National Laboratories Partner with U.S. Manufacturers to Increase Innovation and Energy Efficiency

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HPC4EI Director
Today’s Agenda

11:30 am – 11:35 am PT Welcome and webinar instructions
11:35 am – 12:00 pm PT Overview of program
12:00 pm – 12:30 pm PT Q&A

Participant instructions
► Please turn off video and mute your phone
► Questions will be answered at the end of the briefing
  ► Send to “Q&A” panel
HPC4EnergyInnovation umbrella
Summary - What is new this solicitation?

HPC4Manufacturing Special Call is for U.S. Manufacturing Institutes

- National Additive Manufacturing Innovation Institute (America Makes)
- Manufacturing times Digital (MxD)
- Lightweight Innovations for Tomorrow (LIFT)
- American Institute for Manufacturing Integrated Photonics (AIM Photonics)
- Flexible Hybrid Electronics Manufacturing Innovation Institute (NextFlex)
- Advanced Functional Fabrics of America (AFFOA)
- The National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL)
- Advanced Regenerative Manufacturing Institute (ARMI) (BioFabUSA)
- Advanced Robotics for Manufacturing (ARM)
- The National Alliance for Water Innovation (NAWI)
Summary - What is new this solicitation?

DOE Advanced Manufacturing Office Consortia

- Next Generation Power Electronics Institute (Power America)
- The Institute of Advanced Composites Manufacturing Innovation (IACMI)
- Clean Energy Smart Manufacturing Innovation Institute (CESMII)
- Rapid Advancement in Process Intensification Deployment Institute (RAPID)
- Reducing EMBodyed-energy And Decreasing Emissions (REMADE)
- Critical Materials Institute (CMI)
- Manufacturing Demonstration Facility (MDF)

- Full proposal will require a letter of support from a U.S. Manufacturing Institute or AMO consortium
- New items on Concept Paper Template consistent with reviewer evaluation
- Universities can have subcontracts
The DOE national labs have some of the largest computers in the world and significant technical expertise offering the benefits of HPC to U.S. Industry

- Accelerate innovation
- Optimize design
- Reduce testing cycles
- Shorten the time to market
- Quality processes
- Reduce waste/reduce rejected parts
- Lower energy costs
The HPC4 Program is building an ecosystem to support HPC adoption by industry/government

- Showing what is possible with HPC through demonstration projects
  - DOE program office funds < $300K to laboratories
  - Industry funds at least 20% of total project funding; either in-kind support or optional cash contribution
  - Project duration < one year

- Building the HPC4 community
  - Student intern programs
  - Webinars
Program Approach - Companies apply to program through a solicitation process

Engage industry:
- Industry submits challenges
- Match challenge to PI
- AMO approval; Feedback to industry
- Sign agreements
- Concept paper → Full proposal → Award
- Technical Review Committee

Inform industry:
- Technical Merit Review Committee
  - Partner labs and DOE representatives
  - Heavy focus on nation-wide impact to energy efficiency and clean energy technology industry-wide
  - $300K DOE funds Laboratory PIs
  - 20% in-kind from industry partner
Program Details: Eligibility and Funding

Eligibility for call
- Companies manufacturing in the U.S.
- Member Company of a U.S. Manufacturing Institute or AMO Consortium

Who can be funded from the program
- DOE National Laboratories
- University collaborators can be funded by the industry partner or DOE National Laboratory
- Encourage to partner with universities and non-profit organizations located in federally-designated Opportunity Zones and or Historically Black Colleges and Universities (HBCU)

Industry participant cost share
- At least 20% of total project funding for new projects
- At least 50% of total project funding for follow-on projects
- Can be used to support internal staff
- Source can not be other federal funding
Program Details: If Awarded DOE Model Short Form CRADA

- Used for accelerated placement and execution
- Scope and IP protection defined
- Industry awardees required to sign DOE Model Short Form CRADA
- Standard DOE Model Short Form CRADA available on the web site
  - Individual labs may have some variances
  - If concept paper is selected to go forward; you can ask your laboratory partner for a copy of the specific CRADA

Required!
HPC4Manufacturing solicitation topics directly align with DOE’s Advanced Manufacturing Office goals to save energy.

Broad impact on energy efficiency and/or productivity:
- Use HPC to overcome a key technical challenge
- Process optimization
- Advanced product design
- Predicting performance and failure rates
Concept papers are the first step:

- Two-pages; single spaced; 12 pt. font - Use the template at https://hpc4energyinnovation.llnl.gov/solicitation-winter.html
- Key Elements
  - Title page
  - Abstract (150 words or less) - must be a non-proprietary, publishable summary
  - Background
    - Technical challenge to be addressed
    - State of the art in manufacturing and how this work advances the state of the art
    - Why national laboratory expertise and HPC resources are needed
  - Project Plan and Objectives
    - Technical scope of the work and how this project fits into the overall solution strategy
    - How results will be validated including availability of data
    - Specific simulation codes that will be used if known
  - Impact
    - How this effort results in long-term energy savings or
    - Ability to accelerate innovative energy-efficient manufacturing
    - Metrics include cost savings, energy savings, and improvement in energy intensity

You do not need to identify a laboratory partner up front!
Just an interesting and difficult problem that HPC can help address!
Full proposals provide much more detail

- Six-pages; single spaced; 12 pt. font - Use the template at https://hpc4energyinnovation.llnl.gov/solicitation-winter.html
- Key Elements
  - Title page
  - Abstract (150 words or less) - must be non-proprietary, publishable summary
  - Background
    - Similar to concept paper
  - Project Plan and Objectives
    - Similar to but more detailed than concept paper with specific tasks; specific simulation codes; modifications to the software needed etc.
  - Tasks, Milestones, Deliverables and Schedules
    - Goals, timelines and due dates of milestones and deliverables from all partners, including who is the responsible party for each deliverable and what will be communicated between the partners
  - Verification and Validation Plan
    - How do you intend to validate the findings of the model
  - Impact
    - Similar to concept paper but more detailed; is this transformational for an industrial sector and how; what is the enduring impact; how will results be disseminated
  - Implementation
    - How will this be incorporated into company and industry-wide operations; and follow on activities to extend this effort to solve the broader problem being addressed
- Various appendices (see next slide)
Appendices provide additional information

- Used in the review process; CRADA development process; compute resource determination, etc.
- Not included in the six-page limit
- **Appendix A**: References (not included in page count)
- **Appendix B**: Letter of support from U.S. Manufacturing Institute or AMO Consortia
- **Appendix C**: Project summary of tasks and schedule (similar to project tasks in main proposal, but used for CRADA development)
- **Appendix D**: Project budget: costs, amount and source for participants, cost share (in-kind or cash); how funding makes a difference relative to existing funding
- **Appendix E**: Computational resources: computational approach, performance of the codes, resources requested (platform and core hours)
- **Appendix F**: Pictures for publication (Photos are often used for program announcements)
- **Appendix G**: How the work benefits the laboratory
- **Appendix H**: Paragraphs biographies of industry and lab lead PIs
- **Appendix I**: Resumes of key participants
Success Stories

GE: larger, higher fidelity turbine design using advanced turbulence models

Vitro Glass: real time control of glass furnace using deep-learning tools

ZoomEssence: new food particle dryer configuration using advanced CFD

P&G: faster modeling of paper towel drying process using parallel computing
Industry interested in simulations at many levels

- New alloy design: Alcoa, Arconic, Carpenter
- Junction design: Samsung
- Membrane design for de-humidification air-conditioning: 7AC Technologies
- Catalyst design for lignin denature: APPTI (paper manufacture consortium)
- Microstructure for additive manufacture, casting, welding: GE, Eaton, UTRC, GM, Arconic, Flash Bainite, US AK Steel, ArcelorMittal
- Predict stress-strain curves for new material: LIFT
- Engine/turbine tolerancing: Ford, GE
- Turbine CFD: GE, Rolls Royce
- Semiconductor deposition: Applied Materials, SORAA
- Furnace design: Vitro Glass, ArcelorMittal, Owens Corning
New Proposal Application - Submit Paper Electronically!

Access the electronic proposal system at proposalshpc4.inl.gov or HPC4EI Solicitation website

Instructions available for download on the system’s Home page

Log on here

INL
Idaho National Laboratory
New Electronic Proposal Application

Create account and complete general account information

Create User Account

Click here

Provide information
New Electronic Proposal Application

Proceed to Application tab to view Current Open Calls. Select “Create New Application”. Application form will appear in new window. Directions are displayed for each section.

Application must be saved before PI, Co-Pls, Proposal POC, and National Laboratory PIs sections can be populated. Forms may be saved, revisited, and edited until the deadline.
New Electronic Proposal Application - Upload Submission

Before uploading submission, ensure concept paper is formatted per provided [Concept Paper Template](#). Submission format: Single spaced pages using 12-point font (Times New Roman) and converted to a PDF file. Template instructional boxes should be removed from the document. A concept paper that does not meet the guidelines may be rejected for review.

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After completing and saving this form, the applicant may edit the saved version until Tuesday, December 10, 2019, 11:59 PM PT. To submit the proposal for final review, the applicant **MUST** click on the "Save and Submit" below. **Forms in the system that are "Saved" but not "Submitted" are considered incomplete and will not be reviewed.**

For assistance please contact Michelle Herawi at 925-423-4964 or hpc4ei-submissions@lnl.gov.

[Click to download Concept Paper Template](#)

[Save] [Save and Submit]
Notifications of review results are generated from the proposal system and addressed from hpc4ei-submissions@inl.gov. It is highly recommended to add the email address to contact list to avoid notification from going to spam.

Visit the Applications page to view proposal status and Technical Merit Review Committee comments.

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View Applications and Proposal Status

Link to view Reviewer Comments

Proposal Status
Visit our website for solicitation details

Concept paper deadline is April 21, 2019

Additional information at www.hpc4energyinnovation.org


Questions can be sent to hpc4ei@llnl.gov

Join the hpc4ei-info@llnl.gov distribution lists via the web to receive program announcements

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