NASA Research Announcement (NRA) -

Use of the NASA Physical Sciences Informatics System

National Council of Space Grant Directors’ Spring Meeting
The Westin Crystal City Hotel
1800 Jefferson Davis Highway
Arlington, VA 22202
March 3-5, 2016

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Harri Vanhala (NRESS)
PSI Team (MSFC)
Team

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- Harri Vanhala – Scientist, (NRESS)
- Ben Goodman – Scientist, (NRESS)
- Fran Chiaramonte – Program Scientist for Physical Sciences Research Program (HQ)
SLPS Gravity-Dependent Physical Sciences Research

**Biophysics**
- Biological macromolecules
- Biomaterials
- Biological physics
- Fluids for Biology

**Materials Science**
- Glasses and Ceramics
- Granular Materials
- Metals
- Polymers and Organics
- Semiconductors

**Combustion Science**
- Spacecraft fire safety
- Droplets
- Gaseous – Premixed and Non-Premixed
- Solid Fuels
- Supercritical reacting fluids

**Fluid Physics**
- Adiabatic two-phase flow
- Boiling and Condensation
- Capillary flow and Interfacial phenomena
- Cryogenic storage and handling

**Complex Fluids**
- Colloids
- Foams
- Gels
- Granular flows
- Liquid crystals

**Fundamental Physics**
- Space Optical/Atomic Clocks
- Quantum test of Equivalence Principle
- Cold atom physics
- Critical point phenomena
- Dusty plasmas
The Physical Sciences Research Program Vision: From Microgravity Science to Open Science

Outcomes:
- Global access to cutting-edge research data
- Fuel innovation & discovery leading to increased economic growth
- Acceleration from ideas to research to products
- Enhancement and verification of numerical and analytical models
- Increased products, patents, and publications
- Advancement of fundamental research
<table>
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<th>Investigation</th>
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<td>DAFT (Dust and Aerosol Measurement Feasibility Test)</td>
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<td>Combustion Science</td>
<td>FLEX (Flame Extinguishment Experiment)</td>
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<td>Combustion Science</td>
<td>SAME (Smoke Aerosol Measurement Experiment)</td>
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<td>Combustion Science</td>
<td>SPICE (Smoke Point in Coflow Experiment)</td>
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<td>Complex Fluids</td>
<td>ACE-M1 (Advanced Colloids Experiment-Microscopy – 1) *</td>
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<td>Complex Fluids</td>
<td>BCAT-3 (Binary Colloidal Alloy Test – 3)</td>
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<td>Complex Fluids</td>
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<td>BCAT-6 (Binary Colloidal Alloy Test – 6)</td>
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<td>Complex Fluids</td>
<td>InSPACE-3 (Investigating the Structure of Paramagnetic Aggregates from Colloidal Ellipsoids–3)</td>
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<td>Complex Fluids</td>
<td>InSPACE-3+ (Investigating the Structure of Paramagnetic Aggregates from Colloidal Ellipsoids–3+)</td>
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<td>Complex Fluids</td>
<td>PHaSE (Physics of Hard Spheres Experiment)</td>
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<td>Complex Fluids</td>
<td>SHERE (Shear History Extensional Rheology Experiment)</td>
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<td>Complex Fluids</td>
<td>SHERE II (Shear History Extensional Rheology Experiment II)</td>
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<td>Complex Fluids</td>
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<td>Fluid Physics</td>
<td>CCF (Capillary Channel Flow)</td>
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<td>CFE (Capillary Flow Experiment)</td>
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<td>Fluid Physics</td>
<td>CVB (Constrained Vapor Bubble)</td>
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<td>Fluid Physics</td>
<td>MABE (Microheater Array Heater Boiling Experiment)</td>
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<td>Fluid Physics</td>
<td>NPBX (Nucleate Pool Boiling Experiment)</td>
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<td>Fundamental Physics</td>
<td>GRADFLEX (Gradient Driven Fluctuation Experiment)</td>
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<tr>
<td>Materials Science</td>
<td>CSLM (Coarsening in Solid-Liquid Mixtures)</td>
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<td>CSLM-2 (Coarsening in Solid-Liquid Mixtures – 2)</td>
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<td>Materials Science</td>
<td>ISSI (In-Space Soldering Investigation)</td>
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<td>Materials Science</td>
<td>PFMI (Pore Formation and Mobility Investigation)</td>
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Key dates:
01/19/2016    NRA Appendix B Released
01/26/2016    Conduct Proposers’ Conference
02/09/2016    Notices of Intent Due
03/17/2016    Proposals Due
05/27/2016    Target: Announce Selections

Award Information:
• Typical award: $75,000 – $100,000 /year, for a total maximum award of up to $200,000 for a two-year period.
• Proposals of exceptionally high scientific and technical merit may be considered for up to $125,000 /year, for a total maximum of up to $250,000 for a two-year period.
• Expected number of selections: 10
PSI NRA (Appendix B): Goal and Eligibility

Goal and Requirement: The Use of PSI Data:

- The NRA solicits ground-based research proposals – both experimental and numerical studies – utilizing experimental data residing in the PSI.
- Proposers must review the data in the PSI system before preparing their proposal. The proposal must clearly demonstrate how the PSI data will be used in the project.
- Prior to the submission of the proposal, it is highly recommended that the proposers take at least one representative sample set of PSI data to perform numerical modeling or sample experiments and present the findings as part of the proposal.

Eligibility:

1) Established researchers from all categories of U.S. and non-U.S. organizations, including educational institutions, industry, nonprofit organizations, NASA Centers and other Government agencies

2) Graduate students (with advisors) from accredited U.S. postsecondary institutions and programs.
   - Note: proposals from graduate students must be submitted by their advisor.
PSI NRA Appendix A – Released on June 4, 2015
PSI NRA Appendix B – Released on Jan.19, 2016
PSI NRA Appendix C – Target release date: Sept.15, 2016
PSI NRA Appendix D – Target release date: Sept.15, 2018
PSI NRA Appendix E – Target release date: Sept.15, 2020
This repeats every two years……
Accessing PSI

http://psi.nasa.gov
Navigating to Data

Click on Investigation name
To view data
Navigating Investigation Data

Data categories
- Click on experiment data record to see raw and analyzed data
- Export plot data to Excel
- Download all related files

Ion Delta
- Export plot data to Excel
- Related files Download all plot
At NASA, we are pleased to announce the Physical Science Informatics (PSI) System, a data repository for physical science experiments performed on the International Space Station (ISS). The PSI system is accessible and open to the public thus fulfilling the President's Open Data Policy. The website is: http://psi.nasa.gov/index.html

“The resulting data from that envelope of experiments will then be used to create experimental informatics libraries that will support many more investigators and funded ISS-derived research. What that does is, it converts what would be normally a single [Principal Investigator] PI research opportunity into multiple PI research opportunities now and into the future”. Marshall Porterfield, Space Life and Physical Sciences Director.
PSI NRA Appendix B: Proposal Evaluation

• All proposals will be prescreened for compliance with requirements of this solicitation. Non-compliant proposals may be withdrawn from the review process and declined without further review.

• Compliant proposals will undergo a comprehensive review which includes evaluation of factors such as:
  o Intrinsic scientific/technical merit of the proposal (merit evaluation criteria described on the next slide)
  o Relevance to NASA’s Human Exploration and Operations Mission Directorate (HEOMD)
  o Programmatic balance
  o Cost of the proposed work

• The most important factor in the evaluation is the intrinsic scientific/technical merit, but programmatic relevance/balance and available funds are all taken into consideration when making final selections.
1) **Effective use of the Physical Sciences Informatics system**: How well do the investigators utilize the experimental data contained in the PSI system to meet the research goals stated in the proposal? How well does the use of this data advance research in the chosen research area?

2) **For Graduate Student proposals only: Academic benefit**: How well does the proposed research benefit the advancement of the student’s education and achieving their advanced degree?

3) **Significance**: Does this study address an important problem? If the aims of the application are achieved, how well will scientific knowledge or technology be advanced?

4) **Approach**: Are the conceptual framework, proposed methods, and analysis techniques adequately developed, well integrated, and appropriate to the aims of the project? Is the proposed approach likely to yield the desired results within the specified timeframe? Does the project employ contemporary methods, concepts or approaches? Does the Data Management Plan meet NASA requirements?

5) **Investigators**: Are the investigators appropriately trained and well suited to carry out this work? Is the work proposed appropriate to the experience level of the investigators?

6) **Environment**: Does the scientific environment in which the work will be performed contribute to the probability of success? Is there evidence of institutional support?
PSI NRA Appendix B: 
NOI and Proposal Submission

Notices of Intent (NOI)
• Submission of a brief NOI is highly recommended.
• Use NSPIRES (http://nspires.nasaprs.com) to submit your NOI.
• See Section IV.B.2 of Appendix B for details.
• NOIs are due by 5:00 p.m. Eastern Time on February 9, 2016.

Full Proposals
• The full proposal must include all required components listed in Table 2 of Appendix B (page 12).
• Maximum length of Scientific/Technical Project Description: 10 pages.
• You may use NSPIRES (http://nspires.nasaprs.com) or Grants.gov (http://www.grants.gov/) to submit your proposal. (But remember that regardless of the system used, all proposers, team members, and agency officials must be registered with NSPIRES before proposal submission.)
• See Section IV.B.3 of Appendix B for details.
• Full proposals are due by 5:00 p.m. Eastern Time on March 17, 2016.