



National Aeronautics and Space Administration  
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## **Research Opportunities in Space Biology**

**NASA Research Announcement  
Soliciting Proposals for the Period Ending December 19, 2012**

Catalog of Federal Domestic Assistance (CFDA) Number: 43.003

**NNH12ZTT001N NRA**

**Issued: September 30, 2012**

**Step-1 Proposals Due: October 31, 2012, 5:00 PM Eastern Daylight Savings Time**  
**Step-2 Proposals Due: December 19, 2012, 5:00 PM Eastern Standard Time**

## APPENDIX J: Nanoracks Facilities

NanoRacks provides microgravity research facilities aboard ISS allowing small standardized payloads to be plugged into any of the NanoRack platforms, providing interface with the International Space Station power and data capabilities. The Nanoracks U.S. National Lab facilities provide turnkey opportunities experiments and currently includes two NanoLab Platforms, NanoRacks Plate Reader, NanoRacks Microscope and NanoRacks MixStix, providing repeatable microgravity research opportunities onboard the ISS. A passive centrifuge facility will also be available and may be used to provide variable-gravity environments for a variety of research applications. The facilities are described briefly below with links to the NanoRacks website for more information.

### Overview of NanoRacks Laboratory Inside International Space Station

- Three research platforms in CubeSat form factor with USB standard interface
- Two microscopes;
- Centrifuge (With Astrium)
- Plate Reader allowing sophisticated on-orbit analysis;
- Hardware for biological research
- Data returns to customer
- Power Available
- Return of payloads possible



Two NanoRacks Platforms are now permanently housed on the ISS U.S. National Lab, allowing for 32 payload slots of NanoRacks research modules, known as NanoLabs (1U = 4 inches by 4 inches by 4 inches) or any combination, such as 2U or 3U x 8U and so on. Everything necessary for a mission is taken care of by the NanoRacks team. Through NanoRacks partners and via their own facilities, NanoRacks offers complete in-house capabilities for payload integration, payload design and development and interfacing with NASA and foreign space agencies <http://nanoracks.com/facilities/nanolabs/>.

The NanoRacks optical microscopes allow on-the-ground researchers to undertake in-situ microgravity analysis. The USB Microscope plugs into any ISS laptop allowing crewmembers to adjust the position of the samples on the slide and focus the microscope as well as choose the magnification from the 5X, 10X or 20X objectives. When the desired images are captured, the crewmember will copy them from the USB Video Device to the destination file for later downlink to your team on the ground <http://nanoracks.com/facilities/microscope/>.

The NanoRacks' MD Plate Reader-1 holds 96 samples allowing veteran space researchers and those new to space to perform the same state of the art analysis now done in laboratories on the Earth. The Plate Reader is derived from an off the shelf Molecular Devices M5E < <http://nanoracks.com/facilities/plate-reader/>>.

The NanoRacks Centrifuge was developed in collaboration with Astrium. It is a passive facility that is maintained in the ISS cabin and has no independent temperature, humidity or atmospheric

control. The facility can hold up to 6 ESA Type 1 containers (each one measuring 20 mm x 40 mm x 80 mm).. Hardware for biological research is available for Nanoracks research. ESA Type I Experiment containers are available for supporting plant growth, small aquatic organisms and drosophila. A variety of modified Type I containers and the centrifuge system are shown in **Figure 1** below.

**Figure 1:** Centrifuge and Modified Type I containers

