

National Aeronautical and Space Administration (NASA)

Sample Projects Evaluated by PEER

Center for In-Space Advanced Manufacturing (CISM-R²): Recycling and Regolith Processing

(\$4,900,000, 2024–2029 est)

The University of Illinois Chicago (UIC) leads CISM-R², a project funded with NASA's Minority University Research and Education Project (MUREP), Institutional Research Opportunity (MIRO) award. MIRO was established to strengthen and develop the research capacity and infrastructure of Minority Serving Institutions in areas of strategic importance and value to NASA's mission and national priorities center will specialize in in-space recycling and the utilization of available materials to support sustainable space exploration, development, and civilization. NASA's In-Space Manufacturing (ISM) seeks to develop the materials, processes, and manufacturing technologies needed to provide an on-demand manufacturing capability for deep space exploration missions. In-Space recycling and in-situ resources utilization are critical to the ISM mission as they enable a broad range of in-space services and sustainable development. In this context, the objectives of this proposed project are to: 1) establish a Center for In-Space Manufacturing- Recycling and Regolith Processing (CISM-R2), a prominent engineering research center at UIC, specializing in the advancement of ISM techniques for recycling and regolith utilization; 2) enhance and sustain UIC's research and education capability in NASA-related areas, and 3) increase the number of UIC students engaged in NASA-related areas, promoting the inclusion of underrepresented and low-income students. UIC aims to partner with NASA Marshall Space Flight Center (MSFC), Northwestern University (NU) and Northern Illinois University (NIU). The collaborative effort extends to government/industry/society organizations including DOE Argonne National Laboratory (ANL), Chicago mHUB, and The American Society for Nondestructive Testing (ASNT).

- Principal Investigator: Dr. Yayue Pan, University of Illinois Chicago

NASA Florida Space Grant Consortium

The Florida Space Grant Consortium (FSGC) is focused on generating meaningful and relevant student contributions to NASA's mission and work, driven by requirements from NASA's Mission Directorates. With collaboration with its 22 affiliated members comprised of universities and colleges, as well as three affiliates involved in K12 education, and Space Florida – the state's space economic development agency. FSGC helps support the needs of the Aeronautics Mission Directorate (ARMD), Human Exploration and Operations Mission Directorate (HEOMD), and Space Technology Mission Directorate (STMD). This project works towards its mission of strengthening Florida's economy and augment NASA Educational Outcomes by providing aerospace, aeronautics, or space-related fellowships, scholarships, and internships, supporting research opportunities, increasing awareness among community colleges about NASA/FSGC programs and resources, and enhancing STEM literacy, education, and awareness.

Principal Investigator: Dr. Jaydeep Mukherjee, University of Central Florida

Student Apprenticeships in Aerospace Advanced Manufacturing (SA₃M) (\$749,945, 2022–2025 est)

The Florida International University (FIU) received an award from NASA's MUREP Aerospace High-Volume Manufacturing and Supply Chain Management Cooperative (MUREP HighVolume) program. MUREP High-Volume seeks to address the need for a high-volume manufacturing and supply chain ecosystem in aerospace and future needs of manufacturing ecosystems by introducing new and diverse ecosystem networks. These networks are designed to support the development of a broader technical aerospace high-volume manufacturing workforce while increasing interest in related entrepreneurship opportunities. The vision of SA₃M is for a sustainable high-volume manufacturing integrated with the avionics supply chain, as part of the US Aerospace supply chain ecosystem. The project is supporting NASA and the national efforts in Advanced Aerial Mobility (AAM), and aligns with the ARMD Strategic Implementation Plan, Strategic Thrust 6: Assured Autonomy for Aviation Transformation Vehicles, by supporting the aerospace supply chain innovations, and by training professionals in two domains of the future aerospace workforce: aerospace supply chain specialists and manufacturing technicians and engineers. g capacity in avionics at FIU to support the advanced air mobility supply chain.

- Principal Investigator: Dr. Cheng-Yu Lai, Florida International University

FIU NASA MIRO Center for Research and Education in 2D Optoelectronics (CRE2DO) (\$4,995,539, 2019–2024 est)

The Florida International University CRE2DO project was funded by NASA's Minority University Research and Education Project (MUREP) Institutional Research Opportunity (MIRO). MUREP provides opportunities for research and education to inspire and prepare increasing numbers of students for STEM careers and as an integral part of this mission, MIRO was established to strengthen and develop the research capacity and infrastructure of Minority Serving Institutions in areas of strategic importance and value to NASA's mission and national priorities. CRE2DO aims to emerge as a self-sustained center of excellence for innovative research and education, focused on attaining national competitiveness in advanced optoelectronic technologies that support NASA mission, driven by FIU's pledge for educating and training a highly diverse and inclusive population of future scientists and engineers.

- Principal Investigator: Dr. Daniela R. Radu, Florida International University

STEM Satellites: A Mobile Mathematics and Science Initiative for Orlando Metropolitan Area Children's Hospital (2016–2017)

PEER evaluated the first year of this project. The NASA Competitive Programs for Science Museums, Planetariums, and NASA Visitor Centers Plus Other Opportunities (CP4SMPVC+) funded project involves the Orlando Science Center (OSC) in partnership with BASE Camp Children's Cancer Foundation, and UCF. Members of the project team worked directly with AdventHealth for Children, Nemours Children's Hospital, and Arnold Palmer Children's Hospital to deliver high-quality STEM education at each hospital. The goals of the STEM Satellites project were to promote life-long learning and STEM literacy for chronically and critically ill children; motivate chronically and critically ill children ages 9–19 to pursue STEM learning and improve these children's understanding of NASA's missions, contributions to STEM disciplines, and increase their interest in STEM professions, and to link and engage informal and formal education by providing a collaborative space for chronically and critically ill children and their health peers to pursue NASA-inspired STEM learning through sets of mobile exhibits housed at OSC and UCF.

- Principal Investigator: JoAnn Newman, Orlando Science Center

Kennedy Space Center/Florida Space Grant Consortium (KSC/FSGC) NASA Pre-Service Teacher Institute (PSTI) (2008–2009)

This NASA PSTI was a two-week residential major minority institute, funded by NASA, for junior or senior college students who were preparing to teach in elementary or middle school. The purpose of NASA PSTI was to increase pre-service teachers' skills and enthusiasm for teaching mathematics and science, while incorporating technology in their curriculum. This was achieved through a focus on problem-based learning using an aerospace theme.

- Principal Investigator: Dr. Jaydeep Mukherjee, Florida Space Grant Consortium