Convergence Center for Living Multifunctional Material Systems: New Seed Grant Program

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December 15, 2020
Mission & Vision

A vision of creating and fostering a global Living Materials community

Research

A collaborative and creative environment that encourages equity and inclusivity

Activities
The Convergence Center for Living Multifunctional Material Systems aims to advance the science, technologies, policies, and practices needed for a sustainable world through research on living multifunctional materials.
The Convergence Center for Living Multifunctional Material Systems (LiMC²) is a strategic research and educational partnership between The Pennsylvania State University and University of Freiburg.

Jürgen Rühe
Spokesman for the Cluster of Excellence for Living, Adaptive and Energy–autonomous Materials Systems (livMatS)

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• Complementary functions over different length scales
• Programmed assembly
• Spatial patterning
• Sustainable synthesis and manufacturing

- Adapt and respond to the environment
- Have dynamic properties
- Self-heal and regenerate
- Are resilient
- Self-power
- Self-replicate
- Are robust
- Can be recycled or reabsorbed
- Harvest, transduce and store energy

Nat. Commun., 2015, 6, 8641
Living multifunctional materials

Adaptive architecture

Advanced manufacturing

Sensing, actuation and diagnostics


Living Multifunctional Materials Collaborative Research Seed Grant Program

This seed grant is focused on the discovery of sustainable materials that are biological or inspired by biological principles.

The aim is to seed long-term collaborations and multi-disciplinary research between researchers at Penn State University and University of Freiburg.

Proposals that have excellent intellectual merit, are aimed at broad and significant impact, and have strong potential for external funding will be given priority.

RFP published on November 20, 2020
Proposals due on January 20, 2021
Living Multifunctional Materials Collaborative Research Seed Grant Program

Programmatic goal and outcome:
Generate proof-of-concept studies and preliminary results that will lead to larger externally-funded projects involving increased external funding.

Research goals:
Topics in engineered living materials related to self-assembly, biomimicry, adaptability, multifunctionality, multi-materials manufacturing, and active materials for adaptive architecture are of great interest.

The three core topics identified following the listening sessions and research webinars (July 22 and July 23) that LiMC² organized over the last few months are: 1) (bio)materials for sensing, diagnostics and actuation, 2) materials that enable adaptive architecture, and 3) advanced manufacturing necessary to combine and process hybrid multi-materials. Other emerging areas in living materials with potentially transformative opportunities will be considered as part of this solicitation as well.

Eligibility:
1) All Penn State University full-time faculty
2) All University of Freiburg full-time faculty
3) The minimum number of investigators at both University of Freiburg and Penn State University is one each
Living Multifunctional Materials Collaborative Research Seed Grant Program-
Budget

**Project Budget:** (1 page max)
A total of $40,000 to $50,000 per institution can be requested for the one-year to 18-month project.

Budget estimates should address the split of costs between institutions. Indirect costs are waived for internal research awards. Faculty salary is not permitted and funds for equipment is not allowed.

**Funding Restrictions:**
Regular appointment, summer, or supplemental salary support for faculty is disallowed
Postdoc salary is disallowed
Travel support to attend conferences is disallowed
Equipment purchases are disallowed
Penn State and University of Freiburg will each take on the costs of their respective university efforts on an awarded project
Review Criteria:

1. Does the project have the potential to advance an original, novel, creative, and transformative research concept in the field of living multifunctional material systems?

2. Are the individual team members qualified to conduct the proposed collaborative research?

3. Is the technical approach scientifically sound, well justified, and likely to succeed within the timeframe and budget of the seed grant?

4. Is the proposed strategy likely to lead to future externally funded opportunities and a long-term collaboration between both institutions?

5. Do the investigators have access to the required facilities or computation resources to conduct the proposed research?
Living Multifunctional Materials Collaborative Research Seed Grant Program-Award Requirements

**Reporting Requirements:**

Project investigators commit to attend a kick-off meeting where they will present their proposed research and collaboration plan.

A final report, limited to 5 pages, will be required at the end of the grant period.

Publications should acknowledge support from Living Multifunctional Materials Collaborative Research Seed Grant Program 2021.
questions

Infready site: https://psu.infoready4.com/#manageCompetitionsDetail/1828873

LiMC² website: https://limc2.psu.edu

livMatS website: https://www.livmats.uni-freiburg.de/en

Freiburg Center for Interactive Materials and Bioinspired Technologies: https://www.fit.uni-freiburg.de/?set_language=en
External funding possibilities
External funding opportunities: NSF and DFG Opportunity for Collaborations in Advanced Manufacturing

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NSF merit review criteria of Intellectual Merit and Broader Impacts. In addition, reviewers will be asked to assess the international collaboration in terms of:

- mutual benefit(s);
- true intellectual collaboration among all participating partners;
- benefits to be realized from the expertise/specialized skills, facilities, sites and/or resources of the international counterparts; and
- active research engagement of students and early-career researchers, where such individuals are engaged in the project.

External funding opportunities: Other NSF programs

NSF Convergence Accelerator

The objectives of the NSF Convergence Accelerator are to accelerate *use-inspired convergence research* in areas of national importance and to initiate convergence team-building capacity around exploratory, potentially high-risk proposals addressing selected track topics.

NSF 2026

Investing in bold foundational research questions that are large in scope, innovative in character, originate outside of any particular directorate, and require a long-term commitment. This Big Idea is framed around the year 2026 in order to tie into the Nation's 250th anniversary ("sestercentennial").
External funding opportunities: ELM Program at DARPA

Engineered Living Materials (ELM)

Dr. Blake Bextine

Living biomaterials that combine the structural properties of traditional building materials with attributes of living systems, including the ability to rapidly grow in situ, self-repair, and adapt to the environment.

Living materials could solve existing challenges associated with the construction and maintenance of built environments, and introduce new capabilities to craft smart infrastructure that dynamically responds to its surroundings. Advances under the ELM program could also improve methods for manufacture and maintenance of military systems such as tanks, planes, and ships.

https://www.darpa.mil/program/engineered-living-materials