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Lawrence Livermore National
Laboratory's Early Career University of
California Faculty Initiative Call for
Proposals in Advanced Materials and
Manufacturing

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**Lawrence Livermore National Laboratory's
Early Career University of California Faculty Initiative
Call for Proposals
in Advanced Materials and Manufacturing**

**Lawrence Livermore National Laboratory (LLNL)
University of California National Laboratories (UCNL),
University of California Office of President (UCOP)**

TBD, 2023

Timeline	Dates
Award website on-line	December 4 th , 2023
Expression-of-interest submission deadline	February 5 th , 2024
LLNL Information Days Session at LLNL	March 14 th , 2024
Proposal submission deadline	April 15 th , 2024
Award reviews by Committees	April – July 2024
Award Announcement	Fall 2024

All dates are notional and subject to change.

Call for Proposals

Funding Opportunity Program Description

The Strategic Deterrence (SD) Directorate of the Lawrence Livermore National Laboratory (LLNL) and the University of California National Laboratories (UCNL) at the University of California (UC), Office of President (UCOP) are jointly inviting applications for the LLNL Early Career University of California Faculty Initiative. This award is planned to commence funding in late 2024 and is focused on supporting one tenure-track junior faculty in the UC system for this award cycle. The technical topic for this call is Advanced Materials and Manufacturing, with specific details centering on overlapping interests between the UC faculty and LLNL/SD's programs and mission.

The award is intended to develop next generation UC academic leadership with strong and enduring LLNL and National Laboratory (NL) connections. This award allows the recipient to develop their innovative ideas and advance their research, to help the faculty gain tenure and become recognized for their professional leadership. The award fund is structured to allow faculty to build a research group, including undergraduates, graduate students, and post-doctoral fellows. The award also provides LLNL researchers opportunities to collaborate and be more connected to the UC community to enhance its workforce and research objectives. The required annual on-site visit to LLNL is intended to strengthen the technical and workforce connections between UC and LLNL.

LLNL, SD, UCNL, UC, and UCOP are inviting these applications pursuant to a Memorandum of Understanding between the Laboratory and The Regents of the University of California in accordance with the Lawrence Livermore National Security, LLC's Prime Contract with the United States Department of Energy to operate and manage LLNL. LLNL, SD, UCNL, UC, and UCOP reserve all rights to fund all, some or none of the proposals received under this invitation. Proposal materials submitted pursuant to this invitation will not be returned.

Award Details and Requirements:

Advanced Materials and Manufacturing Technical Focus Areas:

This funding call seeks to support early career, tenure track professors in advancing the field of advanced materials and manufacturing and accelerating the discovery to deployment cycle. We aim to empower researchers to develop cutting-edge solutions that address current and future challenges in this critical area. We will consider proposals that are responsive to one or more of the following areas:

1. Design Optimization and Process Modeling and Simulation

- Development of advanced optimization algorithms for architected materials and advanced manufacturing processes.

- Integration of artificial intelligence and machine learning in materials design including for closed loop design workflows.
- Multi-scale modeling of architected materials behavior for enhanced design under extreme conditions.

2. Tailored Materials and Feedstocks

- Design and synthesis of materials with tailored properties for applications that require materials to perform under extreme conditions.
- Development of sustainable and scalable feedstocks customized for advanced manufacturing methods.
- Functionalization of materials for improved performance under extreme conditions with improved aging behavior and durability.

3. Novel Advanced Manufacturing Approaches

- Creation of new or advancement of existing additive manufacturing techniques for producing complex, multi-scale, multi-material 3D geometries.
- Development of intelligent and adaptive manufacturing systems that leverage digital engineering.
- Methods to scale advanced manufacturing processes such as 3D printing and additive manufacturing for production.

4. Advanced Characterization and Qualification and Certification Methods

- Advancement of in-situ characterization and on-machine inspection techniques for real-time quality control.
- Establishment of novel reliable standards and certification methods that accelerate qualification and acceptance.
- Creation and application of high-throughput, non-destructive testing methods for quality assurance.

5. High Throughput Research and Automation Methods

- Development of automated high-throughput experimentation platforms.
- Integration of robotics and automation in materials testing and analysis including autonomous experimentation and self-driving labs.
- Creation of data-driven pipelines for accelerated research and development including digital twins.

Award Duration and Funding Level:

Award to untenured UC tenure-track faculty up to \$1M over a 5-year period.

Eligibility:

To be eligible for the award, a researcher must be an untenured, tenure-track faculty member at one of the ten University of California campuses.

Award Requirements:

- All work will be conducted at the Unclassified level.
- The submission must include a joint technical proposal with LLNL technical staff member(s).

- Members of the UC research group must spend an agreed amount of time onsite at LLNL each year during the award period. Dates, duration, and visiting members to be agreed upon by UC faculty recipient and LLNL collaborators.
 - The award recipient and members of the UC research group will need to provide necessary information to LLNL Badge Office for badging and site access.

Proposal Process and Timelines:

An essential criterion for award selection is the technical alignment between the proposal and LLNL SD's programmatic focus. To ensure that potential award applicant is knowledgeable of LLNL's technical focus areas, the award processes include several familiarization and acquaintance opportunities before the proposal due date:

- The Award website will include technical details on SD's technical focus areas, research interest, and related papers.
- LLNL will host a series of technical webinars on relevant research topics.
- LLNL will identify several technical PIs in each research topic, ready to engage with UC faculty.
- UC faculty needs to submit an expression-of-interest, describing their research interest and connection to SD's research topics. This allows LLNL's technical PIs to be better prepared to engage UC faculty in preparing a proposal.
- UCNL will host an Information Days Session at the new University of California Livermore Collaboration Center (adjacent to LLNL campus).

Award Website

The award website will go live by **December 4th, 2023**. Please go to the website <https://ucfaculty.llnl.gov/2024-call-proposals> for more detailed information, including:

- Technical focus areas,
- Proposal template
- Award timelines
- Award submission link
- Q&A
- Contacts

Expression-of-Interest

Please submit an expression of interest by **February 5th, 2024**. Required elements are described in Appendix A. This will allow LLNL to assess programmatic alignment and identify potential technical PIs to be partners on each proposal. Please submit your expression-of-interest to the award website <https://ucfaculty.llnl.gov/2024-call-proposals>.

Information Days at Lawrence Livermore National Laboratory:

To ensure understanding of LLNL's technical focus areas related to Advanced Materials and Manufacturing and to connect UC faculty with LLNL staff to develop their proposals, UCNL will

host an Information Days Session over the course of two days at the UC-Livermore Collaboration Center in **March 14th, 2024**.

At the Information Days, UC faculty interested in submitting award proposal will get more detailed technical information on LLNL and SD's research in Advanced Materials and Manufacturing, meet with LLNL's technical POCs and potential co-PIs to discuss possible proposal details, and tour LLNL's campus.

If UC faculty need travel and other support to attend, please contact Alan Wan at alan.wan@ucop.edu and Jill Erbland at jill.erbland@ucop.edu.

Final Proposal Submission

Please submit the completed proposal by **April 15th, 2024**. The required elements for the final proposal are described in Appendix B.

Proposal Reviews

The Screening and Selection Committees will review the proposals during **April - July 2024**.

Notification of Award:

The winning recipient of the award will be announced in **Fall 2024**.

Subcontract:

Upon announcement, LLNL will commence the contracting process with the UC campus and faculty recipient, with the goal of funding commencing in **late 2024**.

LLNL and UC reserve the right to reject a proposal without review including for the following reasons:

- The proposal is clearly nonresponsive to the objectives and/or provisions of the call for proposal.
- The proposal does not meet the requirements for proposal format, content, and organization as specified in the stated guidelines.
- The proposal is not submitted by the submission due date/time.

Review Process during Award Cycle:

The award recipient is requested to submit an annual report and conduct program reviews at LLNL's discretion during the five-year award period. Annual award renewal during the Award Cycle will be considered if there are no changes in the following items:

- The recipient/applicant institution.
- The fundamental technical scope as proposed.
- The faculty remains in good standing at the UC.

Award Selection Process and Criteria:

Screening Committee:

The responsibility of the Screening Committee is to review the proposal and down-select to the top approximately 2-4 proposals and submit those proposals to the Selection Committee for final decision. The Committee is staffed by LLNL technical staff and UC faculty members and co-chaired by LLNL technical expert and UCNL Executive Director for Laboratory Programs.

Co-Chairs:

- Alan Wan, Executive Director for Laboratory Programs, UCNL, UCOP
- Eric Duoss, Director of the Center for Engineered Materials & Manufacturing, LLNL
- Jeremy Lenhardt, Principal Lead, Technology Development for Advanced Materials, LLNL/SD
- Melody Golobic, Research Engineer, LLNL
- Brian Giera, Director, Data Science Institute, LLNL
- Todd Weisgraber, Group Leader for Advanced Computational & Materials Engineering, LLNL
- Alex Stanley, Project & Product Engineer, LLNL

LLNL administrative lead:

- Sean Kauppila

Screening reviewers:

- To be identified and announced (**selection of screening reviewers is contingent upon the final Technical Focus Areas and anticipated number of submissions but, for example, the last AI/ML cycle consisted of 6 LLNL staff and 4 UC professors**).

Review Criteria:

Applications will be subjected to scientific merit review (by the Screening Committee) and will be evaluated against the following criteria:

- Relevance to the mission of the specific program (SD) and capability area (Advanced Materials and Manufacturing) to which the application is submitted.
- Scientific and/or technical merit of the proposal.
- LLNL engagement model, including but not limited to proposal for onsite activities at LLNL.
- Appropriateness of the proposed method or approach.
- Competency of applicant's personnel and adequacy of proposed resources.
- Reasonableness and appropriateness of the proposed budget.
- Potential for leadership within the scientific community and long-term technical and workforce benefit to LLNL.

The questions below are provided to the merit reviewers on the Screening Committee to evaluate the criteria:

RELEVANCE TO THE MISSION OF THE SPECIFIC PROGRAM (SD) TO WHICH THE APPLICATION IS SUBMITTED.

- Please consult the award website for more detailed technical descriptions of Technical Focus Areas in Advanced Materials and Manufacturing.
- The Information Days Session is planned to provide information sharing and networking for potential applicants.
- How does the proposed research contribute to the mission of the program in which the application is being evaluated?
- Is the proposed research aligned with the program office's priorities as described in advisory committee reports?

SCIENTIFIC AND/OR TECHNICAL MERIT OF THE PROJECT

- What is the scientific innovation of the proposed research?
- What is the likelihood of achieving high impact results?
- How might the results of the proposed work impact the direction, progress, and thinking in relevant scientific fields of research?
- Is the Data Management Plan suitable for the proposed research? To what extent does it support the validation of research results? To what extent will research products, including data, be made available and reusable to advance the field of research?
- How does the proposed work compare with other efforts in its field, both in terms of scientific and/or technical merit, scope, and originality?

LLNL ENGAGEMENT MODEL, INCLUDING BUT NOT LIMITED TO PROPOSALS FOR ONSITE ACTIVITIES AT LLNL

- How would the UC faculty and research group engage with LLNL?
- What is the plan to conduct onsite work at LLNL during the award period?
- What about efforts to engage LLNL participants at the UC?

APPROPRIATENESS OF THE PROPOSED METHOD OR APPROACH

- How logical and feasible are the research approaches?
- Does the proposed research employ innovative concepts or methods?
- Are the conceptual framework, methods, and analyses well justified, adequately developed, and likely to lead to scientifically valid conclusions?
- Does the applicant recognize significant potential problems and consider alternative strategies?

COMPETENCY OF APPLICANT'S PERSONNEL AND ADEQUACY OF PROPOSED RESOURCES

- What is the past performance and potential of the PI?
- How well qualified is the research team to carry out the proposed research?
- Are the research environment and facilities adequate for performing the research?
- Does the proposed work take advantage of unique facilities and capabilities at LLNL?

REASONABLENESS AND APPROPRIATENESS OF THE PROPOSED BUDGET

- Are the proposed budget and staffing levels adequate to carry out the proposed research?
- Is the budget reasonable and appropriate for the scope?

POTENTIAL FOR LEADERSHIP WITHIN THE SCIENTIFIC COMMUNITY AND LONG-TERM TECHNICAL AND WORKFORCE BENEFITS TO LLNL

- Scientific leadership can be defined very broadly and can include direct research contributions.
- How has the PI demonstrated the potential for scientific leadership and creative vision?
- How has the PI been recognized as a leader?
- How would this proposal benefit LLNL in the long-term, beyond the award period?
 - Including continuing technical engagement and potential workforce pipeline.

Selection Officials: (to be confirmed)

The responsibility of the Selection Committee is to make the final award decision. Current intent is to award one recipient to be funded starting in **late 2024**).

The Selection Committee (**subject to change**) consists of senior leaders from LLNL and UC including:

- Kim Budil, Director, LLNL
- Pat Falcone, Deputy Director, S&T, LLNL
- Brad Wallin, Deputy Director, SD, LLNL
- Craig Leasure, VP, UCNL, UCOP

Selection Criteria:

The Selection Officials may consider (but are not limited to) any of the following program, policy, and strategy factors in making the selection, listed in no order of significance:

- Relevance of the proposed activity to LLNL priorities and technical merit and engagement with LLNL researchers
- Ensuring an appropriate balance of activities in collaboration between UC and LLNL programs
- Institutional history of training and mentoring early-career researchers
- Placement for postdoctoral researchers
- Mechanisms for training the next generation of researchers
- Effective use of LLNL facilities
- Ensuring opportunities to investigators not currently supported by LLNL
- Commitment to sharing the results of research
- Promoting the diversity of supported investigators and institutions receiving awards

Award Sponsors:

Lawrence Livermore National Laboratory

LLNL has a mission of strengthening the United States' security through development and application of world-class science and technology to enhance the nation's defense; reduce the global threat from terrorism and weapons of mass destruction; and respond with vision, quality, integrity, and technical excellence to scientific issues of national importance.

Strategic Deterrence at LLNL

The Strategic Deterrence (SD) organization provides foundational capabilities to a broad range of national security missions and ensures the success of the strategic nuclear deterrent into the future. Following the strong tradition of multidisciplinary team science, SD nurtures an exceptional workforce and effectively partners with stakeholders to achieve national security impact.

University of California National Laboratory (UCNL), University of California Office of President (UCOP)

UCNL plays a central role in providing leadership, management, and stewardship of the three UC affiliated national laboratories while informing The Regents and the UC President of national laboratory compliance and performance issues. The UCNL Mission is to advance the research, education, and public service mission of the University of California by ensuring the long-term health and vitality of UC-affiliated national labs as centers of world-class science, technology, and innovation solving the world's greatest challenges.

Important Elements of the Proposal:

On Diversity, Equity, and Inclusion:

LLNL and UC recognize and support the benefits of having diverse and inclusive scientific, engineering, and technology communities and fully expect that such values will be reflected in the composition of all committees and proposal teams. LLNL and UC welcome proposals in response to this call from all qualified and eligible UC faculty and LLNL staff.

On Developing the Proposal:

LLNL and UC provide no funding for reimbursement of proposal development costs. Proposal development costs (or any other pre-award costs that have not been pre-approved by UCNL, UCOP, and LLNL) submitted in response to this solicitation will not be reimbursed. It is the policy of LLNL and UC to treat all proposals as competition-sensitive information and to disclose their contents only for the purpose of evaluation.

On Personally Identifiable Information (PII)

Please do not include any PII in the proposal.

Conflicts of Interest (COIs)

Please list any potential COIs from both LLNL and UC.

On Export Control

The majority of LLNL's technical work is based on fundamental research that has no controls regarding broad academic collaborations. There are a limited number of technologies that may be subject to a variety of economic and security controls. LLNL's technical co-PI and partners will need to work closely with the UC faculty to avoid any potential export controls and any other security restrictions in the research proposal, award thereof, and associated work activities.

Appendix A: Expression of Interest Template

Summary Table

Proposal Name	
Short (1 to 2 line) Description	
Name/Department of UC Principal Investigator	
PI's tenure status and years-since-PhD	
PI's address	
PI's contact information	
PI's affiliated UC campus	

Description of your proposal (<2 pages)

A description of the problem, why this research and development is needed and how it relates to LLNL missions, your proposed solution and approach, existing research (if any) you are building upon, and measure of success.

How does the University/LLNL collaborative project support one or more of the following outcomes?

- Innovation in methodologies or processes, contributing toward basic science understanding, or providing independent perspective on existing methodologies or scientific understanding with potential paths forward
- Product (e.g., data, laboratory validated technology, implementable methodology)
- Career development for UC faculty
- Student and post-doctoral researcher development

Appendix B: Final Proposal Template

Proposal Cover Page

Each proposal shall include a *Proposal Cover Page* with a Summary Table (description below).

Summary Table

Proposal Name	
Short (1 to 2 line) Description	
Name/Department of UC Principal Investigator	
PI's tenure status and years-since-PhD	
PI's address	
PI's contact information	
PI's affiliated UC campus	
Name/Org of LLNL collaborator(s)	
Proposed project start/end dates	
Cost/year including	
<ul style="list-style-type: none">• Cost for university subcontract(s) per year	
<ul style="list-style-type: none">• Other, e.g., travel, equipment (with justification), etc. (describe)	
Total cost/year (must be under \$200K/yr)	
Estimated effort for each LLNL collaborators. (Note that funding for LLNL collaborators is not included in award and LLNL collaborators need to obtain LLNL program approval prior to proposal submission.)	

Proposal Summary (Abstract):

Please include a Proposal Summary suitable for release through a publicly accessible archive should the proposal be selected. The Proposal Summary should be concise, should not exceed 4,000 characters in length, and should not contain any special characters, graphics, or formatting (use text only).

Description of your proposal (<5 pages)

A description of the problem, why this research and development is needed and how it relates to LLNL missions, your proposed solution and approach, existing research (if any) you are building upon, and measure of success.

How does the University/LLNL collaborative project support one or more of the following outcomes?

- Innovation in methodologies or processes, contributing toward basic science understanding, or providing independent perspective on existing methodologies or scientific understanding with potential paths forward
- Product (e.g., data, laboratory validated technology, implementable methodology)
- Career development for UC faculty
- Students and Post-docs development

What is the expected engagement scenario for UC research group to visit LLNL annually?

What is the plan to forming a truly collaborative, trusting University/LLNL relationship? What is the expected method and level of university engagement?

Expected Milestones and Deliverables (interim and final – ½ page)

Please provide interim (at least yearly) milestones and deliverables, as well as final deliverables.

Budget Proposal (for the duration of the project)

Proposers need to include budget figures for all years of the proposed project and summarize the budget proposal in the Summary Table. The proposal needs to justify the proposed budget, including the overhead rates (including indirect and benefits) for both UC (each UC campus has different overhead rate) and LLNL (LLNL: please provide guidance on the overhead rate for this type of subcontract).

Budget proposal should include:

- UC faculty's salary covered by this proposal.
 - Funds requested for fringe benefits must be calculated as the product of the requested salary and, if present, the negotiated fringe benefit rate contained in an institution's negotiated indirect cost rate agreement.
 - Funds requested for indirect costs must be calculated using the correct indirect cost base and the negotiated indirect cost rate.
- Students' salaries (including both undergraduate and graduate students).
- Postdocs' salaries.
- Administrative support staff's salaries
- Equipment and supplies, including laboratory and computational needs.
 - Equipment is designated as an item of property that has an acquisition cost of \$5,000 or more and an expected service life of more than one year

- Enter total funds requested for materials and supplies
- Enter total funds requested for ADP/Computer Services. Cloud computing costs must be included under this item. The cost of computer services, including computer-based retrieval of scientific, technical and education information may be requested
- Travel, including conferences and LLNL visits.
- Publication costs
 - Enter the total publication funds requested. The proposal budget may request funds for the costs of documenting, preparing, publishing or otherwise making available to others the findings and products of the work conducted under the award

List of Facility and Other Resources needed to support this proposal

Letters of Recommendation/References (limit of 3)

Proposal Team: (please include PI and LLNL staff's bio, not included in page count limit)

For faculty, please include a short bio or curriculum vitae (CV).

For LLNL staff, please include a statement from your program/division leadership to grant your time and funding for this collaboration and please indicate the expected level of LLNL support (e.g., offices, equipment, administrative support, etc.) for hosting the visit by the UC PI and the research group.

LLNL Participant Expectations and Funding

In the event of a successful award, the LLNL co-PI and any other LLNL partners will work with that UC faculty member for the duration of the award (up to 5 years). Please note, funding for any LLNL employees' efforts will need to come from outside the UC award. Therefore, LLNL participants should work closely with their respective program leadership to discuss planning early and identify appropriate funding in advance of an award. In addition, LLNL PI's programmatic leadership will need to make accommodations for their staff members to work with UC faculty on proposal development and associated pre- and post-award activities. Again, LLNL participants will need to work closely with their programmatic leadership to determine appropriate funding, but it is anticipated that these activities will be part of the LLNL employee's SD roles and responsibilities and regularly job activities, which usually include activities such as research and development, partnership and collaboration, pipeline development and workforce recruitment, among others.

The UC faculty awardee will be expected to provide a detailed scope of work document that clearly outlines the tasks, responsibilities, milestones, and deliverables associated with the project. This should include a detailed breakdown of the methods and strategies the awardee plan to employ, as well as the timeline for each phase of the project. A well-defined scope will help us gauge the alignment of the faculty members approach with the project goals. Additionally, there will be an expectation to provide a comprehensive budget breakdown

that encompasses all costs related to the project. This should include expenses such as materials, labor, equipment, overheads, travel, and any other miscellaneous costs. This will assist us in understanding the allocation of resources for the overall project.