March 18, 2019

The Honorable Lamar Alexander
455 Dirksen Senate Office Building
Washington, DC 20510

Dear Senator Alexander,

Vanderbilt University is grateful that Congress has continued its longstanding and bipartisan support for federal investments in scientific research and education and we urge you to continue that support in the FY 20 appropriations process. We respectfully urge Congress to reach another bipartisan, bicameral agreement to raise the statutory defense and nondefense discretionary budget caps to permit sufficient investment in scientific research, higher education, and other important programs that will build a better America and sustain our nation’s global leadership and security. We strongly encourage Congress to build on recent progress by providing robust funding for scientific research and education in FY 20. We believe that sustained, steady growth in scientific research and student aid are vital to our nation’s economy and security.

We believe that among our country’s highest priorities should be support for education, including the student aid that makes it possible for millions of Americans to attend college, and scientific research, which fortifies America’s health, economic competitiveness, and national security. These federal investments are critical to our country’s security, maintaining American leadership in innovation, and fostering economic growth. Our position as a global leader in technology and innovation is threatened as economic competitors such as China boost their commitment to funding research. Failure to continue to invest in the government-university partnership and to build upon the recent increases in federal scientific research will further erode our position. Recommitting ourselves to this partnership is essential to ensure universities such as Vanderbilt advance American science and educate the next generation of scientists, engineers, entrepreneurs, and leaders.

With federal support, Vanderbilt researchers are: developing new strategies to treat addiction; designing software-integrated systems that are part of the growing Internet of Things; testing advanced sensor systems that can rapidly detect early signs of structural failure in military vehicles; preserving essential historical information about history of Africans in the Atlantic World; and improving instructional programs targeting students with the most severe learning disabilities. We should not compromise our future by cutting spending in areas that improve human health and security and are critical to our nation’s ability to innovate, compete, and advance globally.

We also believe that the federal government, states, and institutions of higher education must work together to ensure that college remains affordable and accessible for all students. Federal student aid, an essential part of this effort, coupled with Vanderbilt’s significant institutional commitment that all undergraduate aid packages include no need-based loans, ensure that we attract highly qualified and diverse students regardless of their ability to pay. Our high graduation rates and lower than average debt levels are evidence that our graduates leave Vanderbilt with a world-class education and the means to succeed in their chosen career paths. We encourage Congress to continue its long-term commitment to robust federal student aid programs for both undergraduate and graduate students.

We recognize your responsibility to spend taxpayer dollars wisely. Vanderbilt relies on partnerships with federal agencies as a force multiplier in providing high-quality education and in continuing the cutting-edge research that improves our lives and those of future generations. We firmly believe that these investments are a prudent and powerful use of federal dollars. Thank you for your continuing support of Vanderbilt and our programmatic priorities.

Sincerely,

Christina D. West
Assistant Vice Chancellor for Federal Relations
Background

For FY 20, Vanderbilt supports $9 billion for the National Science Foundation (NSF), which would provide nine percent real growth over the FY 19 enacted level and would recommit the Congress to the scientific discovery funded by the NSF. Unlike other federal research agencies which have seen sustained growth in their budgets over the past few years, NSF’s budget has remained stagnant, leading to an underinvestment in fundamental research, infrastructure, and STEM education.

NSF is an integral component of America’s scientific research enterprise and innovation ecosystem and enables the scientific work of other federal agencies and departments, including the National Institutes of Health and the Departments of Defense and Energy. According to the National Science Board, $3.92 billion in proposals that were ranked very good or higher were declined due to lack of funding in FY 17. According to the report, “These declined proposals represent a rich portfolio of unfunded opportunities, proposals that if funded may have produced substantial research and education benefits.” A bold commitment to NSF funding would: (1) provide robust support for NSF’s core and interdisciplinary programs and help meet demonstrated need; (2) implement NSF’s potentially transformational 10 Big Ideas initiative; (3) support national priorities including artificial intelligence and advanced manufacturing; (4) support NSF education and workforce development programs; and (5) ensure that the U.S. remains globally competitive in STEM.

The 2018 Science and Engineering Indicators Report, released last year by the National Science Board, clearly shows that competitor nations, particularly China, are rapidly improving their global position in science and technology while the U.S. is resting on its laurels of past investments. The report indicates that China is poised to become the global leader in science and technology in the next few years. Simply put, the U.S. must ramp-up its investments in scientific research supported by NSF if we intend to remain competitive and at the forefront of science, technology, and innovation.

As the only federal agency charged with the promotion of scientific progress across all scientific and engineering disciplines, NSF-funded research has proven vital to the nation’s economic growth, national security, and position as a global leader. NSF is committed to the fundamental, interdisciplinary, high-risk, and transformative research and education needed to ensure that the U.S. remains competitive in the decades ahead. However, to do so, it must have the resources it needs to support research into critical national priority areas, dramatic unmet infrastructure needs, and critical gaps in our ability to address fundamental challenges for undergraduate and graduate STEM education.

NSF at Vanderbilt

Vanderbilt University received over $21.6 million from NSF in FY 18. Examples of NSF funding at Vanderbilt include:
• **Supporting early career faculty and graduate students:** Vanderbilt faculty held 11 active NSF CAREER awards in FY 18, which support promising early career faculty who are committed to the integration of research and education. These awards aid cutting-edge research endeavors such as developing wearable ultrasound devices that will improve the quality of images of the brain and trailblazing the intersection of education and neuroscience in the study of the arithmetic learning disability. In 2018, 16 students were awarded prestigious NSF Graduate Research Fellowships, which support individuals who have demonstrated notable potential early in their careers and increase the diversity of the STEM workforce. Vanderbilt currently has 67 active Fellows.

• **Increasing and improving postgraduate education for minority students:** Vanderbilt is a leader in the effort to expand the Tennessee Louis Stokes Alliance for Minority Participation, a NSF-funded collaborative effort between 10 Tennessee colleges and universities to increase the retention of underrepresented students in STEM fields throughout the state. The NSF-supported Fisk-Vanderbilt Masters-to-Ph.D. Bridge Program has made Vanderbilt the country’s leading producer of underrepresented minority Ph.D.’s in astronomy, materials science, and physics. All 30 current Ph.D.’s have secured jobs in STEM fields following completion of this program.

• **Connecting the world through cyber-physical systems research:** Vanderbilt researchers are leaders in cyber-physical systems (CPS) research, extending the use of the internet to create a deeply connected world where humans, their machines, and the physical environment interact seamlessly and without mistakes that could lead to safety issues. Vanderbilt’s Institute for Software Integrated Systems currently manages NSF’s Cyber-Physical Systems Virtual Organization, which archives and disseminates research documents and links together the thousands of researchers across all of the organizations working together on CPS research through collaborative and experimental platforms. The institute received a $4 million five-year grant from NSF in 2017 to develop and test the incorporation of social norms, policies, and values into this new generation of systems.

• **Utilizing carbon emissions:** With NSF support, a Vanderbilt team of materials scientists and mechanical engineers discovered a method to transform carbon dioxide from toxic air into valuable carbon nanotubes which are revolutionary supermaterials that are more conductive than copper and stronger than steel and can be used in virtually all aspects of nanotechnology and electronics. The team has launched a company based on this patent-pending technology and is currently incubating in the Innovation Crossroads Program at Oak Ridge National Lab.

• **Promoting commercialization of beneficial basic research:** The NSF I-Corps program encourages scientists and engineers to look beyond the lab to commercialize NSF-funded basic research. I-Corps teaches students, faculty, and staff how to identify valuable product opportunities that emerge from academic research and provides training in entrepreneurship and customer discovery. The Vanderbilt I-Corps site has produced innovations such as “smart” prosthetic ankles that move with the user and virtual-reality systems for drug and alcohol addiction treatments.

### NASA Request

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Background

Vanderbilt believes NASA’s Office of STEM Engagement and, in particular, the Space Grant College and Fellowship Program are important priorities. *We urge Congress to appropriate $50 million for the Space Grant Program.* NASA’s STEM Engagement and Public Outreach Mission Directorate creates unique opportunities for students and the public to contribute to NASA’s work in exploration and discovery and to build a diverse future STEM workforce by engaging students in authentic learning experiences with NASA personnel, content, and facilities. To achieve these goals, NASA strives to increase K-12 involvement in NASA projects, enhance higher education, support underrepresented communities, strengthen online education, and boost NASA’s contribution to informal education.

Vanderbilt also recommends $7.5 billion for NASA’s Science Mission Directorate (SMD) and $973 million for Space Technology Mission Directorate (STMD) in FY 20. This increase will support the major SMD missions, as well as the interest in funding individual investigator grant programs, new competitive mission opportunities, and the development of high-payoff technologies.

NASA at Vanderbilt

Vanderbilt University received $1.8 million in research funding from NASA in FY 18. Examples of NASA-funded programs at Vanderbilt include:

- **Inspiring future NASA careers:** Vanderbilt University is the lead institution for the Tennessee Space Grant Consortium (TSGC), which is comprised of 15 affiliate institutions across the state. TSGC endeavors to inspire students from K-12 through the graduate level to pursue careers in NASA-related fields, as well as within the greater STEM sectors. The TSGC provides scholarships and fellowships to undergraduate and graduate students at the affiliate institutions, supports Tennessee students at NASA programs, and promotes research and teacher training.

- **Advancing the field of gravitational wave astronomy:** A Vanderbilt astrophysics professor has been appointed by NASA’s Astrophysics Directorate to chair the U.S. Laser Interferometer Space Antenna (LISA) Study Team; LISA is an international scientific effort led by the European Space Agency. The team of 18 scientists will advise NASA on scientific issues related to the proposed $1 billion-plus project that is tentatively scheduled for a launch in 2030. LISA will take the fledging field of gravitational wave astronomy to the next level.

- **Modeling risk to improve airline safety:** Vanderbilt risk and reliability engineering experts play a key role in a $10 million, five-year project to develop the next generation National Airspace System. Statistically airline travel is the safest mode of transportation, but NASA aims to improve safety by developing a system that will identify and prioritize risks that can be anticipated and addressed. The project is part of NASA’s Aeronautics University Leadership Initiative, which gives top academic centers a larger role in shaping best practices and translating them into commercial use.

### DEFENSE

**Department of Defense Research**

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Vanderbilt urges Congress to provide $2.77 billion for Dept. of Defense (DOD) basic research (6.1) and $16.99 billion for Defense Science & Technology (S&T) in FY 20. Additionally, we urge Congress to fund the Defense Advanced Research Projects Agency (DARPA) at $3.63 billion. These funding requests are consistent with the federal research investment recommendation in the *Innovation: An American Imperative* call-to-action, which is endorsed by over 500 business leaders, national organizations, universities, and scientific societies and calls for four percent annual growth. Defense S&T comprises 6.1 basic research, 6.2 applied research, and 6.3 advanced technology development programs.

Within Defense 6.1 basic research, Vanderbilt supports funding the Defense-Wide Basic Research Initiatives (PE 0601110D8Z) at $60.05 million in FY 20. Defense-Wide Basic Research Initiatives support the strategic investments in basic research that stimulate the long-term scientific discovery needed to maintain the nation’s technological dominance, including the Minerva Research Initiative and the Multidisciplinary University Research Initiatives (MURI). Minerva supports university-based social science research aimed at improving our understanding of security with a goal of improving DOD’s basic understanding of the social, cultural, behavioral, and political forces that shape regions of the world of strategic importance to the U.S. MURI is one DOD’s main mechanisms for engaging with the university community and pursuing basic research to further DOD’s technical capabilities. The tri-service program provides a way for the Services to coordinate with each other and better leverage basic research funds.

Within the Defense 6.1 basic research program, Vanderbilt also urges Congress to sustain funding for the National Defense Education Program (NDEP) and the National Defense Science and Engineering Graduate Fellowships program which support vital STEM activities and scholarships for undergraduates and graduates who will become the next-generation of scientists and engineers supporting the world’s most advanced and innovative workforce.

Finally, Vanderbilt supports DOD medical research which seeks cures to diseases and medical innovations. In order to maintain a strong military, the U.S. must have healthy families and soldiers. Defense medical research programs help ensure the U.S. has the medical technologies necessary to enable military readiness and serve those wounded on the battlefield.

These levels of investment are consistent with the strategic approach to harnessing and protecting the National Security Innovation Base outlined in the 2018 National Defense Strategy, as well as the goals of the 2014 Quadrennial Defense Review, and would enable DOD to address the recommendations contained in the Defense Science Board’s Basic Research Task Force report. New disruptive technologies which enable our military to preserve a leading edge and avoid strategic surprise are essential. Basic defense research, while at times is conducted with no specific end goals, has led to the development of many tools used today by warfighters. Night vision, missile defense capabilities, unmanned vehicles, global positioning systems, and precision munitions all trace their roots to basic defense research and now help ensure our national security. If we are to ensure that the U.S. military maintains technical superiority in the future, we must continue to support DOD’s basic scientific research programs.

**DOD at Vanderbilt**
Vanderbilt University received over $20 million from the Department of Defense in FY 18. Examples of Defense-funded research at Vanderbilt include:

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<th>DARPA</th>
<th>$2.89 billion</th>
<th>$3.07 billion</th>
<th>$3.43 billion</th>
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**Background**

Vanderbilt University received over $20 million from the Department of Defense (DOD) in FY 18. Examples of Defense-funded research at Vanderbilt include:

- **DARPA**
  - $2.89 billion
  - $3.07 billion
  - $3.43 billion
  - $3.56 billion
  - $3.63 billion

| DARPA | $2.89 billion | $3.07 billion | $3.43 billion | $3.56 billion | $3.63 billion |
• **Testing systems integrity and reliability:** Vanderbilt’s Laboratory for Systems Integrity and Reliability (LASIR) ensures that vehicles and equipment can withstand a rigorous operating environment, such as flying a military helicopter into hostile territory, or maneuvering tactical wheeled vehicles in an extreme terrain. LASIR tests advanced sensor systems and develops innovative diagnostic tools that can rapidly detect early signs of failure in ground vehicles, missiles, aircraft, and spacecraft. This research has received funding from the Army, the Navy, the Air Force, and the Marines, and partnered with several large defense contractors and equipment manufacturers.

• **Designing software-integrated systems:** Vanderbilt’s Institute for Software Integrated Systems is a key national player in an effort to design the software-integrated systems that have become an essential part of human lives. Major Defense sponsors of the institute include DARPA, the Air Force, the Army, and the Navy. The institute has received over $200 million in funding since 1998, approximately three-quarters of which is from DOD. In 2018, a Vanderbilt team of researchers and alumni placed 2nd in the second round of the DARPA Spectrum Collaboration Challenge (SC2), a collaborative machine-learning competition to approach the question of how to allocate bands of the radiofrequency spectrum for specific use. The final round will take place in October 2019.

• **Mitigating the effects of radiation on defense systems:** Vanderbilt’s Institute for Space and Defense Electronics (ISDE) is the only academic program in the U.S. directly involved in supporting DOD in radiation effects for strategic applications. Radiation is among the most significant reliability challenges faced by DOD systems, as radiation from space or weapons interacts with sensitive electronic devices resulting in effects ranging from temporary data loss to catastrophic failure. ISDE plays an indispensable role in ensuring that there is a sufficiently trained workforce in radiation hardening and microelectronics. ISDE receives approximately $5 million in support annually from the Navy, the Air Force, NASA, and the Defense Threat Reduction Agency, as well as from various commercial enterprises.

• **Highlighting defects in 3D printing:** With support from the U.S. Office of Naval Research, a collaborative interdisciplinary team of Vanderbilt researchers has developed a technique utilizing gold to highlight defects in 3D printing. The process involves mixing gold nanoparticles into the plastic filament used for printing. Once the printed part is completed, it can be inspected for defects using a special camera. A patent is pending on the technology.

### ENERGY-WATER

**Department of Energy Research**

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**Background**

Vanderbilt recommends $7 billion for the Department of Energy’s (DOE) Office of Science for FY 20; this would be four percent real growth over the FY 19 funding level. Vanderbilt also supports $400 million in FY 20 for the Advanced Research Projects Agency-Energy (ARPA-E). These levels of funding are consistent with the federal research investment recommendation in *Innovation: An American Imperative*, which calls for a renewed federal commitment to scientific discovery and investments in scientific research. Signed by more than 500 leading organizations and CEO’s and Chairmen of several major U.S.
corporations, the Imperative calls for four percent real annual growth in basic research. Stable and sustainable funding for ARPA-E is essential for the advancement of high-risk, high-reward energy research that is unlikely to be supported by industry.

DOE’s Office of Science plays a vital role in the American scientific ecosystem – a proven model for success in discovery and innovation. DOE’s Office of Science plays a central role in ensuring continued U.S. leadership in many areas of research and sponsors research programs in the physical sciences, biological sciences, advanced scientific computing, energy, and engineering. These programs not only make strategic investments in innovative high-risk, high-reward research areas, but also help prepare the next generation of American scientific and engineering talent. Strong and predictable funding for the Office of Science is critical to maintaining U.S. leadership in other fields of scientific research including the biological sciences, computing, artificial intelligence, and engineering.

By prioritizing funding for DOE scientific research, facilities, and training programs, Congress can help preserve our capacity to innovate, reduce our dependence on foreign sources of energy, enhance our competitive edge in the global economy, improve our quality of life, educate the next generation of scientists and engineers, ensure our national security, and create good American jobs.

Within the Department’s Defense Environmental Management, Vanderbilt also supports the following report language:

Technology Development and Deployment – Within Technology Development and Deployment, $5,000,000 is for independent review, analysis and applied research to support cost-effective, risk-informed cleanup decision-making.

Oak Ridge. - Within OR Facility D&D, $2,000,000 shall be used for the study of technical issues regarding groundwater and waste disposal standards that may help resolve regulatory issues associated with these projects.

DOE at Vanderbilt
Vanderbilt University received over $4 million from DOE in FY 18. Examples of DOE funding at Vanderbilt include:

- **Managing nuclear waste**: Vanderbilt leads the multi-university Consortium for Risk Evaluation with Stakeholder Participation (CRESP), one of the nation’s leading independent, interdisciplinary research groups focused on the management and environmental legacy from the production of nuclear materials and energy. This consortium has contributed to addressing the nation’s largest environmental liability for 25 years with the support of DOE by managing nuclear waste from both civilian and defense nuclear power sources. CRESP sees this as a critical component of environmental responsibility stemming from our expanded nuclear power generating capabilities.

- **Shaping the future of American manufacturing**: Vanderbilt plays a key part in the $259 million DOE-funded Institute for Advanced Composites Manufacturing Innovation led by the University of Tennessee-Knoxville. Much of Vanderbilt’s work for the institute is taking place at the Laboratory for Systems Integrity and Reliability (LASIR). LASIR assists in the institute’s goal of developing cost- and energy-efficient composite materials for high-volume production industries by developing systems that automatically diagnose and fix quality control issues. Vanderbilt has designed and deployed a Mobile Lab containing state-of-the-art instruments and data analytics tools to address the quality control needs of its composites institute’s partners across the country.

- **Partnering with Oak Ridge National Lab (ORNL)**: Vanderbilt is one of seven universities working closely with ORNL to support collaborative research and provide regional support for ORNL.
Vanderbilt researchers are currently involved in projects such as the Spallation Neutron Source, nanotechnology laboratories, and the TITAN and SUMMIT supercomputers. ORNL’s analytical and computational capabilities combined with Vanderbilt’s cell biology capabilities have the potential to drive innovation and address issues of national importance.

- **Innovating next-generation biofuels**: With a five-year $10.7 million grant from DOE’s Office of Science, a team of Vanderbilt chemical and biomolecular engineers aim to optimize metabolic networks in photosynthetic microalgae. Microscopic diatoms are a leading contender to improve sustainable production of biodiesel using carbon dioxide and seawater as raw materials. The research effort is expected to develop technologies required to achieve sustainable biochemical production from photosynthetic microbes within the next 10 to 15 years.

- **Developing software to manage the smart grid**: Vanderbilt is the first academic partner to join The Linux Foundation’s effort to advance open-source innovation in the energy and electricity sectors through developing a platform for smart grid applications. Vanderbilt’s expertise in cyber-physical systems and the Internet of Things includes the Resilient Information Architecture Platform for Smart Grid (RIAPS), which provides core services for building secure and powerful distributed software applications and enables smart grid control software to run reliably. RIAPS was developed with funding from DOE’s Advanced Research Projects Agency for Energy (ARPA-E).

### INTERIOR

#### National Endowment for the Humanities

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**Background**

Vanderbilt supports $167.5 million in funding for the National Endowment for the Humanities (NEH) in FY 20. In the last four years, Congress has provided small increases in funding for NEH. Even still, when adjusted for inflation, NEH’s funding has decreased by more than 15 percent since FY 10. The requested funding level would allow the agency to continue to re-build its capacity to support peer-reviewed humanities research and education programs, and to meet unmet demand.

Our country’s long-term success in meeting economic, global, and national security challenges depends not only on the understanding of technological and scientific complexities, but of broader social and international issues as well. Programs funded by the NEH are vital to ensuring that America can compete successfully in a global economy and advance sound public policy to address the challenges of the 21st century. NEH programs stimulate the creativity and innovation that have helped our nation provide global leadership and underlie the cultural intelligence that buttresses successful diplomacy. NEH supports the creation and digitization of tools for teaching and scholarship to democratize learning and research, eliminating some of the physical barriers to allow resources to be shared and used across great distances. NEH support also helps to preserve historical papers, documents, and artifacts, so that they can be appreciated and studied for decades to come.

**NEH at Vanderbilt**

NEH is a vital source of funds for humanities scholars and researchers at Vanderbilt who work to better understand and address the social, economic, and political challenges facing the world today. Over the
last five years, Vanderbilt received nearly $800,000 from NEH; the state of Tennessee received over $6 million from NEH over the same period of time. Examples of NEH funding at Vanderbilt include:

- **Collaborating with partners for humanistic excellence**: Vanderbilt’s Robert Penn Warren Center for the Humanities was awarded a Challenge Grant from NEH in 1989; the $480,000 grant leveraged $1.9 million in matching contributions from the private sector, which has enabled the Center to become a vital part of the university. The Center facilitates interdisciplinary collaboration between the humanities and the social sciences by hosting annual faculty fellows and providing an annual graduate fellowship program, as well as collaborating across the greater Nashville area. The 2018-2019 academic year marks the Center’s landmark 30th year of operation.

- **Developing a digital platform for archeological survey**: Vanderbilt’s Spatial Analysis Research Laboratory has developed a prototype for a Geospatial Platform for Andean Culture, History, and Archaeology (GeoPACHA) with a startup grant from NEH. GeoPACHA will integrate satellite imagery with photos from historic aerial surveys to build a detailed inventory of archaeological remains in the Andes mountains and may assist in the discovery of new remains. The platform will enable archaeologists to move past traditional approaches to allow for regional-scale interaction networks and will serve as a repository for archaeological settlement pattern data.

- **Archiving historical records of slavery**: Supported in part by NEH, Vanderbilt’s Slave Societies Digital Archives has digitized the most extensive collection of historical records of Africans in the Atlantic World. This archive will provide researchers and the public digital access to almost 600,000 records from the U.S., the Caribbean region, and Latin America, documenting the history of 6 to 8 million individuals between the 16th and 20th centuries. The collection also provides valuable information on interactions with the indigenous, European, and Asian populations who lived alongside them.

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**Background**

To continue to advance public health, improve quality of life, and foster innovation and economic growth, Vanderbilt urges Congress to provide $41.6 billion in FY 20 for the National Institutes of Health (NIH). This funding level would continue a trajectory of increases for NIH each year that allow for meaningful growth above inflation that would expand NIH’s capacity to support promising science in all disciplines. Securing a reliable, robust budget trajectory for NIH is key in positioning the agency – and the patients who rely on it – to capitalize on the full range of research in the biomedical, behavioral, social, and population-based sciences.

Biomedical research funded by NIH is essential to the maintenance of U.S. leadership in the life sciences and helps reduce health care costs by advancing medical knowledge in the treatment and prevention of disease. Our nation’s biomedical research enterprise is not only the world’s biggest and best, but it is also an economic powerhouse, supporting more than 430,000 jobs and nearly $74 billion in economic activity across the U.S. In FY 18, nearly $550 million in NIH funding flowed to Tennessee, supporting over 8,600 jobs and generating over $1.4 billion in economic activity, according to a recent report by United for Medical Research.
NIH at Vanderbilt

NIH is the largest source of federal funding for Vanderbilt University, totaling nearly $114 million in FY 18. Highlights of NIH-supported research and training at Vanderbilt include:

- **Designing new drugs to treat schizophrenia:** Vanderbilt University has signed research collaboration and licensing agreements with the Denmark-based global pharmaceutical company Lundbeck to develop a novel approach to treating schizophrenia. In this agreement, Lundbeck has exclusively licensed rights to compounds developed by the Vanderbilt Center for Neuroscience Drug Discovery (VCNDD) that have been shown to produce an antipsychotic-like effect and improve cognitive performance with a low risk of side effects. The compounds were developed at VCNDD with support from the National Institute of Mental Health, a division of NIH.

- **Discovering addiction mechanisms to prevent development:** The Vanderbilt Center for Addiction Research (VCAR) aims to utilize new technologies to discover mechanisms through which addiction develops. NIH supports a variety of research efforts including determining molecular mechanisms and developing new treatment strategies. A team at VCAR has been working to develop ways to abolish the addictive effects of opioids without removing their pain relieving effects.

- **Determining mechanisms of cell death:** A research team at Vanderbilt has discovered an enzyme present in damaged neurons associated with neurodegenerative diseases such as multiple sclerosis with funding support from NIH. The team discovered that moving this specific enzyme from its normal location in a healthy cell triggers a reaction that results in neuronal death. This reaction has been implicated in Alzheimer’s disease, ALS, and traumatic brain injuries, providing a potential avenue for therapy of nervous system diseases and injury.

- **Advancing scientific knowledge of learning disabilities:** Vanderbilt’s Peabody College of Education and Human Development received funding from NIH’s Eunice Kennedy Shriver National Institute for Child Health and Human Development to build a Learning Disabilities Innovation Hub. Within the Hub, a transdisciplinary group of researchers is working to advance scientific knowledge about learning disabilities, as well as their treatment and prevention. These researchers are studying how oral language comprehension may provide a common pathway for explaining difficulty across both reading comprehension and mathematical problem-solving.

### Title VIII Request

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<th>FY 17 Final</th>
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<th>FY 20 PBR</th>
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**Background**

Vanderbilt supports $266 million in FY 20 for the Health Resources and Services Administration’s (HRSA) Title VIII nursing workforce development programs. Over the last 50 years, Title VIII programs have helped build the supply of highly educated nurses. These workforce development programs strengthen nursing education, including growing our capacity of nursing faculty who are needed to teach future nurses. As health care continues to change, the funding of education programs for nurses and advanced nurse practitioners and support for nurse scientists are critical steps toward improving quality and increasing access. With their focus on education, practice, retention, and recruitment, Title VIII programs are essential to meeting the national demand for nurses and improving the health of underserved and vulnerable populations. In working to meet the rising demand for quality care, these programs also remove barriers to increasing nursing capacity and workforce diversity.
Title VIII at Vanderbilt

Vanderbilt University School of Nursing (VUSN) has received over $31 million in federal Title VIII funding since 1999. With the projected shortage of skilled nursing practitioners and the increase in seniors needing additional health care, these programs are more critical than ever to build our national health care workforce. In addition to the Nurse Faculty Loan Program (NFLP), VUSN has also secured funding support from Title VIII’s Nurse Education, Practice, Quality and Retention program in recent years. Highlights of Title VIII funding at Vanderbilt include:

- **Help for sexual assault survivors when and where needed:** VUSN received a $1.43 million grant from a HRSA Title VIII initiative to develop and launch a Sexual Assault Nurse Examiner (SANE) education program. SANEs have specialized education to conduct forensic examinations that have been shown to provide better physical and mental health care for assault survivors, deliver better evidence collection, and support higher prosecution rates. Vanderbilt’s program is projected to increase the number of SANE-trained and certified advanced practice registered nurses practicing in emergency departments in rural or underserved U.S. communities.

- **Providing accessible healthcare for the most vulnerable:** In Nashville’s most economically depressed area, VUSN and a nonprofit housing organization provide consistent and accessible health care through a community health clinic, the Clinic at Mercury Courts. Now in its sixth year and launched with a Title VIII grant, the nurse-managed health clinic uses a comprehensive and collaborative interprofessional team-based model integrating nursing, pharmacy, social work, and medicine. Students from Vanderbilt’s medical and nursing programs gain experience working at the clinic to provide care for Nashville residents who are otherwise unable to receive medical care.

- **Building future nursing faculty:** In FY 18, VUSN received $1.3 million from the Title VIII Nurse Faculty Loan Program (NFLP), bringing the NFLP grant total to $9.38 million since 2008. Vanderbilt has responded to the need for more nurses trained at the doctorate level who can serve as faculty by growing its Ph.D. program and launching its Doctor of Nursing Practice (DNP) program. Since the program began in 2010, VUSN has produced 385 DNP graduates and 36 Ph.D. graduates.

### Department of Education

#### Student Aid Programs

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**Background**

Vanderbilt recognizes the critical role that federal student aid programs play in making college affordable. We encourage Congress to support a maximum Pell Grant award of $6,345 and to protect the future of Pell by ensuring that any of the carryover funding remains in the program, benefiting students. We also urge Congress to increase support for other federal student aid programs that provide grants and work-study to low- and middle-income students, including $1.03 billion for Supplemental Educational Opportunity Grants (SEOG) and $1.43 billion for Campus-Based Work-Study, restoring these programs to their pre-sequester funding level, adjusted for inflation.
Congress to provide $48 million in FY 20 for the Graduate Assistance in Areas of National Need (GAANN) program, which would restore the program to its pre-sequester funding level and provide support for additional students in disciplines critical to our nation’s continuing security and prosperity.

Continued support of the Pell Grant program, the foundation of the Title IV federal student aid program, ensures a reliable source of grant aid for the neediest students, thereby increasing access to and the affordability of higher education. Building on this base, universities match one-to-three the campus-based aid programs, SEOG and Federal Work-Study, multiplying the federal investment in low-income students. SEOG helps us to plug the holes for financially needy students by providing up to $4,000 in need-based grant aid to the neediest Pell Grant students, while the work-study program helps students work part-time on campus to help pay their college costs. Studies have shown that students who work on campus have higher graduation rates.

The GAANN program, targeted at graduate students, helps ensure a strong pipeline of diverse and talented experts and educators who will help to meet the demands of our 21st century workforce. The current funding level does not allow the program to run a competition each year, stifling the country’s ability to support graduate education in important areas of national need. We support including the arts, humanities, and social disciplines as eligible fields for grant competition in FY 20.

We share the goal of making college more affordable for students and look forward to continuing discussions with the Administration and Congress to ensure that efforts to do so do not inadvertently harm quality or jeopardize potential funding for low-income students and graduate students. In general, we are concerned about the erosion of benefits in the federal student loan programs, particularly for graduate and professional students. We appreciate the interest in streamlining these federal aid programs and want to work with Congress and the Administration on a long-term strategy to ensure both undergraduate and graduate students have federal support to access higher education.

**Student Financial Aid at Vanderbilt**

Vanderbilt University is fortunate to be able to offer prospective undergraduate students a need-blind admissions process while meeting 100 percent of all eligible undergraduate students’ demonstrated financial need without loans (see [here](#) for more information). Our expanded aid initiative means that all of an eligible undergraduate student’s demonstrated need is met by grants and scholarships (gift assistance) in addition to an expected work component—no need-based loans are included as part of a student’s aid package. In 2017-2018, 70 percent of our first-year undergraduates received some type of financial assistance and the average need-based financial aid award received by Vanderbilt undergraduates was $49,242. Vanderbilt’s net price in 2017-18 for first time freshmen (the average price paid by families when all aid is subtracted) was $23,295. For families with incomes below $30,000, first time freshmen students received an average of $64,085 in gift aid from the university, federal, and state sources.

We achieve this through a sizeable commitment of institutional funds dedicated to student aid complemented by federal and state student aid programs. During the 2017-2018 year, we have dedicated nearly $165 million in institutional funds in all categories and programs of financial aid for undergraduate aid. Thanks to our debt reduction initiative, our graduates are leaving Vanderbilt with a lower debt burden. The graduating class of 2017 had an average indebtedness of $23,973, approximately $1,279 less than the state average. Our students also find themselves in a position to repay these debts; our three-year default rate from 2013-2015 was 0.7 percent.
Vanderbilt provided our undergraduate, graduate, and professional students with the following amounts of federal aid during the 2017-18 award year:

- Nearly $4.5 million in Pell Grants to nearly 1,090 students;
- Over $897,800 in Federal Supplemental Educational Opportunity Grants to nearly 240 students (excluding the required institutional matching funds);
- $910,000 in Federal Work-Study to over 640 students (excluding the required institutional matching funds); and
- $1.6 million in GAANN funding in recent years, supporting 33 graduate students in Physics and Chemistry; these also involve partnerships with Tennessee HBCUs.

### Institute of Education Sciences

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### Background

The Dept. of Education’s Institute of Education Sciences (IES) is the primary federal agency supporting high-quality education research that provides the evidence on which to ground education practice and policy. Vanderbilt supports $670 million for IES in FY 20 to advance rigorous education research and $61 million for the National Center for Special Education Research (NCSER). This would restore the nearly ten percent decrease in purchasing power in real dollars that IES has experienced since FY 11.

Due to current funding limitations, many high scoring grants continue to go unfunded as only one of every ten grant proposals receive funding. IES supports high-quality education research which results in teaching and learning innovations that offer tremendous returns for our society. This level of funding would help build upon the essential research on which state and local education leaders depend, restore cuts to critical programs, and increase funding for programs for which funding has stagnated. Our education system will be stronger in the future if we provide meaningful, sustained support for rigorous education research and evaluation today. Vanderbilt also urges Congress to ensure that these resources are focused on competitively awarded and investigator-initiated rigorous research projects.

IES research is essential to address our nation’s most pressing educational challenges and to help states and districts build a culture of evidence-driven policy. Local, state, and federal governments depend on the evidence that IES develops to inform how they spend education dollars. Insufficient funding at IES has constrained the ability to support emerging lines of inquiry and tackle pressing questions about education, such as improved teacher professional development and how to better meet the needs of children with complex learning and developmental disabilities.

### IES at Vanderbilt

Vanderbilt is one of the major recipients of IES funding nationally and the top recipient of funding from NCSER, receiving $20.4 million from the Department of Education for research last year. Vanderbilt’s Peabody College of Education and Human Development is deeply engaged in high-quality research into areas of great interest to policymakers including identifying “what works” in the classroom and identifying methods to assess teachers and school leaders. We believe that basing education policy on
research and rigorous evaluations will improve education for all students – if sufficient funding is provided so that theory and research findings can be translated into practice. Examples of IES-funded research at Vanderbilt include:

- **Improving academic achievement of students with learning disabilities**: NCSER awarded a six-year $10 million grant to Peabody to develop and test the efficacy of intervention programs for students in the third through fifth grade with persistent learning disabilities. Researchers are evaluating intensive reading and mathematics interventions and providing teachers with validated tools to use in their classrooms to ensure the academic success of students with learning disabilities.

- **Evaluating career and technical education**: Vanderbilt education policy researchers will help lead the Career and Technical Education Research Network, a novel $5 million IES-funded effort to increase the evidence base on career and technical education. This research will assist leaders and practitioners in their efforts to strengthen career and technical education policies and programs to improve student outcomes. State and district policymakers will be trained to use data and research to make informed decisions about education programs and models.

- **Working to improve education and outcomes for students with learning disabilities**: With support from NCSER, Vanderbilt researchers are evaluating the efficacy of early social-communication and language intervention on toddlers with autism spectrum disorders; evaluating professional development and coaching models for delivering math and reading intervention to students with intellectual and learning disabilities; and developing a positive behavior support approach for developing social-emotional competence in young children called the Pyramid Model.

### International Education programs

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**Background**

*Vanderbilt urges Congress to provide $106 million for the Department of Education’s International Education and Foreign Language programs in FY 20. We want to work with the Administration and Congress to restore funding for these critical national investments.*

The Title VI National Resource Centers (NRCs) play a critical role in supporting our nation’s long-term national security, global leadership, and economic competitiveness and are vital to maintaining a high level of global engagement in the future. An increased investment in these programs would support our nation’s ability to meet the expanding demand for professionals and educators with area, regional, and international knowledge and foreign language skills. This increase would allow the Department to increase the total number of NRCs and Foreign Language Area Studies (FLAS) fellowships. In essence, increased investment would re-build our international education infrastructure and restore our capacity to train the foreign language and area experts who will play a vital role in the U.S.’s future diplomacy and security. The nation needs a steady supply of graduates with expertise in less commonly taught languages, world areas, and transnational trends.

**International Education programs at Vanderbilt**

Vanderbilt’s Center for Latin American Studies (CLAS) was designated as a Title VI National Resource Center in 2006. The designation was renewed in 2010, 2014, and again in 2018, with an award of $1.64 million over four years in NRC and Foreign Language Area Studies (FLAS) funds. More information on CLAS is [here](#).
For sixty years CLAS has distinguished itself in teaching, research, and outreach in Latin American Studies, maintaining one of the strongest concentrations of Brazilianists of any university in the U.S. In addition to being an NRC, CLAS is one of the select graduate programs approved by the Department of Defense for its Foreign Area Officer training. CLAS provides educational seminars, advice, and counsel on Latin America to the U.S. State Department, the U.S. Southern Command, and local and state governments, including the Tennessee State International Development Office. CLAS also advises Tennessee-based businesses seeking to expand to Latin America on the local political and economic conditions in the region. The Center offers instruction, through in-person courses, virtual/distance courses, and FLAS fellowships, in Portuguese and K’iche’ Mayan languages. Portuguese is the sixth most spoken language in the world, and Brazil is an emerging global power with the world’s eighth largest economy; this has led the U.S. State Department to consider Portuguese a critical language – a language that is critical to national security and economic prosperity. In 2010, the Center established the first program in the country teaching K’iche’ Mayan, which is considered a less commonly taught language and is spoken by about 1 million people today.

Vanderbilt has also received Title VI Fulbright-Hays scholarships that allow our students to not only conduct important research, but also to learn from and influence other cultures.