

NASA RESEARCH ANNOUNCEMENT: USE OF THE NASA PHYSICAL SCIENCES INFORMATICS SYSTEM



Introduction

The NASA Research Announcement (NRA) "Use of the NASA Physical Sciences Informatics System" solicits ground-based research proposals from established researchers and graduate students to generate new scientific insights by utilizing experimental data residing in NASA's Physical Sciences Informatics (PSI) system. PSI is an online database of completed physical science reduced-gravity flight experiments conducted on the International Space Station (ISS), Space Shuttle flights, and Free-flyers, or from related ground-based studies.

The next call solicits proposals in five research areas: Combustion Science, Complex Fluids, Fluid Physics, Fundamental Physics and Materials Science. All eligible experimental data will be available in the PSI system. See Appendix D or the PSI website for the detailed list of investigations that are eligible for this NRA. The typical awards will be up to \$100,000 per year for a total maximum award of up to \$200,000 for a two-year period.

Key Information for PSI NRA Appendix D

- Upcoming events related to this NRA:
 - Sept. 15, 2017 - NRA Release (target)
 - Oct 17, 2017 - Conduct Proposers' Conference via WebEx
 - Oct. 31, 2017 - Notices of Intent Due
 - Dec. 15, 2017 - Proposals Due
 - May 2018 - Announce Selections (target)
- Proposals must use data from any of the eligible PSI investigations.

More Information

NSPIRES Registration:

<https://nspires.nasaprs.com/external/aboutRegistration.do>

Appendix D Synopsis:

<https://www.fbo.gov/index?s=opportunity&mode=form&tab=core&id=a3086df0e6b38ec720476107b522fd90>

PSI User Registration: <https://psi.nasa.gov/register.html>

PSI: <https://psi.nasa.gov>

Eligible Investigations for PSI NRA Appendix D*

Combustion Science

- BASS (Burning and Suppression of Solids)
- DAFT (Dust and Aerosol Measurement Feasibility Test)
- DAFT-2 (Dust and Aerosol Measurement Feasibility Test-2)
- FLEX (Flame Extinguishment Experiment)
- SAME (Smoke Aerosol Measurement Experiment)
- SAME-R (Smoke Aerosol Measurement Experiment Reflight)
- SPICE (Smoke Point in Coflow Experiment)
- SLICE (Structure and Ltoff in Combustion Experiment)

Complex Fluids

- ACE-M1 (Advanced Colloids Experiment-Microscopy 1)
- BCAT-3 (Binary Colloidal Alloy Test 3)
- BCAT-4 (Binary Colloidal Alloy Test 4)
- BCAT-5 (Binary Colloidal Alloy Test 5)
- BCAT-6 (Binary Colloidal Alloy Test 6)
- InSPACE (Investigating the Structure of Paramagnetic Aggregates from Colloidal Ellipsoids)
- InSPACE-2 (Investigating the Structure of Paramagnetic Aggregates from Colloidal Ellipsoids 2)
- InSPACE-3 (Investigating the Structure of Paramagnetic Aggregates from Colloidal Ellipsoids 3)
- InSPACE-3+ (Investigating the Structure of Paramagnetic Aggregates from Colloidal Ellipsoids 3+)
- PCS (Physics of Colloids in Space)
- PHaSE (Physics of Hard Spheres Experiment)
- SHERE (Shear History Extensional Rheology Experiment)
- SHERE II (Shear History Extensional Rheology Experiment II)
- SHERE-R (Shear History Extensional Rheology Experiment Reflight)

Fluid Physics

- CCF-EU1-CV (Capillary Channel Flow - EU1-Critical Velocities)
- CCF-EU2-CV (Capillary Channel Flow - EU2-Critical Velocities)
- CCF-EU2-PS (Capillary Channel Flow - EU2-Phase Separation)
- CFE (Capillary Flow Experiment)
- CFE-2 (Capillary Flow Experiment-2)
- CVB (Constrained Vapor Bubble)
- CVB-2 (Constrained Vapor Bubble-2)
- MABE (Microheater Array Heater Boiling Experiment)
- NPBX (Nucleate Pool Boiling Experiment)
- PBE (Pool Boiling Experiment)

Fundamental Physics

- DECLIC-ALI (DEvice for the study of Critical Liquids and Crystallization - Alice Like Insert)
- GRADFLEX (Gradient Driven Fluctuation Experiment)
- PKE and PK-3+ (PKE-Nefedov and Dusty Plasma 3+)

Materials Science

- CSLM (Coarsening in Solid-Liquid Mixtures)
- CSLM-2 (Coarsening in Solid-Liquid Mixtures 2)
- CSLM-2R (Coarsening in Solid-Liquid Mixtures 2 Reflight)
- CSLM-3 (Coarsening in Solid-Liquid Mixtures 3)

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*For the most current list visit <https://psi.nasa.gov>

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Eligible Investigations for PSI NRA Appendix D* (continued)

Materials Science

- DECLIC-DSI (DEvice for the study of Critical Liquids and Crystallization - Directional Solidification Insert)
- IDGE-ST5-62 (Isothermal Dendritic Growth Experiment) - Second United States Microgravity Payload on Columbia (USMP-2)
- IDGE-ST5-75 (Isothermal Dendritic Growth Experiment) - Third United States Microgravity Payload on Columbia (USMP-3)
- IDGE-ST5-87 (Isothermal Dendritic Growth Experiment) - Fourth United States Microgravity Payload on Columbia (USMP-4)
- ISSI (In-Space Soldering Investigation)
- MICAST/CSS (The Microstructure Formation in Casting of Technical Alloys under Diffusive and Magnetically Controlled Convective Conditions/Comparison of Structure and Segregation in Alloys Directionally Solidified in Terrestrial and Microgravity Environments)
- PFMI (Pore Formation and Mobility Investigation)
- SUBSA (Solidification Using a Baffle in Sealed Ampoules)
- TEMPUS (Electromagnetic Containerless Processing in Microgravity)

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Awarded Research Grants

PI Name	PI Organization	Proposal Title	Research Area	Investigation(s) Used	Grant Period
Yiguang Ju	Princeton University	Quantitative Studies of Cool Flame Transitions at Radiation/Stretch Extinction Using Counterflow Flames	Combustion Science	FLEX	2016-2017
Tanvir Farouk	University of South Carolina	Effect of external thermo-convective perturbation on cool flame dynamics: A multidimensional multi-physics CFD analysis	Combustion Science	FLEX	2016-2017
Sean Garrick	University of Minnesota	Utilization of the smoke aerosol measurement experiment data for advanced modeling and simulation of smoke generation in micro-gravity	Combustion Science	SAME	2016-2017
Thomas Avedisian	Cornell University	Use of FLEX data to enhance video image processing for studying combustion of soot-producing jet fuel droplets and their blends with bio-derived fuels	Combustion Science	FLEX	2017-2018
Fumiaki Takahashi	Case Western Reserve University	Structure and stabilization of laminar jet diffusion flames	Combustion Science	SLICE	2017-2018
Lou Kondic	New Jersey Institute of Technology	Structure evolution during phase separation in colloids under microgravity	Complex Fluids	ACE-M1, BCAT-3, BCAT-4, BCAT-5, BCAT-6, PHaSE	2016-2017
James Swan	Massachusetts Institute of Technology	Dynamic self-assembly driven by time with varying fields	Complex Fluids	InSPACE-3, InSPACE-3+	2017-2018
Sinisa Mesarovic	Washington State University	Computational Framework for Capillary Flows	Fluid Physics	CCF, CFE	2016-2017
Amir Riaz	University of Maryland, College Park	Gravity Scaling of Pool Boiling Heat Transfer: Numerical Simulations and Validation with MABE and NPBX	Fluid Physics	MABE, NPBX	2016-2017
Yongsheng Lian	University of Louisville	Development and Verification of a 3D Nucleate Pool Boiling Simulation Model Using PSI Data	Fluid Physics	NPBX	2016-2017
Vladimir Ajaev	Southern Methodist University	Modeling phase change and thermocapillary flow in the Constrained Vapor Bubble experiment	Fluid Physics	CVB, CVB-2	2017-2018
Mark Weislogel	Portland State University	NASA CCF PSI data reduction and benchmark	Fluid Physics	CCF	2017-2018
Ebrahim Asadi	University of Memphis	Enhancement and Verification of Quantitative Phase-Field Crystal Modeling using NASA-PSI Coarsening in Solid-Liquid Mixtures Experiments Data	Materials Science	CSLM, CSLM-2, CSLM-2R, CSLM-3	2016-2017
Kegang Wang	Florida Institute of Technology	Testing Analytical and Numerical Models in Phase Coarsening using NASA Physical Sciences Informatics System	Materials Science	CSLM, CSLM-2, CSLM-2R, CSLM-3	2016-2017
Mohsen Eshraghi	California State University, Los Angeles	Pore-Mushy Zone Interaction during Directional Solidification of Alloys: Three Dimensional Simulation and Comparison with Experiments	Materials Science	PFMI	2016-2017
Mohsen Asle Zaeem	Missouri University of Science and Technology	New insights on solid-liquid interface anisotropy effects on solidification patterns of pure and alloy systems in microgravity	Materials Science	IDGE, MICAST/CSS	2017-2018