

NASA Marshall's Space Grant Research (MSGR) Internship Program



General Description: In collaboration with NASA Space Grant Consortia, NASA Marshall Space Flight Center (MSFC) will host a 10-week summer undergraduate research program called the MSGR Internship Program. The program would support MSFC's workforce development and research needs while at the same time supporting Space Grant's efforts in workforce development, education, and research projects.

Funding: MSGR, modeled after a similar Jet Propulsion Laboratory program, would have the following funding components:

- Space Grant funds support the students' stipends and travel costs. A given Space Grant consortium would establish the level of those payments and handle all payments to the selected students.
- A potential Marshall engineer or scientist mentor for each student would provide administrative funding support to the MSFC Academic Affairs Office in the amount of \$1000/student. This will be used by the Academic Affairs Office to provide administrative support for the selected students.

Selection:

- Individual Space Grant consortia would be responsible for announcement of the opportunity to its students.
- The student would submit basic application information to the Space Grant consortium.

- If the Space Grant consortium chooses to support a given student to participate at Marshall, the student would then submit an MSFC-provided application to MSFC for potential placement with an MSFC mentor.
- The MSGR coordinator would work to place prospective interns with appropriate mentors, following appropriate criteria (e.g. Center need, student qualifications and the development of a diverse group of students).
- Final selection is dependent upon identifying an appropriate MSFC mentor for the student

Other:

- Seminar opportunities for MSGR interns, in conjunction with other summer student and faculty programs, would be provided.
- Links among students would be provided by arranged social events.

Reporting and Student Responsibilities

- Students are responsible for a final report and presentation. Students must also submit profile and feedback information into the NASA NEEIS education database.
- Students are to follow standard procedures for hours, dress and conduct as expected of MSFC personnel.

Contact Information:

L Michael Freeman, PhD
NASA/Marshall Space Flight Center
Academic Affairs Office
Mail Code HS30
Marshall Space Flight Center, AL 35812

Phone: 256-961-7805

Fax: 256-961-7523

Email: michael.freeman@nasa.gov

Example Research Topics
NASA Marshall Engineering Directorate (ED)

- Environmental Effects Group/Contamination Team, **Development of analytical specimens used to determine the limits at which materials can be detected and quantified on the surface of flight hardware**- Work involves application of specific materials, using ultrasonic dispersion and deposition techniques, to simulated hardware surfaces. Fourier transform IR, and UV, spectroscopy are used to verify the quantity and presence of the contaminant on sample surfaces.
- Engineering Directorate & Safety & Mission Assurance (S&MA) Office/Joint Effort, **Understanding uncertainties governing performance of space systems**- Understanding uncertainties that become part of the system during analysis, design, manufacturing, and operations; Assessing uncertainties on flight hardware such as the solid rocket booster (SRB) auxiliary power unit (APU); models to manage the uncertainties toward resource savings. (Singhal/EM01)
- Materials and Processes Laboratory, **Permeation of cryogens through the wall and joints of a dome region of a composite tank**- Fabrication of composite test panels/disks with bonded joints to simulate a cryogenic composite tank dome; Development of a joining methodology to minimize or eliminate the permeation of cryogen through the joint; Development of a cryogenic leak path database. (Smith/EM40)
- Materials and Processes Laboratory/Tribology Laboratory- **Friction and wear test on lubricants and materials with ASTM test equipment to determine relative tribological characteristics and wear properties of selected candidate lubricants and materials.** (Hall/EM40)
- Materials and Processes Laboratory/Surface Metrology Laboratory-**Determine roundness, surface finish, waviness, and general wear patterns of materials exposed to relative mechanical motion and vibration.** (Moore/EM10)
- Mechanical Test Team, NESC ISS weld property development programs for **un-inspected Multi-purpose Logistics Module (MPLM) Nodes**- Mechanical tests on welds built to simulate the MPLM node welds. These welds were not properly inspected prior to location on the International Space Station. Other testing includes: testing of insulating foam and testing in support of the in flight anomaly investigations (IFA) from STS-114. Mechanical Test Team focuses upon planning, design, specimen layout and analysis.
- Space Environmental Effects Impact Testing Facility, **Meteoroid and debris impacts**- Basic assembly and cleaning of system hardware, prepare test samples, and assist with basic data analysis, including digital photography, of test samples and measurements of impact damage.
- Science Directorate/Exploration Science & Technology Division, **Analysis and simulation related to planetary surface nuclear power generation**-Optimizing radiation and thermal shielding solutions for complex geometry and structure; work will include evaluation of current algorithms as well as the development and testing of new ones. (Barghouty/XD41)
- Science Directorate/Earth & Space Science Laboratory, **North Alabama Lightning Mapper Array (LMA)** - LMA is a detection system that measures and maps total lightning in North Alabama region. Duties include: maintaining system, downloading data on tapes, archiving data, supporting field experiments, data retrieval from various sites, troubleshooting, configuring computers, assisting with site installations, and replacing and repairing various equipment. (Blakeslee/XD11)

- Propulsion Research Center, **Chemical applications, nuclear and non-chemical applications, and advanced concepts and technologies**- System development in chemical propulsion for new launch systems and lunar landing systems; Nuclear surface power systems to support habitats on the lunar surface; Advanced technology and concepts for transportation of crews beyond Mars orbit. Tasks include: experimental characterization and evaluation of throttleable injector designs for descent engines, experimental work on igniter technologies including plasma jet applications and testing of thermal sources in support of near-term radioisotope generator development. (Schafer/XD20)
- Additional engineering topics TBD
- Topics in space science TBD
- Additional topics in earth science TBD
- Topics in atmospheric science TBD