"Earth is the cradle of humanity, but one cannot remain in the cradle forever." –Konstantin Tsiolkovsky

## **MISSION**

Our mission is to provide government and commercial space ventures with pioneering technologies that enable working and living on the surfaces of the moon, planets and other bodies in our solar system.

## VISION

Our vision is to be the premier government research and technology laboratory for development of spaceport systems on Earth or at any space destination.

## ISRU

In-situ resource utilization (ISRU) is the idea of using resources at our destination and living off the land in space. For practical and economic reasons, it makes more sense than trying to ship everything with us as we explore. Today, NASA is looking at new ways to create water, air, rocket propellants and infrastructure from the very materials found in the atmospheres and soils of our next planetary destinations. At Swamp Works, Kennedy Space Center is innovating and developing new ISRU technologies with a lean-development approach. Our motto is *fail forward fast*.

www.nasa.gov/centers/kennedy/exploration/researchtech/

### Swamp Works

Innovation Incubator for New Space Technology Development



## **CONTACTS**

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Technology Programs

National Aeronautics and Space Administration



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# KENNEDY SPACE CENTER SCIENCE & TECHNOLOGY PROJECTS DIVISION



## SPACEPORT SYSTEMS BRANCH

### Granular Mechanics and Regolith Operations

#### Robert P. Mueller, (321) 867-2557

Studying robotics and the mechanics of regolith, the loose layer of rocks, gravel and dust on planetary surfaces. Supporting the development of ISRU technologies for living off the land in space.

- Robotics for surface systems
- Excavation technologies
- Construction and 3D printing with regolith
- Dust-tolerant mechanisms
- Rocket exhaust plume effects

### **Cryogenics Technologies**

#### James E. Fesmire, (321) 867-7557 Dr. William U. Notardonato, (321) 867-2613

Providing unique expertise in energy-efficient solutions for the storage, transfer, and use of cryogens on Earth and in space.

- Thermal insulation systems and novel materials
- Integrated refrigeration systems
- Low-temperature applications for superconductivity, medical, science, and industrial processes
- Energy-efficient technologies for space launch and exploration
- Cryobotics operations of mechanisms/electronics in cryogenic environments



## FLIGHT TECHNOLOGY BRANCH

### Electrostatics and Surface Physics

### Dr. Carlos I. Calle, (321) 867-3274

Investigating electrostatics and surface physics with applications for flight and planetary exploration. Detecting and preventing electrostatic charge generation on spaceflight hardware. Leveraging electrostatics to remove dust from solar panels, optical systems, thermal radiators, and other hardware to ensure operation. Electrostatic dust filtration on ISRU air intakes.

### Advanced Materials and Polymer Sciences

#### Dr. Luke B. Roberson, (321) 867-1543

Researching and developing technologies in the areas of nanochemistry, water purification, composite materials, and Self-Contained Atmospheric Protective Ensemble (SCAPE) suits.

### Atmospheric Sciences

#### Jennifer G. Wilson, (321) 867-0824

Research in atmospheric physics and instrumentation analysis. Investigating cloud charge structure over varying terrain, specifically launch environments with land-ocean interactions.



## **APPLIED SCIENCE BRANCH**

### Applied Chemistry

### Dr. Jacqueline W. Quinn, (321) 867-8410

Developing chemical solutions for in-situ resource utilization, leak detection, precision cleaning, environmental remediation, and more. Testing materials against hypergolic fluids and developing hypergol sensors.

### Applied Physics

### Dr. Robert C. Youngquist, (321) 867-1829

Developing instrumentation, sensors and tools in support of ground processing and flight hardware. Developing ground and flight software for instruments and payloads.

### Corrosion Research

### Dr. Luz M. Calle, (321) 867-3278

Conducting applied research in the areas of corrosion detection and mitigation. Developing technologies such as high temperature concrete, self-healing wires, and smart paints that indicate, resist, and repair corrosion.