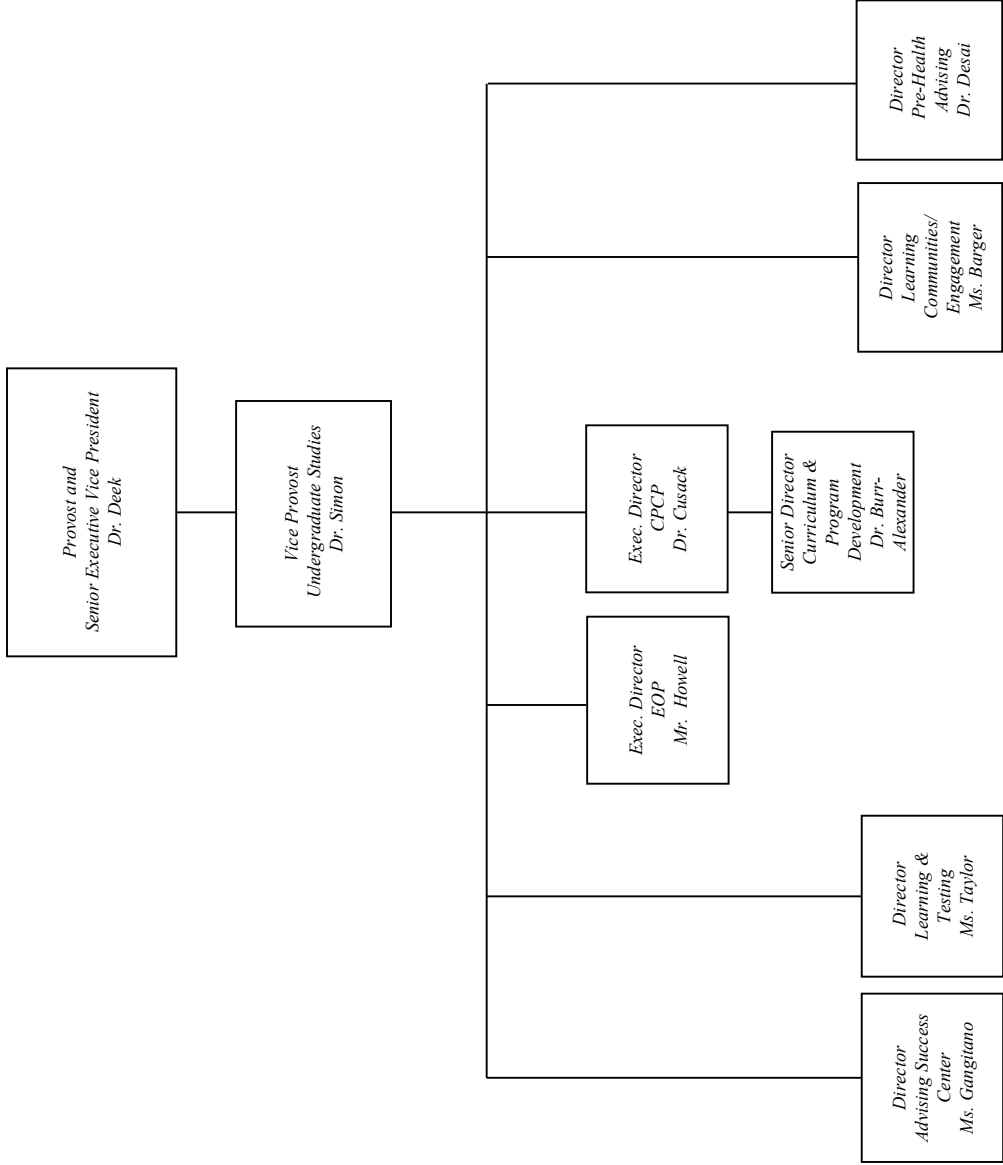


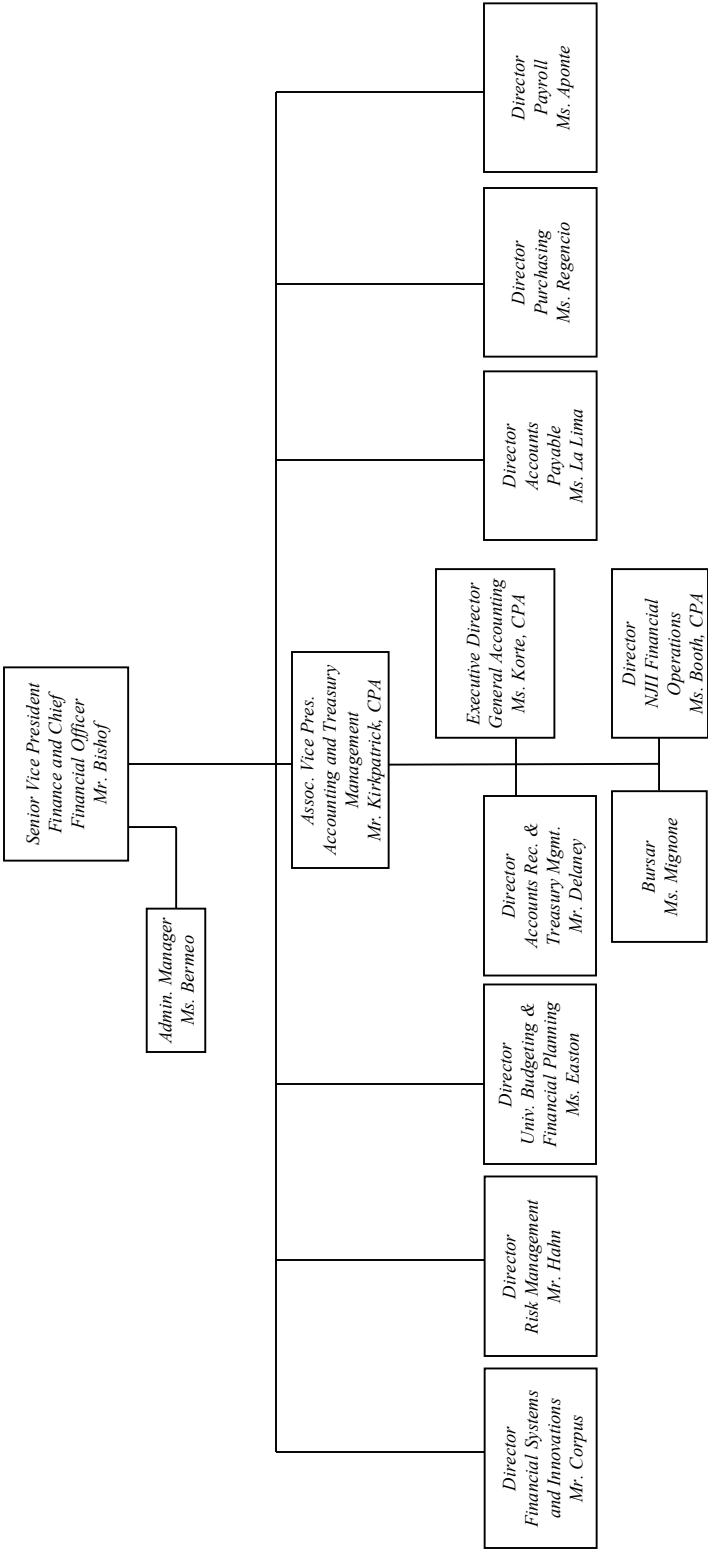


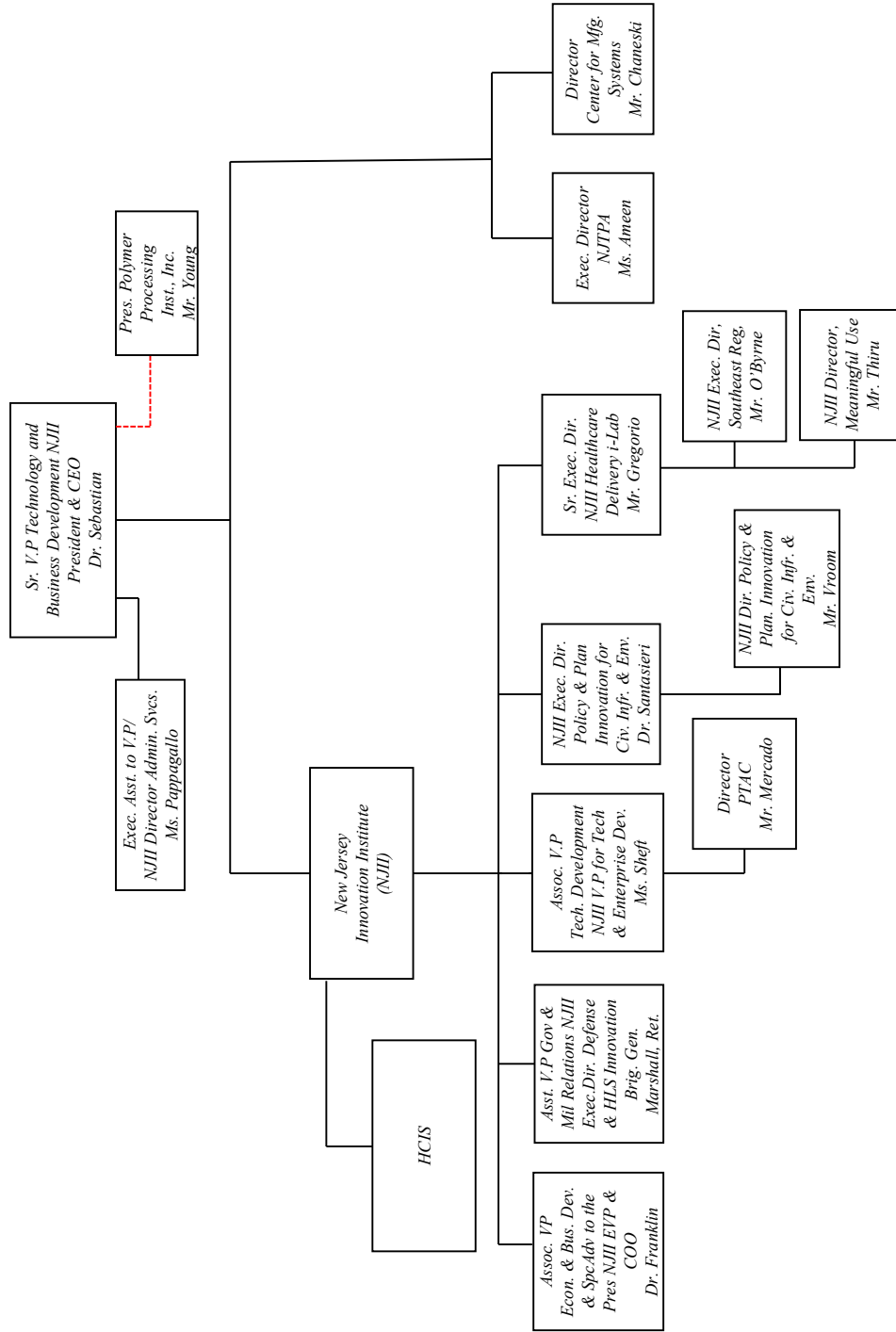


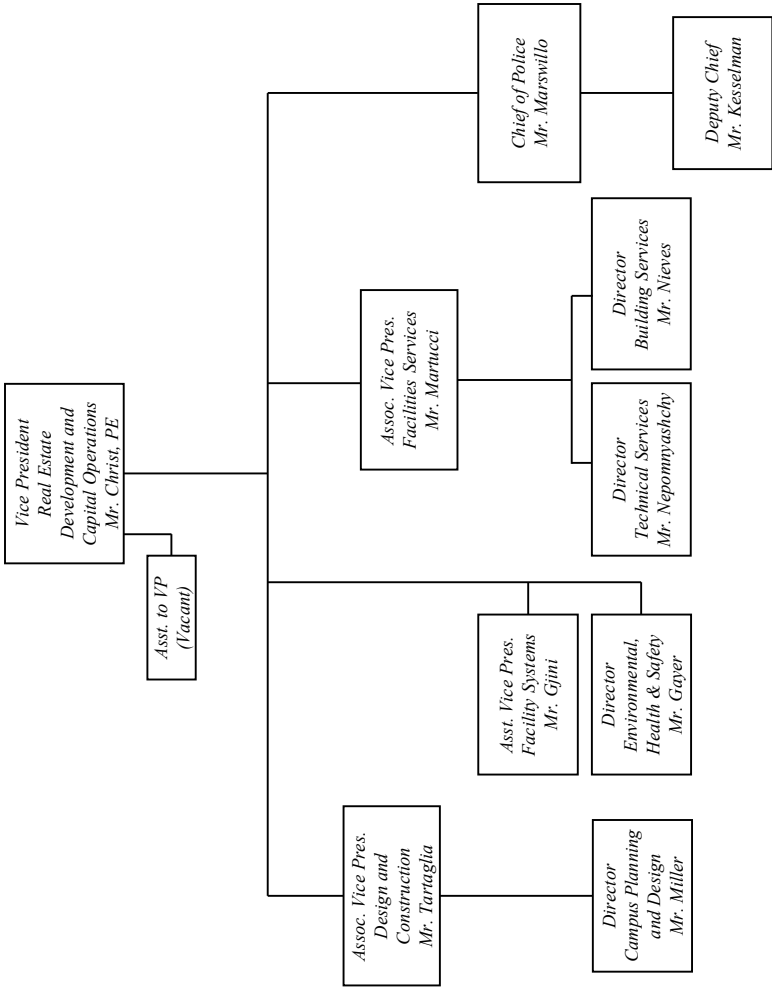


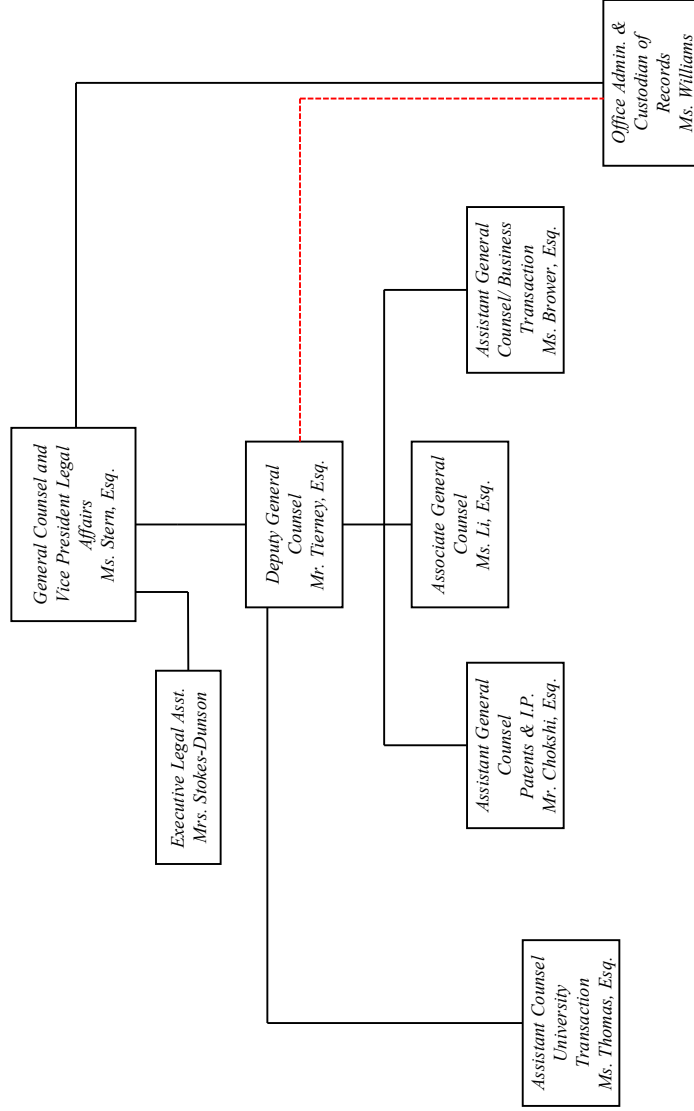


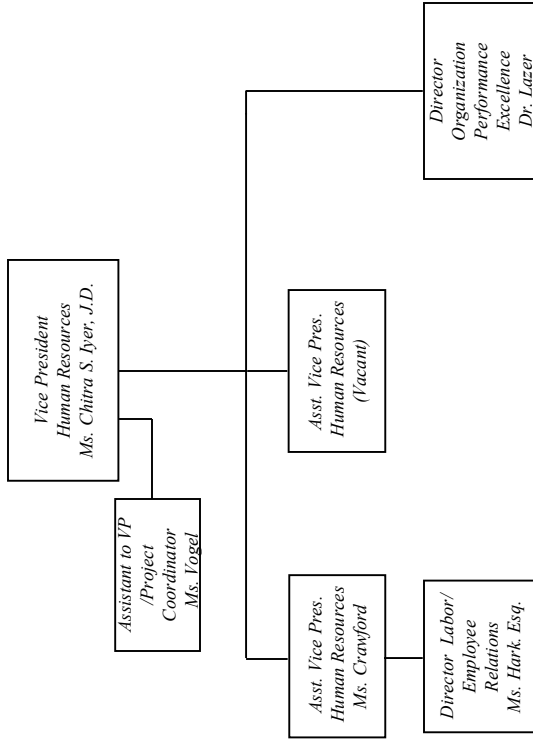


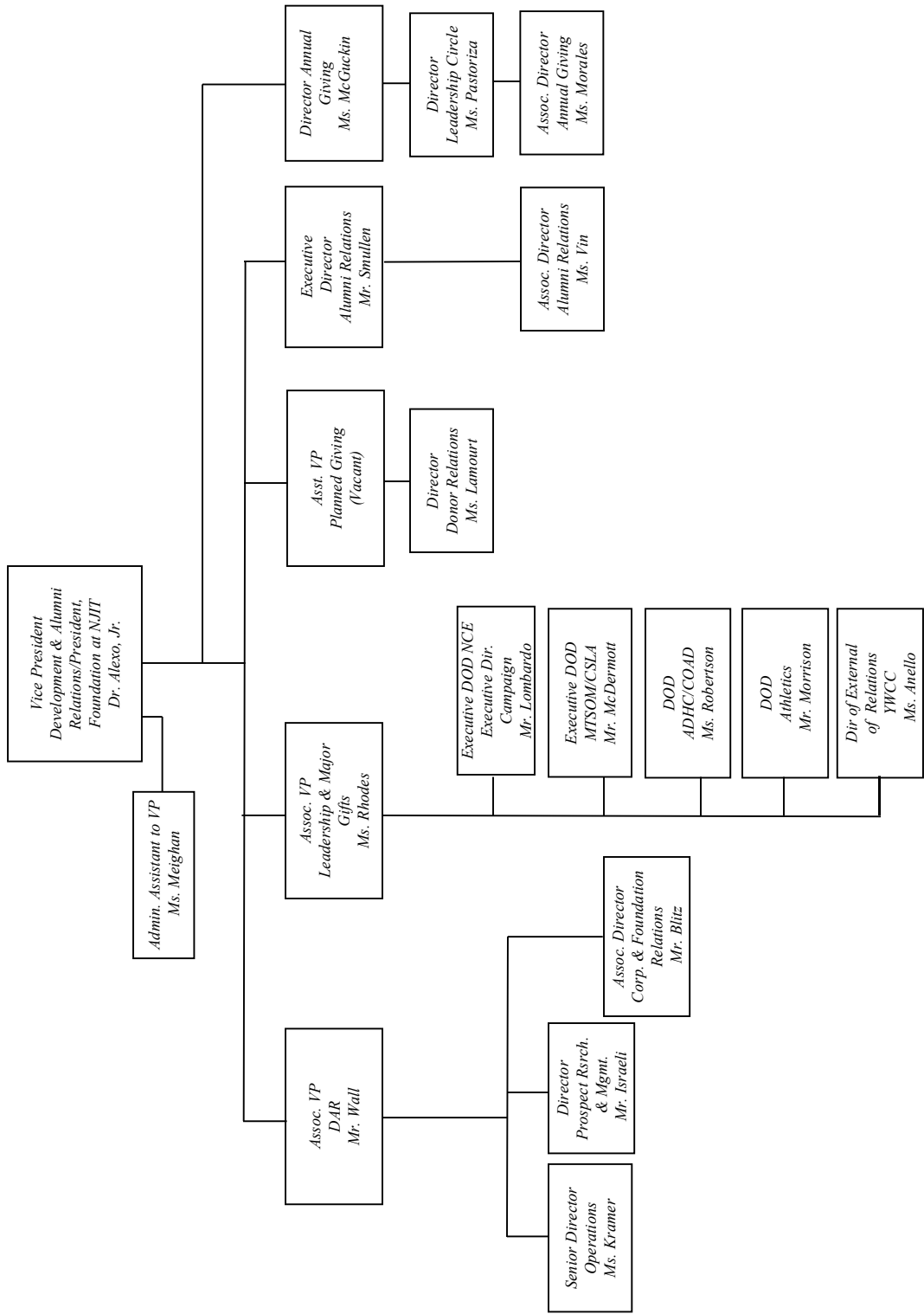


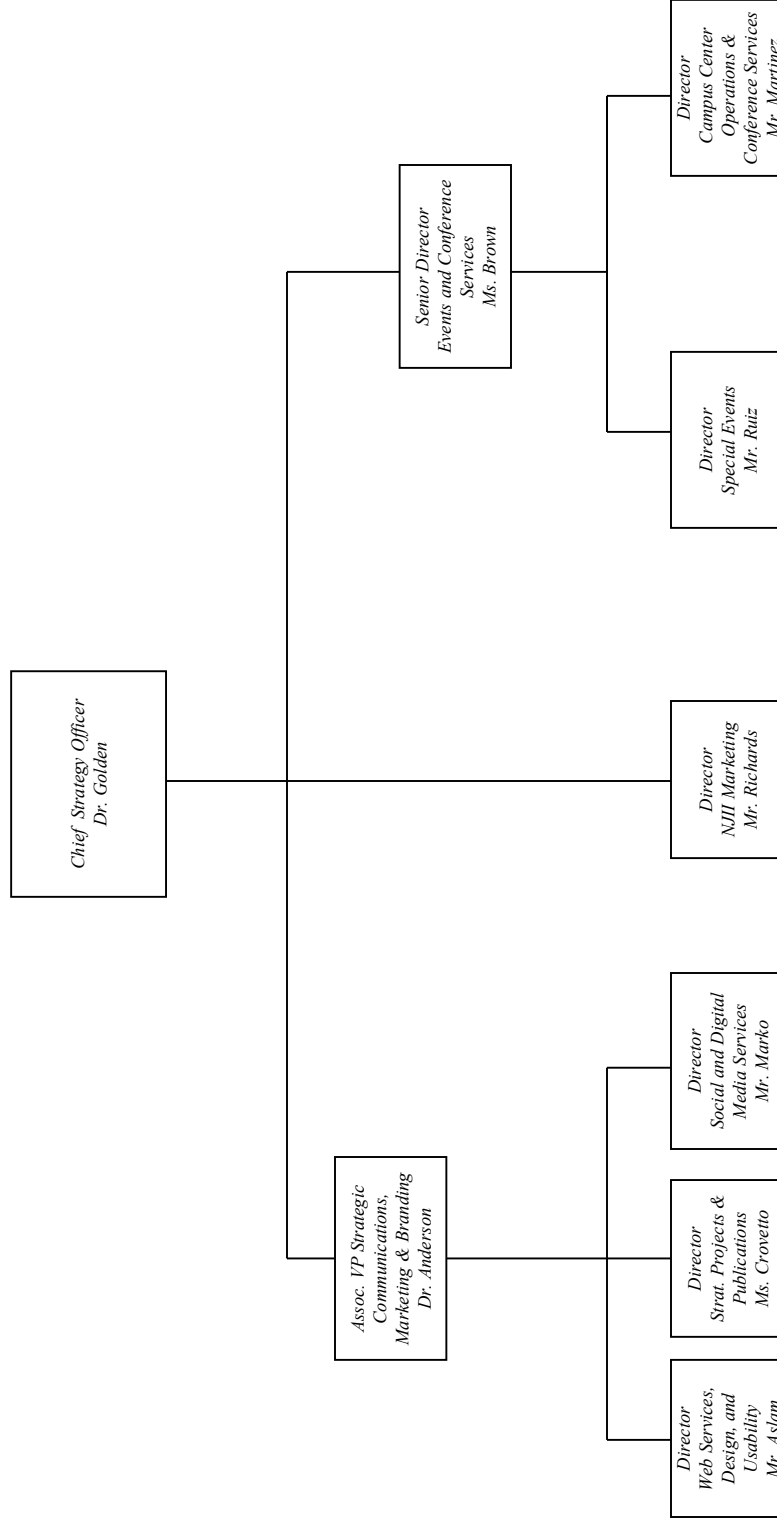


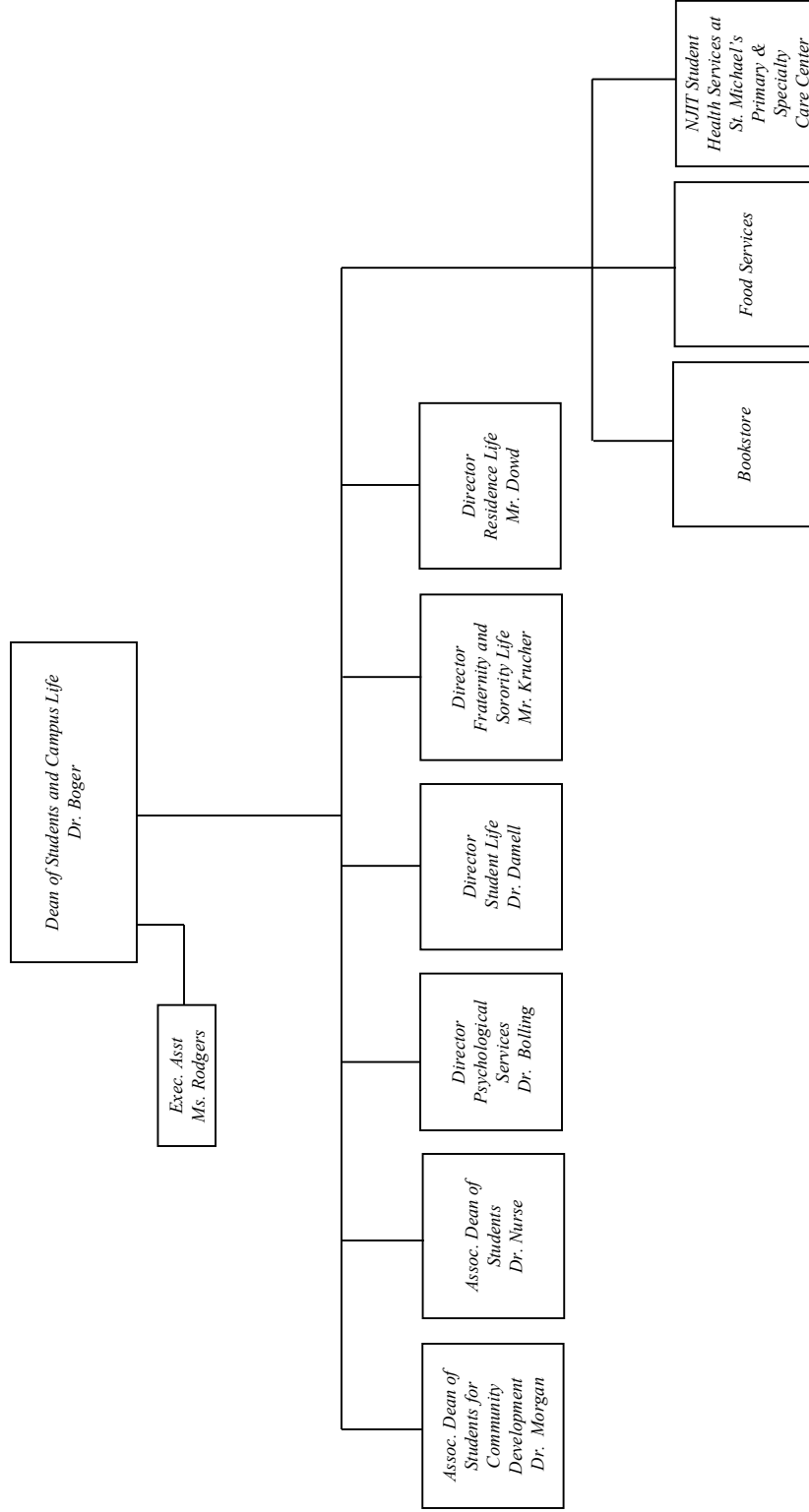


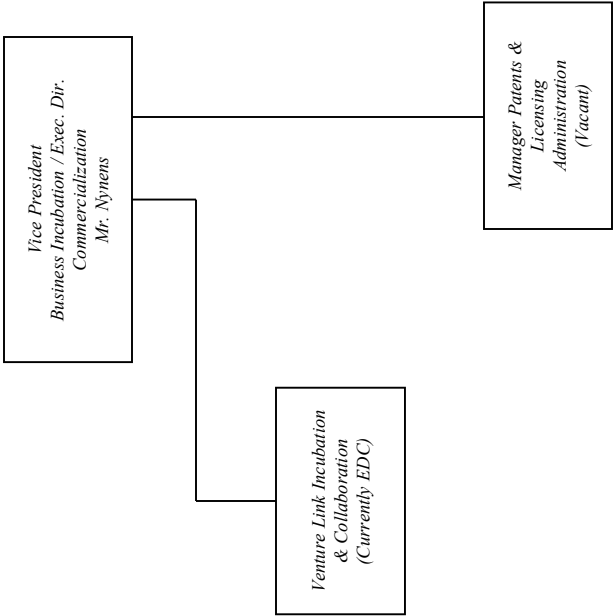












SECTION 3

BUDGET INFORMATION

State of New Jersey
Department of the Treasury
Office of Management and Budget
FY2020 Budget Request (BB-102)

Date: _____ Department: New Jersey Institute of Technology

Citation: _____

Approved by: _____ Director

To the State Treasurer:
Appropriations as follows are requested for the above agency for fiscal year 2020. Attached are data covering the present and preceding fiscal years. The statements given are true and correct to the best of my knowledge and belief. I certify that the request submitted is in accordance with instructions contained in the Budget Instruction Manual.

Department Head/Officer:  Joel Bloom
President

Positions Budgeted by Fund (1,2)	Budgeted FY2019	Agency Request FY 2020
State Funded (per Appropriations Act Language)	1,187	1,508
Non State Funded (per Appropriations Act Language)		
Total Positions	1,187	1,508

Expended 2018					FY2019		Request	
Original and Supplemental	Reappro. and Receipts	Transfers and Emerg.	Total Available	Expended	Recapitulation		By Department By Fund Category	
451,064	(1,621)	\$	449,443	449,443	Institutional Support		Appropriated	
					Total Grants-In-Aid		476,716	
					Less:			
(197,045)	(4,308)	0	(4,308)	(4,308)	Receipts from Tuition Increases		(3,505)	
(20,538)	2,744	0	(194,301)	(194,301)	General Services Income		(199,240)	
(156,659)	(1,314)	0	(21,852)	(21,852)	Auxiliary Funds Income		(22,518)	
(41,382)	4,499	0	(152,160)	(152,160)	Special Funds Income		(170,000)	
(415,624)	-	0	(41,382)	(41,382)	Employee Fringe Benefits		(46,013)	
	1,621	0	(414,003)	(414,003)	Total Income Deductions		(441,276)	
35,440	-	0	35,440	35,440	Total State Appropriation		35,440	
451,064	(1,621)	0	449,443	449,443	Special Purpose			
10,000			10,000	10,000	General Institutional Operations		476,716	
					Grants in Aid Appropriation		3,700	
					State Authorized FTEs			
					Medical Devices Innovation Cluster: Phase 2			
					Need Based Retention Awards			
(415,624)	1,621	0	(414,003)	(414,003)	LESS: Income Deductions		(441,276)	
45,440	-	0	45,440	45,440	Grand Total State Appropriation		39,140	
							45,470	

¹ Per OMB, fringe amount is fixed. Audited financial statements reflect fringe benefits totaling \$61,153 million for FY18.

**New Jersey Institute of Technology
FY 2020 Budget Request**

Spending Agency: New Jersey Institute of Technology

Appropriations Data

(\$000)

—Year Ending June 30, 2018—						FY 2019 Adjust. Approp.	FY 2020 Request	FY 2020 Recom- mended
Original	Reapprop. & Receipts	Transfers & Emerg.	Total Available	Expended	GRANTS - IN - AID Distribution by Fund & Program			
451,064	(1,621)	0	449,443	449,443	Institutional Support	476,716	476,716	
					Total Grants - in - Aid			
					LESS:			
	(4,308)	0	(4,308)	(4,308)	Receipts from Tuition Increase	(3,505)		
(197,045)	2,744	0	(194,301)	(194,301)	General Services Income	(199,240)	(202,745)	
(20,538)	(1,314)	0	(21,852)	(21,852)	Auxiliary Funds Income	(22,518)	(22,518)	
(156,659)	4,499	0	(152,160)	(152,160)	Special Funds Income	(170,000)	(170,000)	
(41,382)	0	0	(41,382)	(41,382)	Employee Fringe Benefits	(46,013)	(46,013)	
(415,624)	1,621	0	(414,003)	(414,003)	Total Income Deductions	(441,276)	(441,276)	
35,440	0	0	35,440	35,440	Total State Appropriations	35,440	35,440	
					Distribution by Fund and Object			
451,064	(1,621)	0	449,443	449,443	Special Purpose			
					General Institutional Operations	476,716	476,716	
10,000	0	0	10,000	10,000	Grants in Aid Appropriation	3,700		
					Medical Devices Innovation Cluster: Phase 2		9,000	
					State Authorized FTEs			
					Need Based Retention Awards		1,030	
(415,624)	1,621	0	(414,003)	(414,003)	LESS:			
					Income Deductions	(441,276)	(441,276)	
					Grand Total State Appropriation	39,140	45,470	
45,440	0	0	45,440	45,440	TOTAL ALL FUNDS	39,140	45,470	

State of New Jersey
Department of the Treasury
Office of Management and Budget

New Jersey Institute of Technology
FY 2020 Budget Request

Revenue Statement (BB-103)

The following information should be reconciled to the "Statement of Revenues, Expenses, and Change in Net Assets" from the audited financial statements for fiscal years indicated as "actual."

Institution: NEW JERSEY INSTITUTE OF TECHNOLOGY	FY 2018 Ending June 30, 2018 ACTUAL	FY 2019 Ending June 30, 2019 ESTIMATED	FY 2020 Ending June 30, 2020 ESTIMATED
EDUCATION & GENERAL REVENUE			
General Services:			
Tuition and Fees			
Gross Tuition	157,355	161,217	164,722
Receipts from Tuition Increase (BB-102 & BB-105)	4,308	3,505	
Required fees	30,405	31,960	31,960
Subtotal Tuition and Fees (Gross)	192,068	196,682	196,682
Less student awards	(60,272)	(63,286)	(63,286)
Subtotal Tuition and Fees (Net)	131,796	133,396	133,396
Operating & Non - Operating Revenue			
Investments	3,201	2,168	2,168
Operating & nonoperating revenues	3,340	3,895	3,895
Subtotal Non - Operating Revenue	6,541	6,063	6,063
Subtotal General Services Income; excluding rate increase (BB-102 & BB-105)	194,301	199,240	202,745
Subtotal General Services Income; including rate increase	198,609	202,745	202,745
Other Non - Operating Revenue			
Base State Appropriation	35,440	35,440	35,440
Employee Fringe Benefits (Per OMB)	41,382 ⁽¹⁾	46,013 ⁽²⁾	46,013
FY Critical Needs Request	10,000	3,700	10,030
Subtotal, Other Non - Operating Revenue	86,822	85,153	91,483
TOTAL EDUCATION & GENERAL REVENUE	285,431	287,898	294,228
NET EDUCATION & GENERAL REVENUE	225,159	224,612	230,942
Auxiliaries			
Resident Life	15,831	16,122	16,122
Bookstore	167	189	189
Other	5,854	6,207	6,207
Total Auxiliaries (BB-102 & BB-105)	21,852	22,518	22,518
Less student awards	(5,463)	(5,594)	(5,594)
Subtotal Auxiliaries (Net)	16,389	16,924	16,924
Special funds			
Grants & Contracts	134,066	148,411	148,411
Other operating revenues	5,561	6,234	6,234
Nonoperating revenues	616	755	755
Other revenues	11,917 ⁽¹⁾	14,600	14,600
Subtotal Special funds (BB-102 & BB-105)	152,160	170,000	170,000
TOTAL REVENUE	393,708	411,536	417,866

(1) Actual FY2018 expense for Employee Fringe Benefits per the audited financials is \$61,153

(2) FY2019 Operating Budget for Employee Fringe Benefits is \$64,004.

NEW JERSEY INSTITUTE OF TECHNOLOGY
Revenue Reconciliation To Annual Financial Statement
(Dollars in thousands)
For the year ended June 30, 2018

Financial Statement Description

	E & G		Special		Additions/	FY18
	<u>Revenue</u>	<u>Auxiliaries</u>	<u>Funds</u>	<u>Subtotal</u>	<u>Deductions</u>	<u>Financial Statement</u>
Operating revenues:						
Student tuition and fees	192,068	-	-	192,068	(60,272) ⁽¹⁾	131,796
Federal grants and contracts	-	-	100,769	100,769	-	100,769
State grants and contracts	-	-	25,297	25,297	-	25,297
Other grants and contracts	-	-	5,054	5,054	-	5,054
Auxiliary enterprises	-	21,852	-	21,852	(5,463) ⁽²⁾	16,389
Other operating revenues	-	-	5,561	5,561	-	5,561
Total operating revenues	192,068	21,852	136,681	350,601	(65,735)	284,866
Nonoperating revenues:						
State appropriations	106,593	-	-	106,593	-	106,593
Gifts and bequests	1,831	-	2,961	4,792	-	4,792
Investment income	3,201	-	8,956	12,157	-	12,157
Other nonoperating revenues, net	1,509	-	616	2,125	-	2,125
Net nonoperating revenues	113,134	-	12,533	125,667	-	125,667
Other revenues:						
Capital grants and gifts	-	-	648 [#]	648	-	648
Additions to permanent endowments	-	-	2,298	2,298	-	2,298
Total other revenues	-	-	2,946	2,946	-	2,946
Total revenues	305,202	21,852	152,160	479,214	(65,735)	413,479

(1) Deductions for student awards: -\$60,272 (tuition & fees).

(2) Deductions for scholarship awards: -\$5,463 (Auxiliary)

(3) Employee Fringe Benefits totalled \$61,153 versus \$41,382 as reported by OMB

New Jersey Institute of Technology
FY 2020 Budget Request
FY 2019 Projected Tuition Revenue
Based Upon FY 2019 FTE Estimates

A. In-State							
6,736 FTE Undergraduate (Est.)	X	\$	14,174	(FY 2019 Tuition Rate)	=	\$95,476,064	
769 FTE Graduate (Est.)	X	\$	20,232	(FY 2019 Tuition Rate)	=	\$15,558,408	
B. Out-of-State							
437 FTE Undergraduate (Est.)	X	\$	29,586	(FY 2019 Tuition Rate)	=	\$12,929,082	
780 FTE Graduate (Est.)	X	\$	29,960	(FY 2019 Tuition Rate)	=	\$23,368,800	
SUBTOTAL						\$147,332,354	

FTE Undergraduate is equated to 32 student credit hours.
FTE Graduate is equated to 24 student credit hours.

	Y	N
Is full - time undergraduate tuition a flat rate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If yes, the flat rate applies to students taking at least 12 credits, but not more than 19 credits.		
Is full - time graduate tuition a flat rate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If yes, the flat rate applies to students taking at least 12 credits, but not more than 19 credits.		

C. FTE Executive Management Programs (Est)	14	641,000
D. FTE E-Tuition Rate (Est)	9	315,000
E. FTE Pearson Programs	129	2,960,000
F. Continuing Professional Education - Non-Credit		48,000
G. Summer / Winter Session Tuition	1220	8,502,000
SUBTOTAL		159,798,354

ADJUSTMENTS: (1) 4,923,646

NET TUITION REVENUE ANTICIPATED FOR FY 2019

164,722,000

(1) Adjustments represent the difference between the block rate tuition for full-time students charged (based on 12 credits, not 16 credits) versus the per credit hourly rate for part-time students as well as fluctuations between resident and non-resident enrollment, cancellations, and withdrawals.

New Jersey Institute of Technology
FY 2020 Budget Request

FY 2019 Tuition & Fee Schedule

	Charge Per Credit Hour	Annual Rate For Full-Time Student	Charge Per Occurrence (If Applicable)
Tuition			
<u>Resident</u>			
Undergraduate	539	14,174	N/A
Graduate	1,101	20,232	N/A
<u>Non-Resident</u>			
Undergraduate	1,265	29,586	N/A
Graduate	1,583	29,960	N/A
Fees Required Of All Students			
University Fee ⁽¹⁾	180	3,054	N/A
Student Activity - UG	6	110	N/A
Student Activity - G	5	88	N/A
Other Fees			
		Undergraduate	Graduate
Application		75	75
Commencement ⁽²⁾		120	120
Matriculation ⁽²⁾		160	160
Payment Plan Set-up		100	100
Payment Plan Late Fee		100	100
Re-instatement		N/A	N/A
Late Registration		100	100
Late Payment Penalty		500	500
First Year Student Fee		230	N/A
F/T Commuter Parking		325	325
P/T Commuter Parking		182	182
Parking- On Campus Resident		490	490
Thesis		N/A	75
Dissertation Binding		N/A	100
Maintaining Registration		25	50
Transfer Student Orientation		30	N/A
International Student		125	125
Optional Practical Training Application Fee		200	200
Health Insurance - if needed:		1,806	1,806
Room And Board - Academic Year			
Typical Student Housing		8,975	8,975
Typical Meal Plan Charge		3,800	3,800
		12,775	12,775

⁽¹⁾ The 'University Fee' is charged to students enrolled in college-credit courses at NJIT. The purpose of this fee is to continue to help support a portion of the costs associated with an array of varied, but integral services and projects that directly affect our students. Some of these important areas include: Student Health Services Office, Campus Center, computer Labs and technology infrastructure, campus facilities, Admissions, Student services, and Career Services offices, and an array of academic, student, and athletics programs.

⁽²⁾ A one-time matriculation fee will be assessed to all new matriculating students (full or part-time) beginning with their first registration (fall 2014 semester). Students assessed this fee would not be assessed the commencement fee once they apply for graduation. The commencement fee will continue being assessed to all students who had been previously registered prior to fall 2014 semester.

FY 2019 Projected Tuition and Fee Schedule (FEES)

Institution: New Jersey Institute of Technology

Use appropriate column for each fee

	Charge per credit hour		Annual rate for full-time student	Undergraduate Charge per occurrence (if applicable)	Graduate Charge per occurrence (if applicable)	Estimated Gen Services Revenue for FY 2019	Estimated Auxiliary Revenue for FY 2019	NJIT Estimated Total Revenue for FY 2019	Estimated Restricted/ Agency Revenue for FY 2019
TUITION:									
Resident									
Undergraduate	539		14,174	N/A	N/A	N/A	N/A	N/A	N/A
Graduate	1,101		20,232	N/A	N/A	N/A	N/A	N/A	N/A
Non-Resident									
Undergraduate	1,265		29,586	N/A	N/A	N/A	N/A	N/A	N/A
Graduate	1,583		29,960	N/A	N/A	N/A	N/A	N/A	N/A
REQUIRED FEES: (Required for all students)									
University Fee - Academic Year Fall & Spring	180	(a)	3,054	N/A	N/A	28,361,000	-	28,361,000	-
Summer Fee						430,000		430,000	
Winter Fee						59,000		59,000	
Student Activity - UG	6		110	N/A	N/A	-	-	-	800,000
Student Activity - GR	5		88	N/A	N/A	-	-	-	180,000
OTHER FEES:									
						209,000		209,000	
						405,000		405,000	
						8,000		8,000	
						26,000		26,000	
Application/Re-admission/Non-Matriculation	N/A		N/A	75	75	648,000	-	648,000	-
Commencement	N/A		N/A	120	120	27,000	-	27,000	-
Matriculation Fee	N/A		N/A	160	160	608,000			
Payment Plan Set-Up	N/A		N/A	100	100	254,000		254,000	
Late Registration	N/A		N/A	100	100	70,000	-	70,000	-
Late Payment Penalty	N/A		N/A	500	500	520,000			
First Year Student Fee	N/A		N/A	230	N/A	279,000	-	279,000	-
Thesis	N/A		N/A	N/A	75	5,000	-	5,000	-
Dissertation	N/A		N/A	N/A	100	6,000	-	6,000	-
Transfer Student Orientation	N/A		N/A	30	N/A	35,000	-	35,000	-
Health Insurance (Resident, Non-Resident, International)	N/A		N/A	1,806	1,806	-	-	-	-
International Student	N/A		N/A	125	125	383,000	-	383,000	-
ID Card Replacement	N/A		N/A	25	25	27,000	-	27,000	-
Optional Practical Training				200	200	248,000			
Commuter Parking - FT	-		-	325	325	-	1,989,000	1,989,000	-
Commuter Parking - PT	-		-	182	182	-	459,000	459,000	-
On-Campus Resident Parking	-		-	490	490	-	315,000	315,000	-
	-		-	-	-	-	-	-	-
TOTAL FEE REVENUE:						31,960,000	2,763,000	33,347,000	980,000
ROOM AND BOARD:									
Typical Student Housing	N/A		8,975	N/A	N/A		17,789,000	N/A	
Typical Meal Plan Charge	N/A		3,800	N/A	N/A		1,729,000	N/A	

NOTES:

(a) Per semester charge for part time students.

**NEW JERSEY INSTITUTE OF TECHNOLOGY
SALARY PROGRAM FY2019 AND FY2020**

ESTIMATED SALARY PROGRAM BY BARGAINING UNIT:

<u>Union Totals</u>	<u>FY19 FTE</u>	<u>FY19 Base Salary</u>	<u>FY19 Estimated Salary Program</u>	<u>FY19 Anticipated Cash Need</u>	<u>FY20 Base Salary</u>	<u>FY20 Estimated Salary Program</u>	<u>FY20 Anticipated Cash Need</u>
afscme	109.00	5,348,541	80,228	5,428,769	5,428,769	54,288	5,483,057
aft-ucan	10.00	493,928	8,644	502,572	502,572	5,025	507,597
fop	23.00	1,311,231	52,449	1,363,680	1,363,680	13,637	1,377,317
fop - soa	9.00	811,958	16,239	828,197	828,197	8,282	836,479
njsolea	3.00	338,185	6,764	344,949	344,949	3,449	348,398
non-aligned	175.76	24,987,694	437,285	25,424,979	25,424,979	254,250	25,679,228
opeiu	121.94	6,019,612	120,392	6,140,004	6,140,004	61,400	6,201,404
psa Faculty	292.00	43,097,275	754,202	43,851,477	43,851,477	438,515	44,289,992
psa Lecturer	106.00	7,460,743	130,563	7,591,306	7,591,306	75,913	7,667,219
psa non tenure Faculty	9.00	720,286	12,605	732,891	732,891	7,329	740,220
psa Staff	322.64	25,917,851	453,562	26,371,414	26,371,414	263,714	26,635,128
Grand Total	1181.35	116,507,304	2,072,934	118,580,238	118,580,238	1,185,802	119,766,040

SALARY PROGRAM PARAMETERS:

	<u>FY18</u>	<u>FY19</u>	<u>FY20</u>
	<u>FY18 Deferred</u>		
	<u>Salary Program</u>	<u>Est. Salary Program</u>	<u>Est. Salary Program</u>
afscme		1.50%	1.00%
aft-ucan		1.75%	1.00%
fop		4.00%	1.00%
fop - soa		2.00%	1.00%
njsolea		2.00%	1.00%
non-aligned		1.75%	1.00%
opeiu		2.00%	1.00%
psa Faculty		1.75%	1.00%
psa Lecturer		1.75%	1.00%
psa non tenure Faculty		0.00%	0.00%
psa Staff		1.75%	1.00%

DISTRIBUTION BY ELEMENT:

<u>Element</u>	<u>FY2019 Estimated Salary Program</u>	<u>FY2020 Estimated Salary Program</u>
Instruction	1,024,763	594,666
Research	78,368	45,389
Public Service	7,126	4,143
Academic Support	229,066	131,427
Student Services	186,945	107,294
Institutional Support	425,522	226,120
Operation and Maintenance of Plant	121,144	76,763
Grand Total	2,072,934	1,185,802

SECTION 4

FY2020 PRIORITY REQUESTS

**NEW JERSEY INSTITUTE OF TECHNOLOGY
FY2020 BUDGET PRIORITY REQUESTS**

This section identifies budgetary needs above our current appropriation that are defined as initiatives to enable New Jersey's polytechnic university to strategically provide a quality STEM workforce, applied science and technology research, community service, and economic development-industry partnerships to meet New Jersey economic and societal goals. Below is a summary of our priority requests for FY2020 which support these objectives.

Total FY2020 Priority Requests (\$000's)

<u>Priority Request:</u>	<u>Total \$</u>	<u>FTE</u>
1) State Authorized FTE	\$0	321
2) Medical Devices Innovation Cluster: Phase-2 Proposal	\$9,000	0
3) Need Based Retention Awards	\$ 1,030	0
<u>Grand Total</u>	<u>\$10,030</u>	<u>321</u>

NJIT is one of 32 polytechnic universities in the United States and is New Jersey's public comprehensive STEM University. It enrolls more than 11,500 students annually in bachelor's, master's, and doctoral degree programs; expends approximately \$162 million on research activity, and generates an economic impact of more than \$1.74 billion on the State of New Jersey each year. The university's academic and research programs are closely aligned with the design, computing, engineering, and life sciences clusters identified in the State Strategic Job Growth Plan that recognizes the need to bring technology and the sciences to bear on in ways that will improve quality of life and spur economic growth. The Medical Devices Innovation Cluster will serve as a beacon for economic growth for the greater Newark area and the State of New Jersey.

**NEW JERSEY INSTITUTE OF TECHNOLOGY
FY2020 BUDGET PRIORITY REQUESTS**

1) State Authorized FTEs

In FY09, after a detailed review of NJIT authorized positions by NJ OMB, the State increased NJIT's State authorized FTE count to 1,246 (95% of 1,313 requested). During the FY11 State budget process, the authorized FTE count was then reduced to 1,187, a decrease of 59, or 4.7%.

NJIT continues to display significant growth in enrollment, research, and operations. Total operations have grown from \$281.9 Million in FY11 to \$545.2 Million in FY19, an increase of \$263.3 million, or 93.4%. Total student headcount has increased from 11,812 in FY11 to 14,522 for FY19, a growth of 23%.

Our FY20 budget request includes 126 additional professional staff FTEs. First, to provide the proper support services for our growing and evolving student body, as many of the requested FTEs will be rolled out as academic advisors, financial aid specialists, counseling center staff, disability services professionals, lecturers and other student life staff. The ability to provide the right support structure for our students will continue to help improve retention and graduation rates as these are key metrics for both NJIT and the State's higher education system as a whole. Secondly, additional staff is required to support and also enable NJIT to partner with industry to create research and development opportunities for technological solutions to our society's most pressing challenges.

NJIT is also requesting recognition of our UCAN Teaching/Research Graduate Assistants which currently total 340; these doctoral students work 20 hours a week would equate to an additional 195 FTEs. Therefore NJIT requests that our State Authorized FTE count be increased to 1,508, an increase of 321 above our current 1,187 FTE count.

Summary of State Authorized FTE Budget Request

<u>Priority Request</u>	<u>FTE</u>
Professional Staff FTEs	126
UCAN TA/RA Grad Assistant FTEs	195
Total State Authorized FTE Increase	321

**NEW JERSEY INSTITUTE OF TECHNOLOGY
FY2020 BUDGET PRIORITY REQUESTS**

2) Medical Devices Innovation Cluster: A Technology Development Ecosystem for New Jersey's Life Sciences Industry Phase-2 Proposal

New Jersey Institute of Technology gratefully acknowledges the partial funding support from the State of New Jersey to develop a medical devices innovation cluster as Phase-1 of the Technology Development Ecosystem for New Jersey's Life Sciences Industry. The Phase-1 funding has enabled the ongoing renovation and repurposing of the Microelectronics Research Center (MRC) to provide the necessary basic infrastructure facility for fabrication of microelectronic and microfluidic devices and sensors.

This Phase-2 proposal, submitted by New Jersey Institute of Technology, is to further expand the newly renovated basic infrastructure facility to include system integration and testing facility with critically needed advanced equipment to complete the development of medical devices innovation cluster. The proposed innovation cluster as a model for economic growth will yield a transformative solution addressing a two-part problem:

1. The need for the New Jersey medical device industry to innovate in order to grow; and
2. The need to develop point-of-care technologies for high risk patients and the elderly in order to improve care and lower costs.

Status of New Jersey's Medical Device Industry

New Jersey's Life Sciences Industrial cluster has a total economic impact of nearly \$110 billion, representing a quarter of New Jersey's gross domestic product. The Medical Device sub-sector includes 700 companies responsible for 65,000 direct and indirect jobs in the state. Big pharmaceutical companies that market directly to consumers may be better known, but New Jersey's med-tech firms are no less dominant in global markets. Johnson & Johnson, founded in New Brunswick in 1886, and Becton Dickinson, established in East Rutherford in 1897, launched med-tech as a US industry, and their annual revenues are among the top five in the world. Other major brands now in New Jersey include: Abbott Laboratories, Honeywell International, Inc., Integra Life Sciences, Micro Corp., Oticon, Inc., Roche Molecular Systems, Inc., SafiloUSA, Inc., Sivantos, Inc., and Stryker Orthopaedics. The medical device industry is diverse, spanning medical electronics and equipment, surgical supplies, prosthetics, and diagnostics. Comprised of primarily manufacturing firms, the medical device industry provides employment across a wide range of skill levels, with jobs in this sector paying twice the statewide average.

New Jersey's Life Sciences sector has long been the envy of other states and is increasingly the target of their business attraction efforts. Changing business models and the emergence of disruptive technologies dilute some factors that have kept this industry rooted in New Jersey for over a century. States seeking to poach New Jersey companies have recognized these trends and are creating conditions for business success that will prove to be attractive. New Jersey needs to respond in kind to anchor this industry and all of the positive contributions it makes to the state economy.

NEW JERSEY INSTITUTE OF TECHNOLOGY FY2020 BUDGET PRIORITY REQUESTS

Societal and Economic Impacts of Medical Technologies

Some of the most exciting and challenging recent developments in medical devices are the point-of-care technologies that provide monitoring and specific diagnostic testing at home to improve patient care, therapeutic intervention, and rehabilitation, specifically for high-risk patients and elderly individuals living alone. Using devices networked with electronic healthcare record (EHR) systems, point-of-care technologies can alert healthcare providers in real time regarding changes in a patient's condition, allowing for immediate interventions and follow-up to reduce hospitalization, improve patient outcomes, and deliver precision medicine for maximal efficacy¹. This is of particular concern for New Jersey, where healthcare is a critical issue that carries with it a high societal and economic impact. According to the NJ Department of Labor and Workforce Development's recent study ², the elderly population (65 & over) in New Jersey is projected to grow by 62% between 2010 and 2030, accounting for 19.9% of the state's total population in 2030 (up from 13.5% in 2010). At the same time, a recent study on healthcare costs published by the *Journal of the American Medical Association* finds that healthcare spending in the United States rose nearly \$1 trillion between 1996 and 2013³. The leading factor in this increase was the growing elderly population.

Innovation Ecosystem

The task of keeping Life Sciences companies rooted in New Jersey while also addressing the state's increasing health care needs is a complex problem. One solution is the development of a medical devices innovation ecosystem that would facilitate the efforts of both large and small companies in innovating, developing, and commercializing technologies in the medical device sub-sector. Such an ecosystem would serve to anchor existing Life Sciences companies in the State of New Jersey, attract small to medium enterprises from other states, and support startup companies seeking to enter the medical device and technology market (see Appendix A for additional details).

However, there are three significant barriers to building a corporate-driven innovation ecosystem for the medical device industry. The first *barrier* is generic to any cluster – it is difficult to assemble a critical mass of new businesses in any technology area such that a given original equipment manufacturer (OEM) will find a useful and willing partner. The second *barrier* reflects the expense of any proposition seeking to nurture new companies from inspiration to profitability. While the first barrier makes it difficult for even large companies to sustain captive incubator programs, the second has caused many of the state's incubators to fold under the cost of operating a facility as a public good. The third *barrier* is specific to technology-rich product sectors. Fabrication of working prototypes and early stage commercial products, particularly medical devices, takes a daunting investment in specialized equipment that is beyond the capacity of a start-up or small company to bear.

¹ <https://allofus.nih.gov/>

² <http://lwd.dol.state.nj.us/labor/lpa/content/njsdc/2013WU%20PopLFProj2030.pdf>

³ <https://jamanetwork.com/journals/jama/article-abstract/2661579?redirect=true>

NEW JERSEY INSTITUTE OF TECHNOLOGY FY2020 BUDGET PRIORITY REQUESTS

For example, many OEMs have tried to solve the innovation pipeline by creating their own start-up clusters. Johnson & Johnson started multiple J-Labs across the country, Celgene plans an incubator in Summit, Wells Fargo launched its fin-tech Startup Accelerator in San Francisco, and Barclay's announced a similar venture in New York. All of these companies recognize the value of co-location and densification around a common end market. What they are learning, however, is that even with a single application focus, the cost of running such an enterprise is greater than the value of deal flow for the single company running the incubator/accelerator. At the same time, the traditional supply chain model is rapidly changing as large firms find themselves without the internal resources to master emerging technologies. New advances such as nano-systems, materials, sensors, machine learning, and advanced robotics are revolutionizing medical devices of all types; however, these technological advances fall outside the core competency base upon which most companies have relied over the last century. In order to embrace change without bearing all of the developmental risks, large companies increasingly rely on small companies to mature new technologies to readiness for commercialization. Thus, the old supply chain model is giving way to a new innovation network model that relies on increased intimacy between technology developers and commercializing firms in the form of partnerships formed at the earliest stages of ideation.

On the other hand, the small to medium enterprises (SMEs) upon which large companies rely for innovations consist of companies of fewer than 500 employees, representing 99.7% of US employer firms and accounting for more than 60% of all employment. New Jersey's medical device sector reflects those statistics. Even with the presence of so many global leaders in the state, the average company size is less than 50 employees, and companies of this scale and orientation have never possessed the resources to maintain and equip dedicated R&D facilities, let alone the advanced material synthesis and characterization, nano-structuring, and micro electro-mechanical device fabrication equipment that is required for medical device innovation – expensive, specialized equipment. Such demands are beyond the capabilities of most SMEs, making them particularly vulnerable to dramatic shifts in the technology base for their sector and creating a tension between the need to innovate and the tools required to do so.

The public-private model proposed here addresses these difficulties by using the target market focus to attract a critical mass of related small to medium sized enterprises (SMEs), but offers them to all the companies of a sector, not just a single enterprise. As such models are in their infancy, there is an opportunity for New Jersey to take a lead in pro-actively forming and sustaining public-private innovation clusters that secure the state's Life Sciences industrial base – this proposal addresses an approach to accomplish that end.

Medical Devices Innovation Cluster– A New Jersey Network and Technology Translation Ecosystem (TTE)

With its expertise and history in the Life Sciences industry, New Jersey is well positioned to take the initiative in developing a public-private medical devices innovation cluster with the New Jersey Institute of Technology (NJIT), the state's premier public polytechnic institution, as its partner. NJIT is uniquely qualified to work with the state in developing the medical devices innovation cluster, particularly given the university's mission of economic development. NJIT will focus its full array of technology business services to expedite the nucleation, acceleration and

NEW JERSEY INSTITUTE OF TECHNOLOGY FY2020 BUDGET PRIORITY REQUESTS

maturation of medical technologies. It will provide access to advanced prototype fabrication, characterization and analytic equipment to support innovators. Finally, it will make available its talent pool of faculty researchers and well trained students to support the needs of this sector, a sector that will become a hub in NJIT's Enterprise Development Center, a motivation for expanding university investment in analytic and fabrication equipment, and a theme for new faculty recruitment and for creation of related instructional programs addressing workforce needs.

NJIT has a long history of supporting technology business incubation. Its Enterprise Development Center (EDC), opened in 1989, is the state's oldest and largest such operation, having grown to 95 companies in residence that generate \$145 million in total output for the state, supporting roughly 910 jobs and creating \$3.4 million in tax revenues for New Jersey. The business initiation and growth services provided by the EDC result in a 5-year post-graduation persistence rate of over 85% - significantly higher than the national average of under 50%.

In 2014, NJIT formed the New Jersey Innovation Institute (NJII) to execute the university's technology based economic development mission. NJII has developed cluster formation and growth services as part of its "innovation as a service" suite. These services are designed to build and grow business clusters around NJII's core market verticals and connect these clusters to anchor industries through agile strategy sessions, open innovation challenges, shared technology development partnerships and supply chain initiatives. As an example, a JP Morgan Chase \$3M Small Business Forward grant supported the NJII Health IT Connections program that guided over 100 companies in the last three years to achieve 46% annual revenue growth and over 40% annual employee growth as a result of the cluster building activities.

The proposed medical devices innovation cluster will be supported by an NJIT-NJII-EDC Technology Translation Ecosystem (TTE), a hub that will facilitate innovation by providing expertise and resources in advanced materials, sensors, communications, and machine intelligence – that is, technologies that stand to revolutionize medical devices of all types. NJIT would provide companies in the cluster with expertise in related research areas, drawing on the more than 50 faculty and researchers from at least ten NJIT departments already engaged in ongoing research projects in the following areas:

- Biomaterials, Scaffolds and Tissue Engineering
- Biosensors and Labs on a Chip
- Biosensors, Wearable Biosensors, and Point-of-Care Technologies for Monitoring and Therapeutic Intervention
- Polymers and Membrane Technologies
- Particle Engineering and Particulate Composites
- Advanced Materials and Nanotechnologies
- Artificial Intelligence (AI) and the Internet of Things (IoT)

Equipment providing advanced research and technology development capabilities focused in the fields of biomedical engineering and materials science and engineering would be available

NEW JERSEY INSTITUTE OF TECHNOLOGY FY2020 BUDGET PRIORITY REQUESTS

to member companies of the medical devices innovation cluster through NJIT's new Life Sciences and Engineering Center (LSE) that features state-of-the-art materials-characterization equipment including a Scanning Electron Microscope (SEM), a Tunnel Electron Microscope (TEM) and an X-ray Diffraction (XRD) Spectroscopy. The laboratory space in the LSE Center is further designed to foster collaborative research in biomaterial, biosensor and tissue engineering through its open lab design. (The first and second floors of the LSE have wet lab-based open research space. An additional unfinished laboratory space of over 10,000 square feet is available on the third and fourth floors.) With the current Phase-1 and new Phase-2 funding, renovations to the former NJIT Microfabrication Research Center would additionally provide micro- and nano-fabrication facilities for the development of semiconductor and microfluidic sensors and devices.

In summary, through the development of a Medical Devices Innovation Cluster and the NJIT-NJII-EDC Technology Translation Ecosystem (TTE) Center, NJIT would lead New Jersey's efforts to accelerate the innovation and translation of point-of-care medical devices and healthcare applications. The TTE Center would provide infrastructure support, foster the development of interdisciplinary clusters of research expertise, and promote collaborations among the stakeholder groups including innovators, developers, entrepreneurs, investors and users. The TTE Center will foster a new model of innovative translational research that will leverage technological expertise from academia, industry, and federal and regulatory agencies to target unmet healthcare needs with a high societal impact. The ecosystem will target transformative improvements in diagnostics and treatments for complex diseases and medical conditions that could not be met by researchers working alone, but instead require close collaborations among innovative engineers, scientists, clinicians, and implementation experts. In the long run, the Medical Devices Innovation Cluster and TTE Center will provide not only improved healthcare outcomes and reduced healthcare costs but also rapid growth in New Jersey's economy, opportunities to attract students and researchers to the state through cutting-edge healthcare expertise, and the generation of new healthcare-related STEM jobs in the state.

Phase-1 Funding Report on the Development of Medical Devices Innovation Cluster

NJIT submitted the original proposal for the development of Medical Devices Innovation Cluster and Technology Translation Ecosystem (TTE) Center in February 2018 with a total budget request of \$12.5 million. The original proposal was well received but partially funded for \$3.7 million. The Phase-1 funding has enabled NJIT to support ongoing renovation and re-purposing of the previously decommissioned Microelectronics Research Center to provide a state-of-the-art cleanroom class 1000 facility for the fabrication of micro- and nano-electronic devices along with a basic microfluidic sensor fabrication facility. This renovation was budgeted for \$3 million in the original proposal. With the current Phase-1 funding of \$3.7 million, NJIT is completing the renovation with the purchase of basic photolithography equipment required to develop micro- and nano-electronic devices and sensor. The following table shows the assignment of \$3.7 million Phase-1 funds.

**NEW JERSEY INSTITUTE OF TECHNOLOGY
FY2020 BUDGET PRIORITY REQUESTS**

**Budget Justification
Phase-2 Priority Request
Medical Device Fabrication Infrastructure**

Micro & Nano Device Fabrication

The use of micro-electronic cleanroom technology to fabricate functioning micro-electro-mechanical systems (MEMS) has increased in sophistication, facilitating its applicability to med-tech. Even more recently, researchers at NJIT have demonstrated practical applications of nano-technology to assemble implantable fuel cells deriving power from the sugars metabolized in the blood stream, and probes making measurements on single cells. Work like this requires access to highly specialized equipment in sterile facilities that are expensive to maintain. NJIT has maintained a class-10 cleanroom since 1990 that needs a technology boost to support technologists working on the forefronts of device technology.

Such new micro- and nano-fabrication technologies would be enablers for the development of medical sensors and devices. These sensors and devices include MEMS (Micro-Electro-Mechanical Systems) and Microfluidics systems such as Lab-on-a-Chip. Smart medical devices with specific biomarkers can sense, monitor and control physiological processes with embedded communications connected to medical information systems and servers to support point-of-care diagnostics and therapeutic intervention. Such smart connected sensors and devices with advanced data analytics and artificial intelligence (AI) algorithms are expected to transform medical device industry and the practice of medicine. With the proposed TTE Center, medical sensors and devices will be prototyped, tested and characterized with data communication protocols through advanced IT and Internet of Things (IoT) technologies. The ability to design and build prototype smart medical sensors and devices that reflect the latest technologies in each of these areas is critical to rapidly growing the medical devices startup industry from concept to commercial operation. The proposed prototype building facility will also reduce the risk to investors when considering early stage med-tech companies.

This Phase-2 proposal therefore requests funds to complete the renovation the current Microelectronics Research Center to develop advanced micro- and nano-device fabrication technologies and build a new Microfluidics Sensor Fabrication Laboratory to develop biomarkers-based medical sensors such as Lab-on-a-Chip for detection of HIV and other infectious diseases as well as specific types of cancers. An itemized budget for fabrication infrastructure for micro/nano electronic and microfluidic sensors and devices is attached in Appendix B.

Advanced Prototyping, Machining & Additive Manufacturing

Small companies do not have the resources to equip, maintain and operate prototyping centers that can take an idea from blueprint to execution. Leveraging university investments in such resources to support instructional and scientific research needs is the proposed solution to this problem. NJIT's recently opened Makerspace is designed to support academic and commercial use. The current suite of metal-working and additive manufacturing technologies includes a

NEW JERSEY INSTITUTE OF TECHNOLOGY FY2020 BUDGET PRIORITY REQUESTS

spectrum of advanced 3-D printing and machining technologies suitable for building small to micro-scale prototype devices efficiently and economically.

Medical Device Characterization, Testing and Analytics Infrastructure

As medical device technology moves from the macro- to micro- and even nanoscales, it is necessary to be able to view both the device and its performance in situ using various forms of advanced imaging equipment. NJIT's new Integrated Life Sciences and Engineering Center expands the university's complement of leading-edge analytical tools to include a High-Resolution Tunnel Electronic Microscope, a Scanning Electron Microscope (SEM), an Atomic Force Microscope (AFM), a 2-Photon Fluorescence Microscope, an NMR Spectroscopy, and a Raman Spectroscopy for advanced material characterization. However, additional equipment including an FTIR Spectroscopy, a Confocal Microscope, an Epifluorescent Imaging Microscope System and an Electrochemical Microprobes necessary for testing and characterization of micro/nano electronic and microfluidic sensors and devices are requested. The proposed set of tools would be critical for the validation and translation of medical sensor and device technologies that address unmet needs for the robust growth of medical device companies in New Jersey. An itemized budget for medical device characterization and analytics infrastructure is attached in Appendix B.

Faculty Seed Grants for Technology Translation to Market and Acceleration to Commercialization

The proposed medical devices innovation cluster and TTE will help identify and facilitate interdisciplinary collaborative teams fostering a path of technology translation along the healthcare innovation cycle. As the NJIT-NJII-EDC ecosystem brings these groups of researchers, developers and stakeholders together, the following types of collaborative projects would be promoted and funded in acceleration of the innovation cycle:

Early Innovation Translation and Proof-of Value Projects will include collaborative pilot projects to demonstrate proof-of-concept/principle for improving patient care that typically involves devices, procedures, and diagnostic systems for existing medical fields and practices. The objective is to scientifically explore a novel idea by showing early-stage proof of concept, thereby justifying advancement to the proof-of-value stage to generate a viable candidate for further pre-commercial development. At this stage, all risks associated with the target device must be recognized and addressed directly. The collaborative project will investigate existing medical fields and practices, and show the clinical value for the unmet healthcare need in order to license the technology or to receive additional funding for prototyping, technical de-risking, or early-stage clinical studies. This would be pursued through technology research clusters at NJIT working with market research clusters and stakeholder groups.

Commercial Accelerator Projects will focus on business plan development and technology transfer to an existing company or forming a new start-up company establishing market channels. These projects, often called incubation stage, include advanced clinical studies and trials for validation of potential impact on patient care. The projects typically require

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investment and/or business development expertise to attract interest from an entrepreneur or commercial entity for licensing and commercialization. This will be pursued with the resources available at NJIT, NJII, partner institutions, EDC, and NJIT Highlander and other angel investor groups.

Advanced Translation and Commercial Growth Projects will involve technical, medical, and business development experts in the development and implementation of regulatory, random clinical trials, and medical practice adoption plans to demonstrate potential transformational changes in healthcare for further investment funding and large-scale commercialization. This will be pursued with the resources available at NJIT, NJII, partner institutions, EDC, and NJIT Highlander and other angel investor groups.

Infrastructure for Acceleration of Technology Translation for New Start-Ups and Workforce Development

The most critical aspect of training future leaders and innovators in establishing new startup companies as well as growing new startups is to provide them an accelerated translation to market experience. The proposed TTE Center will provide an integrated experience to owners of potential new or recently established startups to help them navigate through the translation pathway from innovation to market. NJIT has effective graduate courses and certificate programs in entrepreneurship and business and risk management. A cohort of applicants would be provided entrepreneurship training with the objective of scientifically de-risking a novel idea showing early-stage proof of concept, and then proceeding on to the proof-of-value stage to establish a viable start-up for further pre-commercial development with investment funding.

Full Request

In total, NJIT requests \$9,000,000 in funding from the New Jersey FY20 Budget to support the creation of a regional medical devices innovation cluster.

Summary of Medical Devices Innovation Cluster – Phase-2 Proposal Budget Request

<u>Priority Requests (\$000's)</u>	<u>Total \$</u>
Medical Device Fabrication Infrastructure Requirements	\$3,500
Medical Device Characterization & Analytics Requirements	\$1,500
Life Sciences & Engineering Building 3 rd Floor Renovation for Medical Device Characterization and Analytics	\$3,000
Early Innovation Translation and Proof-of-Value Projects	\$250
Commercial Accelerator Projects	\$250
Advanced Translation & Commercial Growth Projects	\$500
Total	\$9,000

Appendix A – Technology Development Ecosystem: Transitioning Technology Innovation to Market

NEW JERSEY INSTITUTE OF TECHNOLOGY FY2020 BUDGET PRIORITY REQUESTS

NJIT will form a hub with its Life Sciences and Engineering Center, Microelectronic Research Center, the New Jersey Innovation Institute, and Enterprise Development Center for expanding university investment in innovative device fabrication and data analytics. This initiative is well aligned with NJIT's *2020 Vision* strategic plan for new faculty recruitment, translational research clusters, and creation of related instructional programs addressing workforce needs.

The technology innovation, acceleration, and translation process includes: identifying and understanding the unmet market needs of stakeholder groups, developing an innovative idea, brainstorming feasibility with expert stakeholders, building prototypes, and developing resources to facilitate and accelerate translation towards technology validation. For identifying market needs, stakeholder groups include domain experts and users (for example, healthcare providers, clinicians, and patients for healthcare applications), researchers, industry leaders, innovators, and entrepreneurs. In the later stages of the innovation and translation cycle, other stakeholders, such as policymakers, regulatory agency providers, and environment and infrastructure experts will be added.

To help investigators navigate the translation process, customized Key Performance Indicators will be used in collaboration with assigned stakeholder groups in the following areas:

Market/Business Need Assessment: This area determines if there is a significant unmet need with enough buyers willing to acquire the innovation at a sustainable price. Market needs will be defined with respective stakeholder groups for healthcare technologies and applications.

Innovation: This area determines whether an innovation will be accepted and adopted in the healthcare market based on improved outcomes or lowered costs.

Technology Development and Integration: This area determines if the technology is feasible and will work better and at lower cost than the alternatives.

Regulatory Compliance: This area determines standards and regulations to be followed and proven, the best pathway to gain regulatory approval, and how long it will take/how much it will cost.

Each of the above areas will have review panels of stakeholder groups for the respective application area (clinical/industry/business) to assess and mentor technology translation from research to commercialization with the development of necessary resources for the following stages of the healthcare innovation cycle:

1. **Need and Market Assessment:** Insights into unmet clinical or market needs and available solutions.
2. **Ideation:** Potential solution described to meet the need.
3. **Proof of Concept:** Key component concepts validated in models and value proposition articulated.
4. **Proof of Feasibility:** Feasibility of whole solution demonstrated in models and feedback from stakeholders.

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5. **Proof of Value:** The potential of the solution to work and create value for all stakeholders is demonstrated.
6. **Initial Clinical/Market Assessment:** Development of prototypes and collection of clinical and impact data.
7. **Validation of Solution:** The solution is shown to be effective, and its value to all stakeholders is validated.
8. **Approval and Launch:** Institutional and regulatory approval for pre-commercial entity.
9. **Commercialization and Use:** The technology is produced and used in practice.

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Appendix B – Itemized Budget

The itemized requested budget for the creation of a Medical Devices Innovation Cluster, including Medical Device Fabrication Infrastructure and Medical Device Characterization and Analytics Infrastructure Requirements, is provided below.

Micro-Nano Fabrication Laboratory

E-Beam Lithography (partially funded from Phase-1 Grant)	\$500,000
Photolithography Mask Aligner	\$450,000
Thin-Film Deposition (PVCVD/LPCVD)	\$300,000
Deep Reactive Ion Etching (DRIE) Dry Etching Processer	\$500,000
Oxidation/Diffusion Furnaces	\$150,000
Metallization (evaporation and sputtering)	\$150,000
Packaging (polishing, bonding, dicing, etc.)	\$150,000

Microfluidic Sensor Fabrication Laboratory

Sputter Coater	\$150,000
High Resolution Ion Beam and Sputter Coater	\$300,000
Nanomill	\$100,000
Wet Benches with Acid, Solvent and Electroplating Fumehoods	\$500,000
Sample Preparation Ovens and Probes	\$250,000
Ellipsometer (available from ELF-LSE)	

Total Medical Device Fabrication Infrastructure **\$3,500,000**

Medical Device Characterization and Analytics Infrastructure

FTIR Spectroscope	\$200,000
Table Top SEM	\$150,000
Confocal Microscope System	\$250,000
Epifluorescent Imaging Microscope System	\$250,000
High Speed Camera	\$50,000
Micro PIV System, Probe Station and Electrical Characterization	\$200,000
Non-contact Profilors	\$150,000
Electrochemical Analyzer System	\$250,000
Raman Spectroscope (available from ELF-LSE)	
Atomic Force Microscope (available from ELF-LSE)	

Total Medical Device Characterization and Analytics Infrastructure **\$1,500,000**

Faculty Seed Grants for Technology Translation to Market and Acceleration to Commercialization \$1,000,000

**NEW JERSEY INSTITUTE OF TECHNOLOGY
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Life Sciences and Engineering Building 3rd Floor Renovation for Medical Device Characterization and Analytics	\$3,000,000
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Budget Request Summary:

Total Equipment	\$5,000,000
Total Renovation and Facility Upgrade	\$3,000,000
Faculty Seed Grants for Technology Translation to Market and Acceleration to Commercialization	<u>\$1,000,000</u>
Grand Total	\$9,000,000

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3) Need Based Retention Awards

There is an unmet obligation at NJIT for need based aid for undergraduate in-state students and transfer students. These are students with financial hardships that require additional aid to close the gap between unmet Tuition and Fees greater than \$500 but less than \$5,000 after federal, state and institutional aid.

Regular Admitted Students

An analysis of the entering freshman class data revealed that for students with a remaining need greater than \$500, but less than \$5,000, the first year retention rate was 5 points below freshman with a remaining need of less than \$500. Consequently, this gap persisted, and in fact became slightly higher by their junior year. The earlier we are able to provide financial assistance to this population, the more impactful those dollars become in improving the likelihood of retention and ultimately graduation from NJIT with reduced student debt. NJIT would like to request funding to support need-based retention scholarships, totaling \$750,000 to fill a gap in remaining student need.

Transfer Admitted Students

A similar, but larger, performance gap exists among entering transfer students. On average, students with a remaining need gap of \$500 to \$5,000 have a 1-year retention rate of seven percentage points below their peers. This gap remains consistent when 2-year retention rates are considered. The cost of filling the need gap for this population of transfer students is estimated at \$280,000.

With a total cost of \$1,030,000 to support all students (regular and transfer admits) in their first and second year of studies, this program aims at increasing the retention rates by 5% (regular admits) and 7% (transfer students) with similar eventual increases in the four- and six-year graduation rates.

Summary of Need Based Retention Award Budget Request

<u>Priority Requests (\$000's)</u>	<u>Total \$</u>
Regular admitted students	\$750
Transfer admitted students	\$280
Total	\$1,030

STATE OF NEW JERSEY
DEPARTMENT OF THE TREASURY
OFFICE OF MANAGEMENT AND BUDGET
FISCAL YEAR 2020
PLANNING DOCUMENT BUDGET INITIATIVE FORM (BIF)
For
DEPARTMENT OF STATE
NJ INSTITUTE OF TECHNOLOGY

Title: State Authorized FTE
Type: Growth
CIC: Potential Growth (Discretionary) ☐ Legislation ☐ Capital Request ☐ It Component
Space Needs: No Effect **Rank:** 1

Initiative Description:

In FY09, after a detailed review of NJIT authorized positions by NJ OMB, the State increased NJIT's State authorized FTE count to 1,246 (95% of 1,313 requested). During the FY11 State budget process, the authorized FTE count was then reduced to 1,187, a decrease of 59, or 4.7%.

NJIT continues to display significant growth in enrollment, research, and operations. Total operations have grown from \$281.9 Million in FY11 to \$545.2 Million in FY19, an increase of \$263.3 million, or 93.4%. Total student headcount has increased from 11,812 in FY11 to 14,522 for FY19, a growth of 23%.

Impact

As the University continues to grow we need to add additional faculty and staff, as we are approaching our State authorized FTE maximum of 1,187.

Out-year Considerations

Our FY20 budget request includes 126 additional professional staff FTEs. First, to provide the proper support services for our growing and evolving student body, as many of the requested FTEs will be rolled out as academic advisors, financial aid specialists, counseling center staff, disability services professionals, lecturers and other student life staff. The ability to provide the right support structure for our students will continue to help improve retention and graduation rates as these are key metrics for both NJIT and the State's higher education system as a whole. Secondly, additional staff is required to support and also enable NJIT to partner with industry to create research and development opportunities for technological solutions to our society's most pressing challenges.

NJIT is also requesting recognition of our UCAN Teaching/Research Graduate Assistants which currently total 340; these doctoral students work 20 hours a week would equate to an additional 195 FTEs. Therefore NJIT requests that our State Authorized FTE count be increased to 1,508, an increase of 321 above our current 1,187 FTE count.

Language

FY Funding

	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>
Total Fiscal Year Funding:		\$0	\$0	\$0
Change:				
Total FY Budget Request:	<input type="text" value="\$0"/>	<input type="text" value="\$0"/>	<input type="text" value="\$0"/>	<input type="text" value="\$0"/>

Position:

Saving initiative start date: 7/1/2019

<u>Position Type</u>	<u>Positions</u>		<u>Comments</u>
	<u>#</u>	<u>\$</u>	
Increase FTE	321	\$0	
<u>Total Positions</u>	321	\$0	

**STATE OF NEW JERSEY
DEPARTMENT OF THE TREASURY
OFFICE OF MANAGEMENT AND BUDGET
FISCAL YEAR 2020
PLANNING DOCUMENT BUDGET INITIATIVE FORM (BIF)
For
DEPARTMENT OF STATE
NJ INSTITUTE OF TECHNOLOGY**

Title: Medical Devices Innovation Cluster: A Technology Development Ecosystem for New Jersey's Life Sciences Industry Phase-2 Proposal

Type: Growth

CIC: Potential Growth (Discretionary) ☐ Legislation ☐ Capital Request ☐ It Component

Space Needs: No Effect **Rank:** 2

Initiative Description:

New Jersey Institute of Technology gratefully acknowledges the partial funding support from the State of New Jersey to develop a medical devices innovation cluster as Phase-1 of the Technology Development Ecosystem for New Jersey's Life Sciences Industry. The Phase-1 funding has enabled the ongoing renovation and repurposing of the Microelectronics Research Center (MRC) to provide the necessary basic infrastructure facility for fabrication of microelectronic and microfluidic devices and sensors.

This Phase-2 proposal, submitted by New Jersey Institute of Technology, is to further expand the newly renovated basic infrastructure facility to include system integration and testing facility with critically needed advanced equipment to complete the development of medical devices innovation cluster. The proposed innovation cluster as a model for economic growth will yield a transformative solution addressing a two-part problem:

1. The need for the New Jersey medical device industry to innovate in order to grow; and
2. The need to develop point-of-care technologies for high risk patients and the elderly in order to improve care and lower costs.

Through the development of a Medical Devices Innovation Cluster and the NJIT-NJII-EDC Technology Translation Ecosystem (TTE) Center, NJIT would lead New Jersey's efforts to accelerate the innovation and translation of point-of-care medical devices and healthcare applications. The TTE Center would provide infrastructure support, foster the development of interdisciplinary clusters of research expertise, and promote collaborations among the stakeholder groups including innovators, developers, entrepreneurs, investors and users. The TTE Center will foster a new model of innovative translational research that will leverage technological expertise from academia, industry, and federal and regulatory agencies to target unmet healthcare needs with a high societal impact. The ecosystem will target transformative improvements in diagnostics and treatments for complex diseases and medical conditions that could not be met by researchers working alone, but instead require close collaborations among innovative engineers, scientists, clinicians, and implementation experts. In the long run, the Medical Devices Innovation Cluster and TTE Center will provide not only improved healthcare outcomes and reduced healthcare costs but also rapid growth in New Jersey's economy, opportunities to attract students and researchers to the state through cutting-edge healthcare expertise, and the generation of new healthcare-related STEM jobs in the state.

Impact

NJIT will form a hub with its Life Sciences and Engineering Center, Microelectronic Research Center, the New Jersey Innovation Institute, and Enterprise Development Center for expanding university investment in innovative device fabrication and data analytics. This initiative is well aligned with NJIT's 2020 Vision strategic plan for new faculty recruitment, translational research clusters, and creation of related instructional programs addressing workforce needs.

Out-year Considerations

In total, NJIT requests \$9,000,000 in funding from the New Jersey FY20 Budget to support medical devices innovation cluster, which includes \$8M of one time funding for the 3rd floor renovation of the Life Sciences & Engineering building (\$3M), Medical Device Fabrication Infrastructure (\$3.5M), and Medical Device Characterization & Analytics (\$1.5M). Continuing support (\$1.0M) is requested for Technology Translation to Market and acceleration to commercialization.

Language

FY Funding

	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>
Total Fiscal Year Funding:	\$0	\$9,000	\$9,000	\$9,000
Change:	\$9,000	\$0	\$0	\$0
Total FY Budget Request:	\$9,000	\$9,000	\$9,000	\$9,000

STATE OF NEW JERSEY
DEPARTMENT OF THE TREASURY
OFFICE OF MANAGEMENT AND BUDGET
FISCAL YEAR 2020
PLANNING DOCUMENT BUDGET INITIATIVE FORM (BIF)
For
DEPARTMENT OF STATE
NJ INSTITUTE OF TECHNOLOGY

Title: Need Based Retention Awards
Type: Growth
CIC: Potential Growth (Discretionary) ☐ Legislation ☐ Capital Request ☐ It Component
Space Needs: No Effect **Rank:** 3

Initiative Description:

There is an unmet obligation at NJIT for need based aid for undergraduate in-state students and transfer students. These are students with financial hardships that require additional aid to close the gap between unmet Tuition and Fees greater than \$500 but less than \$5,000 after federal, state and institutional aid.

An analysis of the entering freshman class data revealed that for students with a remaining need greater than \$500, but less than \$5,000, the first year retention rate was 5 points below freshman with a remaining need of less than \$500. Consequently, this gap persisted, and in fact became slightly higher by their junior year. The earlier we are able to provide financial assistance to this population, the more impactful those dollars become in improving the likelihood of retention and ultimately graduation from NJIT with reduced student debt. NJIT would like to request funding to support need-based retention scholarships, totaling \$750,000 to fill a gap in remaining student need.
Transfer Admitted Students

A similar, but larger, performance gap exists among entering transfer students. On average, students with a remaining need gap of \$500 to \$5,000 have a 1-year retention rate of seven percentage points below their peers. This gap remains consistent when 2-year retention rates are considered. The cost of filling the need gap for this population of transfer students is estimated at \$280,000.

Impact

NJIT is requesting \$1,030,000 to support a regular and transfer admits in their first and second year of studies, this program aims at increasing the retention rates by 5% (regular admits) and 7% (transfer students) with similar eventual increases in the four- and six-year graduation rates.

Out-year Considerations

NJIT is requesting \$1,030,000 to support a regular and transfer admits in their first and second year of studies, this program aims at increasing the retention rates by 5% (regular admits) and 7% (transfer students) with similar eventual increases in the four- and six-year graduation rates.

Language

FY Funding

	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>
Total Fiscal Year Funding:		\$1,030	\$1,030	\$1,030
Change:	\$1,030	\$0	\$0	\$0
Total FY Budget Request:	\$1,030	\$1,030	\$1,030	\$1,030

SECTION 5

CAPITAL BUDGET

NEW JERSEY INSTITUTE OF TECHNOLOGY FY 2020 CAPITAL BUDGET REQUEST

Executive Summary

The FY20 Capital Budget Request of the New Jersey Institute of Technology was crafted to meet the priorities of our strategic plan, 2020 Vision: A Strategic Plan for NJIT. The request has been prepared for submission to the New Jersey Commission on Capital Budgeting and Planning in accordance with State guidelines. While the submission was crafted with all of the strategic priorities as a basis, we specifically focus on the strategic priority of investments, which is outlined below:

Investments: NJIT will ensure that the human, physical and technological resources for student learning and faculty research have the highest priority. The university's faculty will continue to grow in numbers and renown. They will work in the best laboratories with the highest-quality equipment and technology infrastructure. All classrooms will accommodate a variety of instructional layouts and will offer the latest technology. A multiyear campus plan for student learning, faculty, research and community investment will propel NJIT to state, regional, national and international prominence.

Chartered by the State of New Jersey in 1881 as Newark Technical School, NJIT has grown into a major research University and premier educational institution. The University has grown its enrollment from 6,300 students in 1979 to 11,560 in fall 2018, which is an all-time high for NJIT. This growth has been accomplished without compromising quality of the NJIT student. Students entering in the 2018 fall semester had average SAT scores for critical reading and mathematics of over 1200. Research has grown during the same period from \$375,000 to over \$162,000,000 making NJIT one of the preeminent research universities in the region.

To continue the growth trajectory in both education and research, the NJIT FY20 request reaches across all aspects of the University as we work to steward our existing resources as well as adding new facilities. As the State of New Jersey's only polytechnic university, NJIT has facilities that require more resources and technology than the traditional educational institution. The total request outlines \$424,428,000 in capital projects through 2026. The FY19 projects range from \$5,000,000 to renew our existing capital assets, a priority of the 2020 Vision, to a \$62,100,000 investment to convert Tiernan Hall into an IDEAS center to transform and modernize this building to suit the needs of our Chemistry and Environmental Science, Physics, and Chemical, Biological, and Pharmaceutical Engineering students.

NJIT has continued to invest in its physical assets in order to deliver on our promise of a premier educational experience to our highly competitive students. The FY20 request is in alignment with our strategic plan and our facilities mission to provide a healthy, safe and helpful campus experience for students, parents, faculty, staff and alumni. We will maximize the use of human and financial resources to create an environment for learning, research, and innovation for the NJIT family through the incorporation of teamwork, communication, and creativity. The projects requested herein will continue the good work of the institution for generations of students to come.

Department Priority Summary Report- All Fund Sources

Department Priority	Project Title	Organization	Project Number	FY 2020	FY 2021	FY 2022	FY 2023 - 2026	Total
75 C	New Jersey Institute of Technology							
1	CURRENT/DEFERRED MAINTENANCE	NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY	838	\$15,000	\$10,000	\$15,000	\$10,000	\$50,000
2	MODERNIZATION OF LABORATORY AND INI	NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY	1091	\$8,300	\$0	\$0	\$0	\$8,300
3	THE IDEAS CENTER: INNOVATION, DESIGN,	NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY	1230	\$65,204	\$0	\$0	\$0	\$65,204
4	LIBRARY	NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY	324	\$7,750	\$10,490	\$21,439	\$38,250	\$77,929
5	ACADEMIC BUILDING	NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY	27	\$0	\$0	\$40,170	\$40,170	\$80,340
6	EXPANSION OF THE LIFE SCIENCES AND E	NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY	1253	\$0	\$0	\$5,150	\$56,635	\$61,785
7	ENGINEERING FACILITY EXPANSION	NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY	1254	\$0	\$0	\$0	\$66,870	\$66,870
8	LAND ACQUISITION	NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY	24	\$0	\$0	\$0	\$14,000	\$14,000
Department Total				\$96,254	\$20,490	\$81,759	\$225,925	\$424,428

Project Status Report

Capital Improvement Projects FY2012 - FY 2018

(000's)

Project Name

Proj No.	Start Year	Status	Total Available	General	Bond	Federal	Other
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New Jersey Institute of Technology

NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY

LABORATORIES, CLASSROOMS, AND STUDIO FOR STEM	32	2013	Completed	79,137	0	66,342	0	12,795
CENTER FOR INTEGRATIVE LIFE SCIENCES	33	2014	Continuing	19,000	0	13,500	0	5,500
WELLNESS EVENTS CENTER	34	2015	Continuing	102,000	0	92,000	0	10,000
PARKING DECK	35	2015	Completed	23,800	0	23,800	0	0
INTEGRATED MAKERRSPACE	36	2016	Continuing	20,000	0	20,000	0	0

TOTAL FOR:

NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY

\$243,937

\$0

\$215,642

\$0

\$28,295

Department Totals

\$243,937

\$0

\$215,642

\$0

\$28,295

Capital Project Report by Org & Priority

11/2/2018

Project Number: 838

Project Title: CURRENT/DEFERRED MAINTENANCE

Project Type: A06

Department: NEW JERSEY INSTITUTE OF TECHNOLOGY

Preservation-Other

Organization: NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY

Department Priority: 1

Facility Name: NEW JERSEY INSTITUTE OF TECHNOLOGY

New Project: Yes

Project Location: NJIT NEWARK

PROJECT DESCRIPTION AND JUSTIFICATION

The university has continued to extend the standard replacement lifecycle for campus facilities. NJIT has invested resources to begin the mitigation of the deferred maintenance backlog, however, the resources are limited and have been addressing the most emergent issues. Current identified projects include, but are not limited to, the following: Campus wide roof replacements (\$10 Million), Elevator modernization/upgrade in several buildings (\$3.5 Million), Sidewalk and roadways (\$2 Million), Window replacement in Campbell, Cullimore, Colton and Tiernan Hall (\$12.5 Million), and HVAC modernization in Cullimore Hall (\$5 Million).

PROJECT ANNUAL OPERATING IMPACT (000's)

IMPACT	INCREASE	DECREASE
No	\$0	\$0

EXPLANATION:

Cost avoidance by installing more energy efficient equipment and systems. If funds are not available, tuition rates will be increased to cover required repairs.

PROJECT PHASE		ESTIMATED COST (000's)				
CONSTRUCTION		\$50,000				
Total Estimated Cost:		\$50,000				

PRIOR YEARS' APPROP.	FUND TYPE	(000's)				TOTAL PROJECT COST
		FY-2020	FY- 2021	FY- 2022	FY 2023 - 2026	
	<i>General</i>	\$15,000	\$10,000	\$15,000	\$10,000	\$50,000
	TOTALS	\$15,000	\$10,000	\$15,000	\$10,000	\$50,000

Capital Project Report by Org & Priority

11/2/2018

Project Number: 1091

Project Title: MODERNIZATION OF LABORATORY AND

Project Type: E03
Construction-Renovations and Rehabilitation

Department: NEW JERSEY INSTITUTE OF TECHNOLOGY

Organization: NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY

Department Priority: 2

Facility Name: NEW JERSEY INSTITUTE OF TECHNOLOGY

New Project: Yes

Project Location: NEW JERSEY INSTITUTE OF TECHNOLOGY

PROJECT DESCRIPTION AND JUSTIFICATION

The frontier areas of science and engineering are increasingly dependent upon experimental studies, after decades in which computer modeling and simulation were the dominant tools. Nano-systems technology and molecular biology are examples in which the underlying scientific principles are not well enough understood to use model based approaches to discovery. Hands-on and eyes-on are needed and this requires a new generation of analytic and imaging systems to support both research and instruction. The expansion of this research will be incorporated into existing renovated space.

PROJECT ANNUAL OPERATING IMPACT (000's)

IMPACT	INCREASE	DECREASE
No	\$0	\$0

EXPLANATION:

Renovation of existing space.

		PROJECT PHASE	ESTIMATED COST (000's)			
		CONSTRUCTION	\$6,000			
		FURNISHING AND FIXTURES	\$1,000			
		OTHER	\$300			
		FEES	\$1,000			
		Total Estimated Cost:	\$8,300			

PRIOR YEARS' APPROP.	FUND TYPE	(000's)				TOTAL PROJECT COST
		FY-2020	FY- 2021	FY- 2022	FY 2023 - 2026	
	<i>General</i>	\$8,300	\$0	\$0	\$0	\$8,300
	TOTALS	\$8,300	\$0	\$0	\$0	\$8,300

Capital Project Report by Org & Priority

11/2/2018

Project Number: 1230

Project Title: THE IDEAS CENTER: INNOVATION, DESIGN,

Project Type: E03
Construction-Renovations and Rehabilitation

Department: NEW JERSEY INSTITUTE OF TECHNOLOGY

Organization: NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY

Department Priority: 3

Facility Name:

New Project: Yes

Project Location:

PROJECT DESCRIPTION AND JUSTIFICATION

The project converts Tiernan Hall into an IDEAS Center and transforms the entire building. Currently, Tiernan Hall is an aging building in need of an overhaul of all mechanical and electrical systems. It also requires renovation and modernization of twelve classrooms, including a large lecture hall, and thirteen instructional laboratories (five for chemistry, four for physics, and four for chemical engineering). When complete, the building will provide state of the art homes for three departments: Chemistry and Environmental Science; Physics; Chemical, Biological, and Pharmaceutical Engineering.

PROJECT ANNUAL OPERATING IMPACT (000's)

IMPACT	INCREASE	DECREASE
No	\$0	\$0

EXPLANATION:

Cost avoidance due to new, modern equipment

		PROJECT PHASE		ESTIMATED COST (000's)		
		CONSTRUCTION		\$52,500		
		FURNISHING AND FIXTURES		\$6,184		
		FEES		\$6,520		
		Total Estimated Cost:		\$65,204		

PRIOR YEARS' APPROP.	FUND TYPE	(000's)				TOTAL PROJECT COST
		FY-2020	FY- 2021	FY- 2022	FY 2023 - 2026	
	Bond	\$58,684	\$0	\$0	\$0	\$58,684
	Other	\$6,520	\$0	\$0	\$0	\$6,520
	TOTALS	\$65,204	\$0	\$0	\$0	\$65,204

Capital Project Report by Org & Priority

11/2/2018

Project Number: 324

Project Title: LIBRARY

Project Type: E03
Construction-Renovations and Rehabilitation

Department: NEW JERSEY INSTITUTE OF TECHNOLOGY

Organization: NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY

Department Priority: 4

Facility Name: NEW JERSEY INSTITUTE OF TECHNOLOGY

New Project: Yes

Project Location: VAN HOUTEN LIBRARY - NJIT NEWA

PROJECT DESCRIPTION AND JUSTIFICATION

Planned renovation and expansion of existing library to create a learning commons with additional student support services and on-line/multimedia library material and access. It will provide a new learning environment including provisions for group projects utilizing current technologies. The expansion is necessary based on the increase in student population through year 2025 and is outlined in the NJIT facilities master plan.

PROJECT ANNUAL OPERATING IMPACT (000's)

IMPACT	INCREASE	DECREASE
No	\$544	\$0

EXPLANATION:

Additional operating and maintenance cost.

		PROJECT PHASE	ESTIMATED COST (000's)			
		CONSTRUCTION	\$57,989			
		FURNISHING AND FIXTURES	\$10,000			
		OTHER	\$1,700			
		FEES	\$8,240			
		Total Estimated Cost:	\$77,929			

PRIOR YEARS' APPROP.	FUND TYPE	(000's)				TOTAL PROJECT COST
		FY-2020	FY- 2021	FY- 2022	FY 2023 - 2026	
	<i>General</i>	\$7,750	\$10,490	\$21,439	\$38,250	\$77,929
	TOTALS	\$7,750	\$10,490	\$21,439	\$38,250	\$77,929

Capital Project Report by Org & Priority

11/2/2018

Project Number: 27

Project Title: ACADEMIC BUILDING

Project Type: E04

Department: NEW JERSEY INSTITUTE OF TECHNOLOGY

Construction-Other

Organization: NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY

Department Priority: 5

Facility Name: NEW JERSEY INSTITUTE OF TECHNOLOGY

New Project: Yes

Project Location: NEWARK

PROJECT DESCRIPTION AND JUSTIFICATION

A new multi-purpose facility, constructed to meet current and projected demand - providing much needed instructional, academic and academic support space for a growing array of disciplines and multi-disciplinary areas of activity. This facility provides for teaching and learning, including facilities for online and converged classrooms, accommodating NJITs growth.

PROJECT ANNUAL OPERATING IMPACT (000's)

IMPACT	INCREASE	DECREASE
Yes	\$1,714	\$0

EXPLANATION:

Additional operating and maintenance costs.

PROJECT PHASE

ESTIMATED COST (000's)

CONSTRUCTION	\$61,800
FURNISHING AND FIXTURES	\$8,034
OTHER	\$2,266
FEES	\$8,240

Total Estimated Cost: \$80,340

PRIOR YEARS' APPROP.

FUND TYPE

(000's)

FY-2020

FY- 2021

FY- 2022

FY 2023 - 2026

TOTAL PROJECT COST

General

\$0

\$0

\$40,170

\$40,170

\$80,340

TOTALS

\$0

\$0

\$40,170

\$40,170

\$80,340

Capital Project Report by Org & Priority

11/2/2018

Project Number: 1253

Project Title: EXPANSION OF THE LIFE SCIENCES AND

Project Type: E03
Construction-Renovations and Rehabilitation

Department: NEW JERSEY INSTITUTE OF TECHNOLOGY

Organization: NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY

Department Priority: 6

Facility Name:

New Project: Yes

Project Location:

PROJECT DESCRIPTION AND JUSTIFICATION

The Life Sciences and Engineering Center, constructed in 2016, supports multi-discipline, collaborative research between the life sciences and engineering disciplines. The NJIT Facilities Master Plan outlines the need for space to accommodate further growth in these critical areas through 2025. The 24,000 GSF facility, planned for future expansion, provides for 50,000 GSF in additional space on the current site to support the critical integration of these fields.

PROJECT ANNUAL OPERATING IMPACT (000's)

IMPACT	INCREASE	DECREASE
Yes	\$400	\$0

EXPLANATION:

Additional operating and maintenance costs.

		PROJECT PHASE		ESTIMATED COST (000's)		
		CONSTRUCTION		\$51,500		
		FURNISHING AND FIXTURES		\$4,635		
		OTHER		\$500		
		FEES		\$5,150		
		Total Estimated Cost:		\$61,785		

PRIOR YEARS' APPROP.	FUND TYPE	(000's)				TOTAL PROJECT COST
		FY-2020	FY- 2021	FY- 2022	FY 2023 - 2026	
	Bond	\$0	\$0	\$5,150	\$56,635	\$61,785
	TOTALS	\$0	\$0	\$5,150	\$56,635	\$61,785

Capital Project Report by Org & Priority

11/2/2018

Project Number: 1254

Project Title: ENGINEERING FACILITY EXPANSION

Project Type: E03
Construction-Renovations and Rehabilitation

Department: NEW JERSEY INSTITUTE OF TECHNOLOGY

Organization: NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY

Department Priority: 7

Facility Name:

New Project: Yes

Project Location:

PROJECT DESCRIPTION AND JUSTIFICATION

The Newark College of Engineering remains NJIT's largest college providing education to half of our students in the various engineering disciplines. The Facilities Master Plan outlines a need for additional space to accommodate teaching laboratories and support spaces to serve our students. The 65,000 GSF facility will be constructed on land currently owned by NJIT and will add to the engineering complex created by Faculty Memorial Hall, Tiernan Hall, and the Electrical and Computer Engineering Center.

PROJECT ANNUAL OPERATING IMPACT (000's)

IMPACT	INCREASE	DECREASE
Yes	\$520	\$0

EXPLANATION:

Additional operating and maintenance costs.

PROJECT PHASE

ESTIMATED COST (000's)

CONSTRUCTION	\$51,500
FURNISHING AND FIXTURES	\$6,025
OTHER	\$2,650
FEES	\$6,695
Total Estimated Cost:	\$66,870

PRIOR YEARS' APPROP.

FUND TYPE

(000's)

FY-2020

FY- 2021

FY- 2022

FY 2023 - 2026

TOTAL PROJECT COST

Bond

\$0

\$0

\$0

\$66,870

\$66,870

TOTALS

\$0

\$0

\$0

\$66,870

\$66,870

Capital Project Report by Org & Priority

11/2/2018

Project Number: 24

Project Title: LAND ACQUISITION

Project Type: D04

Department: NEW JERSEY INSTITUTE OF TECHNOLOGY

Acquisition-Other

Organization: NJIT - NEW JERSEY INSTITUTE OF TECHNOLOGY

Department Priority: 8

Facility Name: NEW JERSEY INSTITUTE OF TECHNOLOGY

New Project: Yes

Project Location: NEWARK

PROJECT DESCRIPTION AND JUSTIFICATION

A critical element of the campus master plan is to acquire a limited amount of land to permit the construction of new facilities and to complete the campus edge at the intersection of Central Avenue and Martin Luther King BLVD. The area is within the Campus Gateway Development Plan, which is a subset of the City approved Broad Street Station District Redevelopment Plan. NJIT is the designated Redeveloper by the City of Newark. In addition, acquisition of another adjacent, strategically located property allows for future campus expansion exists on the west side of campus. Each will enhance the capabilities of NJIT and accommodate growth.

PROJECT ANNUAL OPERATING IMPACT (000's)

IMPACT	INCREASE	DECREASE
No	\$0	\$0

EXPLANATION:

PROJECT PHASE

ESTIMATED COST (000's)

OTHER

\$14,000

Total Estimated Cost:

\$14,000

PRIOR YEARS' APPROP.

FUND TYPE

(000's)

FY-2020

FY- 2021

FY- 2022

FY 2023 - 2026

TOTAL PROJECT COST

General

\$0

\$0

\$0

\$14,000

\$14,000

TOTALS

\$0

\$0

\$0

\$14,000

\$14,000