DMR Update

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Where Materials Begin & Society Benefits!
Alex Klironomos named Deputy Division Director in May 2020. Former APS journal editor and CMMT Program Director.
PI Departmental Affiliations

- Physics: 26%
- Chem/Chem Eng: 30%
- Biomedical Engineering/Biochem/Bio: 7%
- Mechanical Eng: 7%
- Materials Eng/Science: 6%
- Elec Eng/Comp Sci/Math: 12%
- Other Eng and Science: 7%
- Centers, Institutes, Industry: 2%
- Unknown: 8%
Materials Research Science and Engineering Centers (MRSEC)

PROGRAM SOLICITATION
NSF 19-517

REPLACES DOCUMENT(S):
NSF 16-545

Preliminary Proposal Due Date(s) (required) (due by 5 p.m. submitter’s local time):
June 24, 2019

Full Proposal Deadline(s) (due by 5 p.m. submitter’s local time):
November 26, 2019

By invitation only

Specifically, it should be stressed that DMR plays an important role in the following NSF Big Ideas:

- Harnessing the Data Revolution;
- The Future of Work at the Human-Technology Frontier;
- Understanding the Rules of Life;
- The Quantum Leap.

In addition, potential research topics to broaden the current MRSEC portfolio include, but are not limited to:

- Use of supervised and unsupervised Machine Learning addressing materials science complex problems, and in particular as applied to traditional materials science problems in ceramics, metals, metallic alloys and others.

Finally, a few additional strategic research areas of DMR interest have also been identified:

- Synthetic Materials Biology: in such an effort biologists and system engineers work with materials scientists to identify materials challenges hindering advancements of Synthetic Biology, as well as to generate new Synthetic Biology approaches to materials development i.e., "Materials Biology";
- Structural Materials under Extreme Conditions: this effort addresses fundamental challenges in ceramic, metallic, and polymeric materials and their composites for applications under extreme conditions;
- Recyclable Plastics and Alternative Materials for Sustainable Development: these efforts could include the development of intrinsically recyclable polymers, a better understanding of mechanical properties of recycled plastic products, strategies to improve the properties of recycled plastics, and materials alternatives for plastics.
Awards are now 4 year duration, up to $1,750,000.

Opportunity for PIs to engage Google Cloud resources


Over 500 proposals (300 projects)

$52M FY19 awards

MGI PI Meeting FY20, March 30-31
U of Maryland

Next competition 2021

Planning a Decadal Study
Midscale Research Infrastructure - 1

"... the first in NSF’s agency-wide effort to support the mid-range infrastructure that will be invaluable to strengthening the U.S. scientific research enterprise, ... These projects fill gaps and provide unique research capabilities for the U.S. that will engage many early-career scientists and engineers in the pursuit of ground-breaking discoveries.”

Jim Ulvestad, National Science Foundation chief officer for research facilities.

Mid-scale RI:1 (M1:IP): A world-class Neutron Spin Echo Spectrometer for the Nation

- Coherent Dynamics
  - Density Fluctuations corresponding to some SANS peaks
  - Diffusion
  - Shape Fluctuations (Internal Dynamics)
  - Polymer Dynamics
  - Liquid and Glassy Systems

- Incoherent Dynamics
  - Self-Dynamics (H atoms)

- Magnetic Dynamics
  - Spin Glasses

Plots and images are included showing the spectral range and applications of the spectrometer.

PI: Norman J. Wagner

$11M
(1) feedback to our recent studies for you

**Broad Recs:**
- Increased coordination across all sectors – especially industry
- Support for Interagency Polymer Decadal Study (POL/NSF lead)
- Mid-scale infrastructure
- Sustainable Material Development
- Computation and Data Science
- High-throughput syn/characterization
- Quantum Materials
- Hybrid/Composite Materials
- Advanced Manufacturing

Mid-Scale Research Infrastructure Program – strong response from MR community

Critical Aspects of Sustainability (CAS) meta program and DCL- NSF20-050

AI Institutes & planning grants solicitation- NSF20-503

New - DMR Data Management Plan

New Materials Innovation Platforms (MIPs)– NSF19-526- to be announced later this year

Future Manufacturing solicitation- NSF20-552

Hybrid Materials Workshop/Solid State and Materials Chemistry- MRS bulletin
(2) how national initiatives such as QIS, AI/ML, exascale computing, and microelectronics (and others?) are impacting your programs, including the extent to which these initiatives are bringing with them new funding vs. unfunded mandates

- **National Quantum Initiative (NQIA)** - amplifies the efforts started with NSF Big Idea – The Quantum Leap. QIS funds are expected.

- **Materials Genome Initiative (MGI)** – OSTP decided to keep this subcommittee – important that MGI underlies the success of other initiatives- Advanced Manufacturing & AI, Bioeconomy. No new money. New strategic plan being prepared.

- **Advanced Manufacturing Initiative (AMI)** – New monies to support Future Manufacturing solicitation

- **American Artificial Intelligence Initiative (AII)** – New monies to support the AI Institutes solicitation

- **Biotechnology/Bioeconomy** – Industries of the Future – plan to participate: searching for soft CMP and POL Program Directors- cross disciplinary
(3) any comments you’re prepared to make on the impacts the coronavirus is expected to have on your programs
Questions?