DESIGNING MATERIALS TO REVOLUTIONIZE AND ENGINEER OUR FUTURE
(NSF DMREF) OPPORTUNITY WORKSHOP AND
PANEL DISCUSSION

AND

WORKING EFFECTIVELY WITH SIRO

Information Session for

The Penn State Materials Research Institute

November 15, 2022
Today’s Agenda:

Lunch (provided)—Welcome Introductions and Opening Remarks, Zoubeida Ounaies

NSF Housekeeping: Revised NSF PAPPG and DMREF Program Solicitation Announcement*
   Important Info and Revision Notes — Mike Mueller, SIRO Associate Dir. Proposal Development

Emerging DMREF Topics Discussion — Zoubeida Ounaies

DMREF Best Practices Panel Discussion + Q&A

Working Effectively with SIRO for Proposal Development, Pre-Award Administration,
and Project Management—Mike Mueller, Diane Rudy, Crystal Hubler

* If revised DMREF program solicitation not released by workshop date; discussion will revisit, NSF 21-516
NSF HOUSEKEEPING

- NSF Virtual Grants Conference - November 14-17, 2022
- NSF New PAPPG effective 1/30/23

References to Research.gov have been incorporated throughout as part of final transition from FastLane for proposal prep & and submission.

NSF Disclosure Requirements, incorporates a new section describing specific NSF disclosures, the sections of the PAPPG they apply to and the consequences for violating these requirements.

New certification requiring senior personnel to certify that the information provided in their Biographical Sketch and Current and Pending Support documents are accurate, current, and complete. This certification will be included in both SciENcv and the NSF fillable format for proposals submitted or due on or after January 30, 2023.

Biographical Sketch(es), has been revised to increase standardization with the Common Disclosure Form for the Biographical Sketch that has been developed in compliance with NSPM-33 Implementation Guidance. NSF has made every effort to mirror the Common Form.

Require the use of SciENcv for the preparation of this document effective in October 2023.
Revisions from NSF 19-516 include:

1. Submission window (January 2023)

2. The Division of Chemistry is participating in the 2021 DMREF competition.

3. The Air Force Research Laboratory (AFRL), including the Air Force Office of Scientific Research (AFOSR), will participate in the 2021 DMREF competition.

4. DMREF recognizes the importance of partnerships among universities, industries (e.g. Grant Opportunities for Academic Liaison with Industry - GOALI), Federal Agencies, and National and Federal Laboratories.

5. Where appropriate (i.e., depending on where a proposed project lies along the Materials Development Continuum), DMREF proposals should consider the feasibility of deployment of new materials and address the scientific questions relevant to their processing and manufacture.
6. The list of Cognizant Program Officers updated.

7. Specific strategic potential application areas have not been defined for this competition. DMREF aligns with national priorities and continues to be open to all areas of materials research.

8. Additional requirements have been included for proposal preparation related to the Data Management Plan. Review guidance is provided on evaluating Data Management Plans.

9. Proposals may now include requests for cloud computing resources through an external cloud access entity supported by NSF’s Enabling Access to Cloud Computing Resources for CISE Research and Education (Cloud Access) Program. Cloud Access replaces the cloud credit mechanism used in the previous DMREF solicitation.

10. The award size had been increased from $1,000,000 - $1,750,000 to $1,200,000 – $1,800,000 over a duration of four years.
The 2021 MGI Strategic Plan highlights:

• Unify the Materials Innovation Infrastructure (MII).

• A suite of interdisciplinary tools and capabilities for supporting the MGI approach to materials, including
  • Computational (theory, modeling, and simulation) tools
  • Experimental (synthesis, characterization, and processing) tools
  • Integrated research platforms
  • Data infrastructure

• Expand the reach of the MII into all materials properties, synthesis, processing, and manufacturing methods while reducing barriers to integration of data and use of these tools.
• Build on the national computational infrastructure by developing community codes and incorporating these into commercial codes

• Support the bridging, building, and bolstering of data infrastructures.

• Strengthen collaboration with related communities to bolster cross-disciplinary computational research and tool sharing and development.

• Develop a strategy to expand synthesis and processing tools to more materials classes and to develop multimodal characterization tools.

• Development of modular, autonomous, integrated, high-throughput experimental tools

• Identify pilot projects to seed the development of integrated materials platforms.

• Identify and learn from industrial exemplars of integrated materials platforms

• FAIR-Data Principles (Findability, Adaptability, Interoperability, Reusability)
2021 MGI STRATEGIC PLAN HIGHLIGHTS CONT.

• Expand availability of computational and experimental tools
• Develop a strategy to expand synthesis and processing tools to more materials classes and to develop multimodal characterization tools.
• Leverage advances and bolster development of modular, autonomous, integrated, high-throughput experimental tools—from lab to manufacturing.
• Identify and remove barriers that limit access by a diverse user community, including historically black colleges and universities and other minority serving institutions, to state-of-the-art instrumentation.
• Develop integrated materials platforms
  • Convene workshops to build community and identify incentives and barriers to collaboration.
  • Identify pilot projects to seed the development of integrated materials platforms.
  • Learn from industrial exemplars of integrated materials platforms
• Build out a comprehensive data infrastructure
• Create tools, standards, and implement policies to encourage FAIR data principles.
The NSF Division of Materials Research (DMR) welcomes proposals from U.S. organizations that involve collaboration and cooperation with counterparts from other nations and/or may provide opportunities for U.S. students and postdoctoral researchers to gain an international research and/or education experience.

Proposers are encouraged to address the following aspects of the collaboration, as applicable:

• Anticipated mutual benefits to the collaborating partners, as evidenced in true intellectual collaboration with complementary responsibilities and contributions;

• Benefits to be realized from the expertise and specialized skills of the collaborators;

• Any unique facilities, sites and/or resources available through the international collaboration, and

• Whether active research engagement of students and early-career researchers at the international site would occur.
BEST PRACTICES

Panel discussion

Ismaila Dabo  Enrique Gomez  Robert Hickey  Yun Jing
# Designing Materials to Revolutionize and Engineer our Future (DMREF) Active Awards

The table below lists the active awards under the DMREF program:

<table>
<thead>
<tr>
<th>Award Number</th>
<th>Award Title</th>
<th>Award Amount</th>
<th>Principal Investigator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1921864</td>
<td>DMREF: Tuning Liquid Crystallinity in Conjugated Polymers to Simultaneously Enhance Charge Transport and Control Mechanical Properties</td>
<td>$1,750,000</td>
<td>Enrique Gomez</td>
</tr>
<tr>
<td>1921969</td>
<td>DMREF: Collaborative Research: Elastomers Filled with Electro- and Magneto-Active Fluid Inclusions: A New Paradigm for Soft Active Materials</td>
<td>$590,000</td>
<td>Zoubeida Ounaies</td>
</tr>
<tr>
<td>2039351</td>
<td>MIP: 2D Crystal Consortium (MIP-2DCC)</td>
<td>$12,949,244</td>
<td>Joan Redwing</td>
</tr>
<tr>
<td>2119545</td>
<td>DMREF/Collaborative Research: Inverse Design of Architected Materials with Prescribed Behaviors via Graph Based Networks and Additive Manufacturing</td>
<td>$376,317</td>
<td>Yun Jing</td>
</tr>
<tr>
<td>2119717</td>
<td>DMREF/Collaborative Research: Computationally Driven Design of Synthetic Tissue-Like Multifunctional Materials</td>
<td>$400,000</td>
<td>Robert Hickey</td>
</tr>
</tbody>
</table>
WORKING WITH SIRO
SIRO Strategic Interdisciplinary Research Office

Working Effectively with SIRO for Proposal Development, Pre-award Administration and Project Management

PennState Senior Vice President for Research
What is SIRO?

Our **mission** is to provide comprehensive proposal development, pre-award administration, and funded project life-cycle management support services to Penn State University faculty researchers and staff responding to large ($1M+), complex (multiple faculty, colleges or institutes), multidisciplinary, and multi-institutional research and education program funding opportunities.
SIRO Provides Unique Resources

For multidisciplinary projects
  • Strong connections to college research administrators and faculty
  • Collaborations with Associate Research Deans and Institute Directors as advocates

Example areas of focus
  • Centers NSF (AI, ERC, STC), DoD (MURI), NIH (U01, PO1), USDA (NIFA)
  • Training grants (NIH T32 and NSF NRT)
  • International development team (USAID, NSF PIRE, IRES)
  • Foundations (Keck, MacArthur, Gates)
Additionally, supports OSVPR Institute and Unit Proposals

- Huck Institute of the Life Sciences
- Institutes for Energy and the Environment
- Materials Research Institute
- Institute for Computational and Data Sciences
- Various OSVPR offices, such as the Office of Entrepreneurship & Commercialization and the Office for Research Protections
SIRO provides coordinated expertise to grow and support research at Penn State. SIRO offers expertise developed from a decade of successful support to University faculty in the professional preparation of proposals and management of funded projects.

What does a typical SIRO project look like?
SIRO Supported projects typically involve significant efforts from multiple faculty spanning two or more colleges, campuses or institutes. Projects often involve other universities and international partners, or are of strategic importance to Penn State. SIRO services are available to faculty at all Penn State campuses.

Our Capabilities
Your Proposal Advocate

Discuss your proposal ideas with your Proposal Advocate

Proposal Advocate’s role in proposal development and submission

Obtain your Advocate’s approval to work with SIRO before you submit a SIRO Support Request Form

PI and Advocate will both receive weekly email updates documenting progress and potential issues
SIRO Service Request Form

SIRO offers expertise from a decade of successful support to University faculty in the professional preparation of proposals and management of funded projects. Please review the SIRO Pre-Award Proposal Activity Monitoring and Reporting policy here. Fields denoted with an asterisk (*) are required.

Enter your first and last name. *

List the principal investigator.
Please list the first and last name(s) and title(s) of the principal investigator(s).

List the name of the proposal advocate. (i.e. Research Dean, Institute Director, etc.) *

I have discussed this proposal and SIRO request with my proposal advocate. *

Yes
No

Who is the target agency/sponsor? *
SIRO Director
Phillip Savage

Proposal Development
Assoc. Dir.
Mike Mueller
- Summarize solicitation goals and requirements
- Create and manage project timeline, document templates
- Strategic input on technical and non-technical proposal sections
- Assist with non-technical sections
- Specialized graphics support
- Red team review and final formatting; letters of support

Pre-Award Administration
Assoc. Dir.
Diane Rudy
- Create and integrate intercollege and inter-university budgets
- Work with collaborating PIs and sub-awardees to collect and format supporting documents – bios, CoAs, C&P
- Agency compliance reviews
- Multi-unit cost share coordination
- Proposal file uploads
- Authorized to submit proposals on behalf of Penn State

Project Management
Assoc. Dir.
Crystal Hubler
- Develop project management plan in partnership with PIs, RAs and Developers during proposal submission process
- Once awarded, work with PI to execute project implementation plan
- Coordinate sponsor reporting requirements with PI
- Interface with post-award team on expenditure and cost-sharing reports
Proposal Development
Development Team: Multidisciplinary Proposals

Michael Mueller
Associate Director of Development

Austine Decker
Multidisciplinary Proposal Developer

TBD
Multidisciplinary Proposal Developer

Dr. Carolyn Trietsch
Multidisciplinary Proposal Developer
Multidisciplinary Development Activities

Facilitate Communications:
- Engage administrators and external collaborators for support letters
- Communicate with advocate (research dean)

Document Preparation:
- Plan and implement proposal timelines and design templates
- Contribute to outreach, broader impacts and workforce development sections
- Write/edit non-technical sections (e.g. facilities)
- Coordinate red team reviews
DEVELOPMENT TEAM: TRAINING GRANTS

Dr. JaLessa Wright
Associate Research Professor & Training Grants Developer

Pauline McMinn
Data Advocate
Training Grant Development Activities

- Create & Manage a project timeline
- Data Collection & Analysis for Demographic Data table completions in Program Plan (>100 pages of admissions and publication data!)
- Draft Templates & Collect Letters of Support from participating faculty/organizations
- Assist with non-technical sections & forms
- Develop & Monitor training budget with SIRO Project Manager of training grants
- Red-Team & final review including compliance formatting
- Support submission, resubmission & renewals
DEVELOPMENT TEAM: INTERNATIONAL DEVELOPERS

Jian Hsu
Director, Joint Innovation Partnerships (JIPs)

TBD
Multidisciplinary Proposal Developer--International
GRAPHIC DESIGN AND WEBSITE ADMINISTRATION

Andy Cheshire
Multimedia Specialist Coordinator

Lori Settlemyer
Multimedia Specialist
Conceptualization and development of management plans, timelines and GANTT charts
Graphic Design Activities

Additional Capabilities

such as the development of graphics and figures and assistance with compiling institutional data sets (training grants).

[Image of space environment and ASRA^2 elements]
International Development: A collaboration with Penn State Global

Strategic international research partnerships sharing complementary strengths will yield successful collaboration.

Goals

- Identify a few trusted and respected research partners to focus on high-impact research areas
- Establish faculty partnerships conducive for high-impact, collaborative research
- Formalize the research interactions
- Key Performance Indicators and Metrics: joint projects and publications, proposals for major research grants, exchange students (4-5 visits per year from both sides)
The Penn State-Taipei Tech Collaborative Seed Grant Program 2023

The Materials Research Institute at Penn State and the National Taipei University of Technology (NTUT) are seeking to fund collaborative materials research projects between investigators at Penn State and NTUT.

This Seed Grant Program will provide funds to faculty groups with the goal of fostering collaborative and multi-disciplinary research that involves researchers and students from both universities.

We anticipate funding up to three proposals at $30k each per institution for a period of 12 months.

Internal Submission Deadline: Saturday, December 31, 2022 at 5:00 pm
Pre-Award Administration
Pre-Award Administration

Diane Rudy  
Associate Director, Pre-Award Administration

Leah Mothersbaugh  
Associate Research Administrator

Laura Reddington  
Associate Research Administrator

Mary Masterson  
Associate Research Administrator

Wanda Barlett  
Assistant Research Administrator

TBD  
Assistant Research Administrator

Megan Meinecke  
Research Administrator
**Pre-Award Administration – Larger, Interdisciplinary, Strategic Proposals**

- Over $1M per year in external funding
- Multiple colleges, campuses, institutes, and universities
- Large and strategic subawards
- Key initiatives of the University's Strategic Plan
- Training grants
- International collaboration & engagement

<table>
<thead>
<tr>
<th>PROPOSAL CAPACITY: Associate Proposal Specialist (PAG-4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
</tr>
<tr>
<td>Min</td>
</tr>
</tbody>
</table>
| Mid | 150 | 3.75 | • NASA ROSES, NIH, NSF with special requirements and cost share and/or 3+ subawards  
• DoD, DOE, Gates Foundation, USDA, USAID, and industrial contracts |
| Max | 300 | 7.5 | • Centers: NSF ERC, NSF STC, DOE EFRC  
• NIH: P01, T32, U19  
• Foundations: Kellogg, MacArthur |

Number of hours cannot be predicted solely based on dollar amount of proposal. There are many factors such as Proposal Specialist experience, PI experience, sponsor, requirements, cost share, subawards, etc.
### Pre-Award Administration – Large Proposal Activities

<table>
<thead>
<tr>
<th>Number</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Analyze solicitation</td>
</tr>
<tr>
<td>2</td>
<td>Develop budget and justification: Facilitate, advise and ensure compliance</td>
</tr>
<tr>
<td>3</td>
<td>Coordinate, manage and review external subaward proposals</td>
</tr>
<tr>
<td>4</td>
<td>Collect, review and format personnel supporting documents</td>
</tr>
<tr>
<td>5</td>
<td>Coordinate multi-unit cost share</td>
</tr>
<tr>
<td>6</td>
<td>Facilitate support from colleges, central administration and other partners/entities</td>
</tr>
<tr>
<td>7</td>
<td>Compile proposal for review and submission</td>
</tr>
<tr>
<td>8</td>
<td>Perform final compliance review</td>
</tr>
<tr>
<td>9</td>
<td>Authorize agency submission (PSU AOR)</td>
</tr>
<tr>
<td>10</td>
<td>Provide post-submission sponsor inquiry management</td>
</tr>
<tr>
<td>11</td>
<td>Coordinate post-award document hand-off</td>
</tr>
</tbody>
</table>
Pre-Award Administration – Large Proposal Acceptance

Faculty member or delegate completes **online request form**.

SIRO Administrative Team then...

1. Reviews request for the following criteria:
   - Over $1M per year in external funding
   - Multiple colleges, campuses, institutes, and universities
   - Large and strategic sub-awards
   - Key initiatives of the University's Strategic Plan
   - Training grants
   - International collaboration and engagement

2. Assesses Pre-Award and Development Teams' capacities:
   Partial support may be offered if one team has more capacity than the other.
Project Management Office
**Project Management Responsibilities**

**Planning**
- Review project plan, assess sustainability
- Develop coordination plan across participating units/institutions

**Budgeting**
- Financial/technical reporting, cost projections
- Coordinate cost-share tracking and development of fiscal projections

**Communicating**
- Work with PI, and collaborators in individual departments to implement project management plan
  - Listen

**Executing**
- Ensure timely submission of technical and financial reports as identified in federal contract

**Investigating**
- Unliquidated Obligations and Re-budgeting funds
- Proactively finding potential problems, define and solve for success

**Regulating**
- Coordinate compliance with regulatory requirements throughout the award and on award closeout

**Growing**
- Leverage current programs to identify new opportunities for growth
- Coordinate with developers to design new partnerships

**Organizing**
- Manage daily activities and ensure compliance with university and federal funding policies
- Anticipate and manage issues

**Prioritizing**
- Evaluate time required to manage an award if funded
- Prioritize tasks, provide daily technical/professional guidance

**Producing**
- Review expenses monthly and yearly and send out final report to complete that year funding