



**Moffitt Cancer Center and
Florida Institute for Human and Machine Cognition
FY 2021-2022 Legislative Budget Request**

Moffitt Cancer Center - \$8.5 M

Moffitt is the only National Cancer Institute (NCI)-designated Comprehensive Cancer Center in Florida and is also the leading educational facility for oncology in the state. As part of the State University System, and a Statutory Teaching Hospital that is accredited by the Accreditation Council for Graduate Medical Education (ACGME), we train more students in cancer care and research than any other Florida institution.

- Moffitt is a training ground for the next generation of oncologists, scientists, and other oncology professionals. Current funding of \$10.6 million contributes to the education and training of over 2,600 students either rotating or working full time at Moffitt. These students include:
 - Full-Time Medical Residents and Fellows
 - Post-Doctoral Training Program
 - +145 trainees currently
 - Postdoctoral fellows attract grants in cancer biology, epidemiology, cancer care and delivery, drug discovery, immunology, and health outcomes
 - Medical Residents and Fellows who rotate annually through our training programs utilizing a formal Physician-Scientist Mentorship
 - Undergraduate and Advanced Practice Nursing Students
 - Radiologists and Medical Physics Graduate Students
 - Nutrition Therapists
 - Medical and Physician Assistants
 - Pharmacy Students
- Our educational programs start as early as high school with summer internship programs with our Integrated Mathematical Oncology Department.
- Moffitt works with the University of South Florida at the graduate level. Dr. Kenneth Wright (Immunology) has directed an accredited PhD Program since 2001 in Cancer Biology, funded by Moffitt Cancer Center in collaboration with the University of South Florida. Taught exclusively by Moffitt faculty members, it has produced more than 69 graduates and currently has 54 active students. The training program expanded its Cancer Biology degree to include three new majors: 1) Integrated Mathematical Oncology; 2) Chemical Biology; and 3) Cancer Immunology Immunotherapy. With four majors, the

program now contributes to the training of a more diverse group of tomorrow's scientists and has increased its enrolled student population by more than 50% since prior requests.

- We continue to face a critical shortage of oncologists in the State of Florida as the next generation reaches the peak cancer age. It is proven that the majority of residents stay in the state in which they train; Moffitt Cancer Center is working to ensure that we maintain as many residents/physicians as possible.

Moffitt's education funding was, at one time, almost \$14 million. Several reductions occurred during the recession and the appropriation has still not been restored to the 2008 level. While education programs have remained strong, growth and expansion have not been to the levels needed. We are now spending over \$19 million a year in education funding.

In addition, the state appropriations also fund a portion of the infrastructure necessary for the diverse set of training programs to succeed. These activities include protected time for faculty to train and mentor students and other trainees, and the maintenance of a wide array of scientific literature and periodicals, which continues to increase as Moffitt expands into new areas of research. Examples of initiatives to be funded from the incremental \$8.5M request include:

- Medical Residents, Fellows and Other Training Positions
- Research Graduate Training and Other Research Education
- Other Organizational Training and Education

Junior Faculty (Assistant Members)

A shortfall of cancer physicians and researchers is projected nationally in the coming decades due to many challenges facing trainees and faculty. For researchers, the limited extramural funding and competition nationally against more senior faculty make it difficult for junior faculty just beginning their careers to be successful. Moffitt emphasizes recruitment and training of early career faculty members to provide a nurturing and robust scientific environment that encourages junior faculty to succeed.

Florida Institute for Human and Machine Cognition (IHMC) - \$4.2 M

For the 2021-2022 Legislative Budget Request year, IHMC is requesting \$4.2 million in recurring funds from the State of Florida to enhance and grow current operations at its Pensacola and Ocala, Florida locations. IHMC is a world-renowned research institute working in the areas of artificial intelligence, cyber security, robotics, assistive technologies, natural language understanding, data mining, and other related high technology fields. A 501(c)3 statewide research institute created pursuant to section 1004.447 Florida Statutes, IHMC is part of the State University System of Florida with formal research affiliations with FAU, FIT, UCF, UF, USF, UWF, MOTE Marine, Moffitt Cancer Center, and the Andrews Research Institute. IHMC's federal research clients include NASA, Army, Navy, Air Force, DARPA, and IARPA, including work for special operations community in human performance enhancement and resilience in extreme environments.

IHMC has received national recognition for its community outreach initiatives, including its highly popular public evening lecture series, summer robotics camp, and youth-oriented science and educational outreach initiatives (Science Saturdays and I LOVE Science). In 2016, IHMC launched its STEM-Talk Series, a free podcast series featuring some of the most interesting people in science and technology. With 110 episodes online, STEM-Talk has maintained a five-star rating with over two million listeners and twice has been awarded first-place in the Science and Medicine Category of the Annual People's Choice Podcast Awards.

A recognized economic driver, IHMC was honored with the top US Department of Commerce Award for Excellence in Technology-Driven Economic Development. In 2015, IHMC scientists and researchers made worldwide news after placing second in the international DARPA dynamic walking robotics competition held in Pomona, California. In 2016, IHMC won the Silver Medal for its powered exoskeleton in the "Cybathlon" and IHMC has been invited back and will be competing in the second "Cybathlon" to be held in the fall of 2020. The Cybathlon, held in Zurich, Switzerland, is a unique international championship in which people with physical disabilities compete against each other to complete everyday tasks using state-of-the-art technical assistance systems. In January of 2019, IHMC was named one of the five finalists to compete in the three-year Toyota Mobility Assistance International Competition.

IHMC's scientists and researchers continue to bring honors and recognition to Florida. In 2019, CEO Ken Ford was selected to join an elite group of industry leaders (to include senior executives from Google, Oracle, Amazon, and Microsoft) on the newly formed National Security Commission on Artificial Intelligence. IHMC's CEO Dr. Ken Ford and Senior Research Scientist Dr. Jerry Pratt have both been inducted into the Florida Inventor's Hall of Fame. Dr. Ford, Senior Research Scientists Bill Clancey and Peter Pirolli and Research Scientist David Fries have recently been honored as elected Fellows of the National Inventors Academy, and Research Scientist Dr. Dawn Kernagis received the Young Scientist/Medical Doctor Award from the Undersea and Hyperbaric Medical Society. In 2020, Ocala's Associate Director and Senior Research Scientist Dr. Bonnie Dorr was named to the Defense Advanced Research Project Agency's (DARPA) Information and Science Study Group (ISAT).

Researchers at IHMC pioneer technologies aimed at leveraging and extending human capabilities. Active research areas include: knowledge modeling and sharing, adjustable autonomy, robotics, advanced interfaces and displays, communication and collaboration, computer-mediated learning systems, intelligent data understanding, software agents, cyber security, sensory substitution, natural language understanding, expertise studies, work practice simulation, knowledge representation, and other related areas. IHMC prides itself on a broad and interdisciplinary approach to addressing societal issues and creating advanced technological solutions, thus its research staff includes well-known computer scientists, cognitive psychologists, neuroscientists, physicians, and engineers. IHMC faculty and staff collaborate extensively with industry and government to develop science and technology that can be enabling with respect to society's broader goals. IHMC researchers receive contract and grant funding from an array of government and private sources. IHMC research partners include: DARPA, NSF, NASA, Army, Navy, Air Force, NIH, DOT, IBM, IDEO, Microsoft, Boeing, Lockheed, Bank of America, Salk, UAB, SRI, and SAIC, among many others.

In October 2016, IHMC completed construction of an \$8 million, world class research building in Pensacola that houses a state-of-the-art robotics lab and a sensory augmentation lab. Named the “Levin Center for IHMC Research”, the building is purposefully equipped with a glass walkway on its second floor to enable (and encourage) student field trips and visitors to experience, in real time, activities transpiring in the robotics lab below. This unique experience of watching young scientists and engineers at work on futuristic technologies, including walking robots and powered exoskeletons, will inspire and excite local youth about careers in STEM (science, technology, engineering, math, and medicine) fields. Since the grand opening of the Levin Research Center, IHMC has hosted thousands of public school student field trips, as well as expanded outreach in the community for visitors including international groups and professional organizations. And every April, in conjunction with National Robotics Day, IHMC opens its doors to over 1200 young people who visit and tour the Levin Research Center and its robotics labs.

In 2017, IHMC purchased a two-acre lot adjacent to its main facility with the future plan to build additional lab space for expanding research in areas of human performance and resilience. IHMC recently leased space from the Andrews Institute in nearby Gulf Breeze to house two IHMC lab research simulations on newly awarded projects as we are currently out of space in the two Pensacola facilities. In FY 2018-19, the State University System Board of Governors approved the establishment of a joint Ph.D. program in Intelligent Systems and Robotics between IHMC and the University of West Florida, the first of its kind in Florida and one of only a few in the nation. A PhD Program Director has since been hired and there are currently twelve doctoral students in this program.

Over the past several years, IHMC has worked to expand and diversify its research areas by attracting new Research Scientists in the research and development of microsystems and robotics/automation, human performance optimization, and risk mitigation for operators in extreme environments, and in cognitive science, artificial intelligence, and human-computer interaction, with applications in digital health, sensemaking, and information foraging. IHMC believes all three of these new research arenas will be very successful and assist IHMC in attracting more federal research dollars to Florida. IHMC has recently recruited an out-of-state Senior Chief Research Scientist, who is the third most-funded NIH scientist in his field of medical rehabilitative research, to join its ranks. He will be arriving September 1, 2020, and be bringing a number of his research team with him to include Research Scientists, Research Associates, and Lab and Program Directors. IHMC is confident that this new team will be instrumental in bringing significant new federal research award dollars to Florida.

Also, IHMC has licensed its exercise technology innovations into the commercial sector and is working with a small Pensacola-based business to further economic development efforts in our region. Similar conversations about licensing IHMC technologies are happening with small businesses in Ocala and Gainesville.

In summary, the funding request of \$4.2 million will enable IHMC to continue to enhance its operations and expand in research of national significance including advanced cognitive assistance technologies, network/cyber security, ocean technologies, companion devices, exoskeletons, critical infrastructure protection, human performance enhancements, and sustainable energy modeling and simulation. This research expansion is happening in both downtown Pensacola and downtown Ocala, in part through the successful recruitment of top

scientists and researchers to Florida. Maintaining prominence in current research areas and developing strength in these emerging research areas are vital to IHMC's continued growth and of critical importance to our national defense, security, and overall societal needs.