



ENERGY INNOVATION



MANUFACTURING MATERIALS

# HPC4EI: Partnering with US Manufacturers to Bring National Lab Scale Impact to the World

Aaron Fisher  
Director HPC4EI

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U.S. DEPARTMENT  
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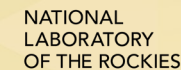
U.S. DEPARTMENT  
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Hydrocarbons and  
Geothermal Energy Office

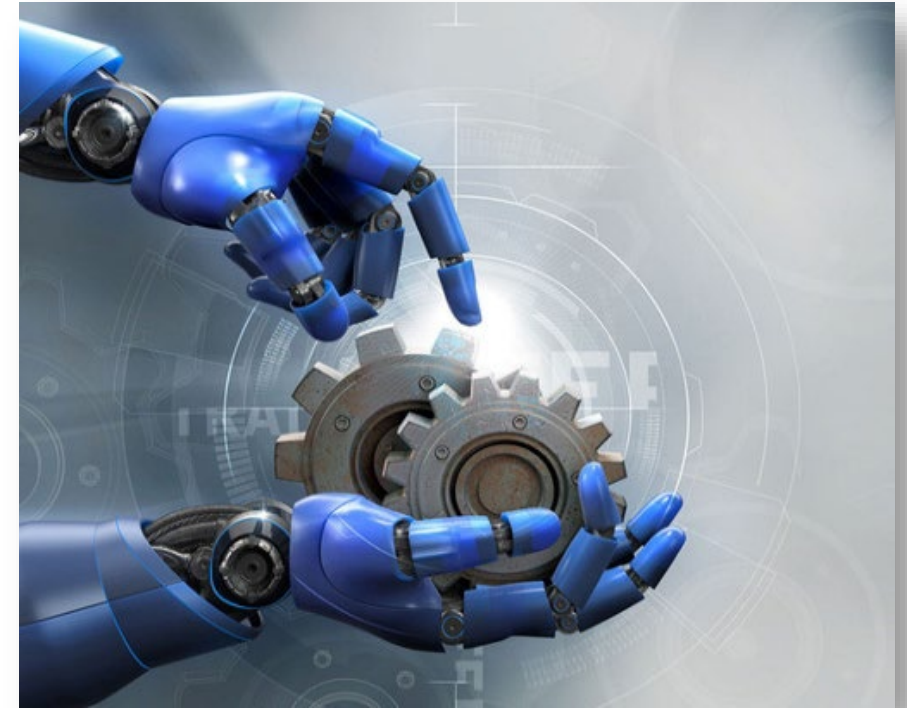
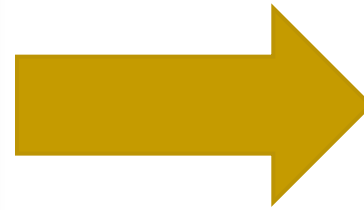


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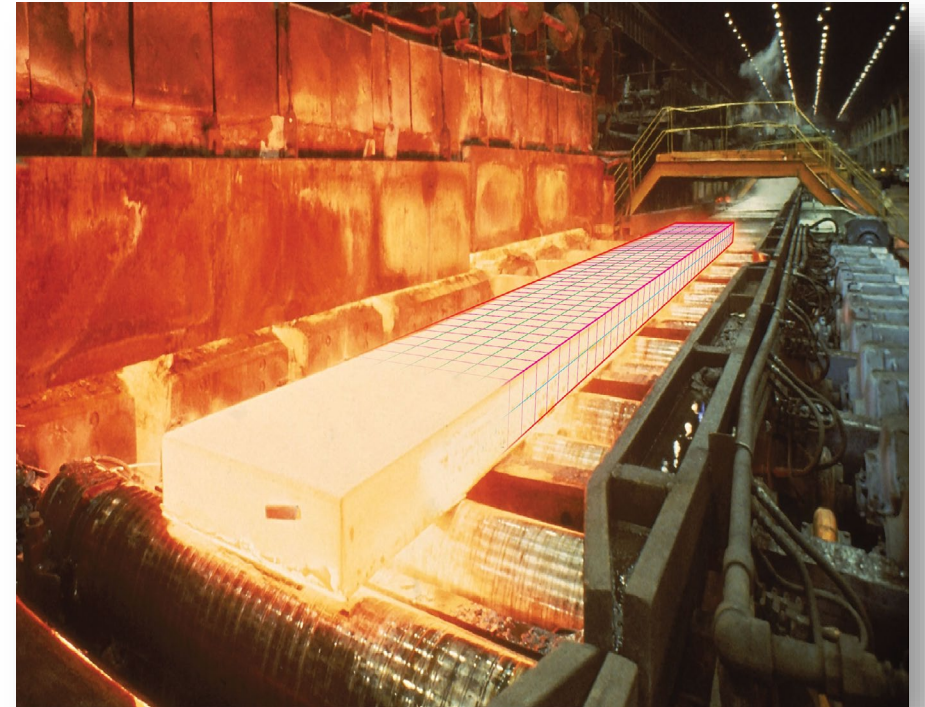
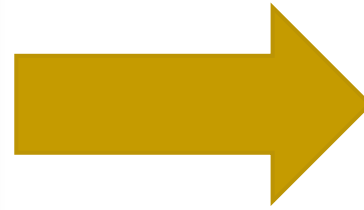


# U.S. industry is undergoing a technological revolution



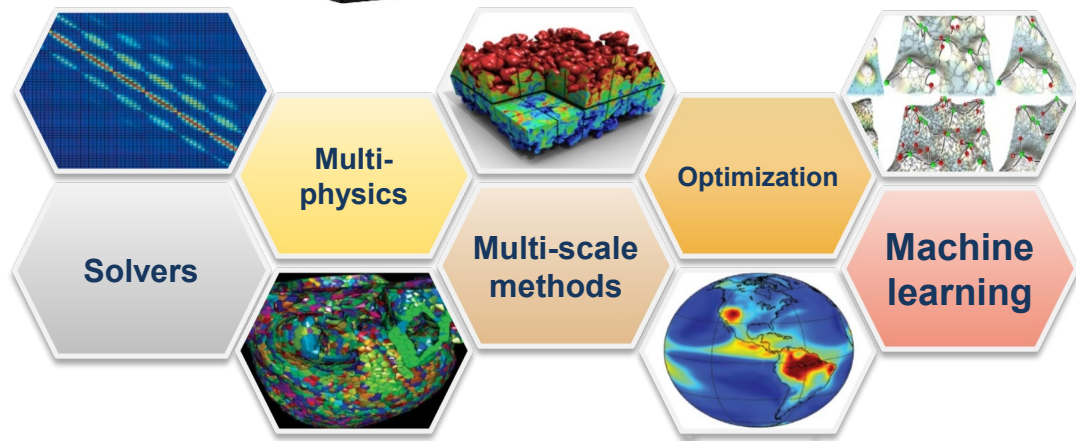
Computer Simulation – Data Analytics/AI – Material Discovery

# We are advancing the energy agenda through advanced simulation

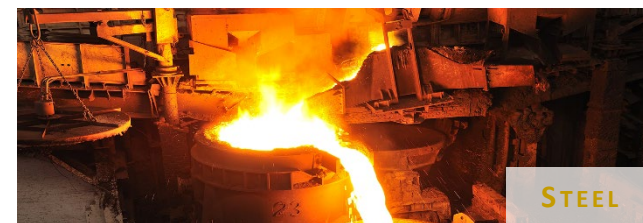


Computer Simulation shortcuts the Edisonian approach

# HPC4EI connects the DOE HPC ecosystem to US industry

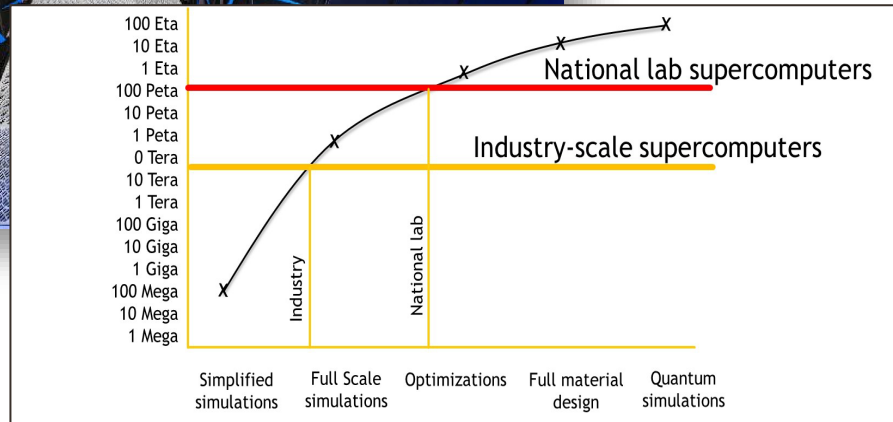
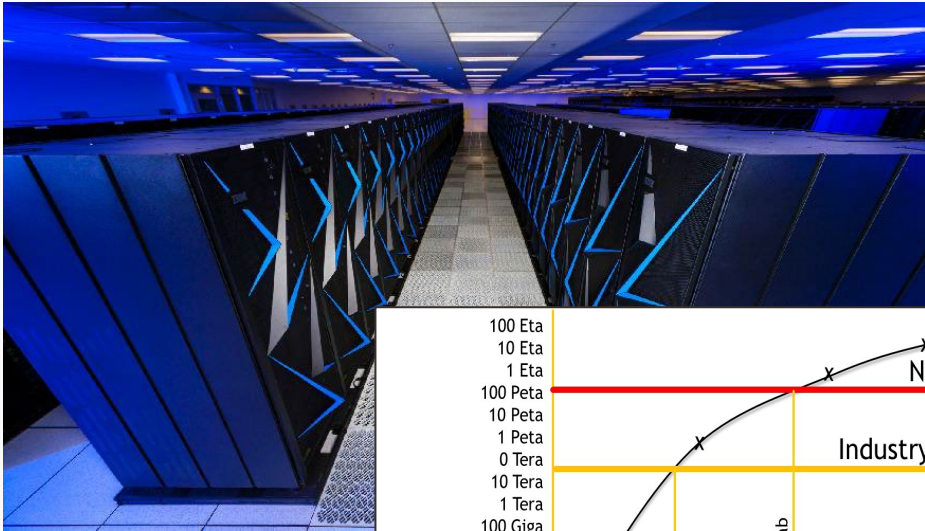


World-class supercomputers  
Unique software  
Subject Matter Experts



# HPC Enhances Modeling, Simulation, and AI

## National Lab Supercomputers



## Multiscale Multiphysics Modeling and Simulation



- ▶ Accurate physics
- ▶ New material discovery
- ▶ Optimization
- ▶ AI data analytics

# HPC4EI has established an efficient process for DOE Labs to partner with industry



- Two solicitations a year
  - AMMTO, IEDO, FECM
- \$400k / Project
- ~\$7-8M /yr Budget
- 12 participating National laboratories
- 200+ projects funded with 100+ companies over 10 years

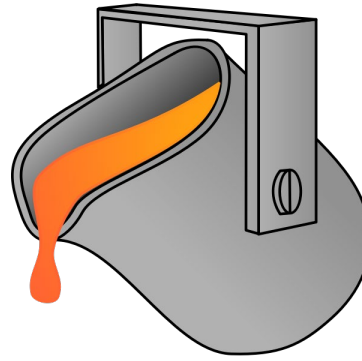


# Benefits all around



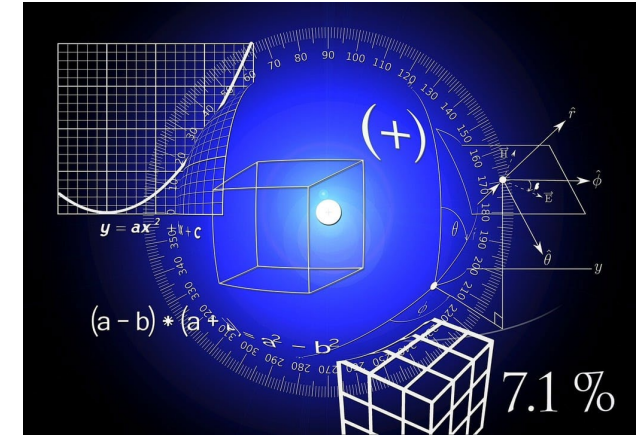
## Government interests

- ▶ Energy reduction
- ▶ Improve competitiveness of US industry
- ▶ Improve supply chain security



## Industry Interests

- ▶ Shorter time to market for new products
- ▶ Improved quality and yield
- ▶ Lower energy and material costs
- ▶ Improved profitability



## NL Researcher Interests

- ▶ Opportunity to model new problems
- ▶ Access to industry data
- ▶ Improvements to computational models and AI systems

# Over 200 projects have been funded with over 100 manufacturers in US



- ▶ Aerospace leading edge companies
- ▶ Legacy industries
- ▶ Innovative small companies

# Visit our website for solicitation details

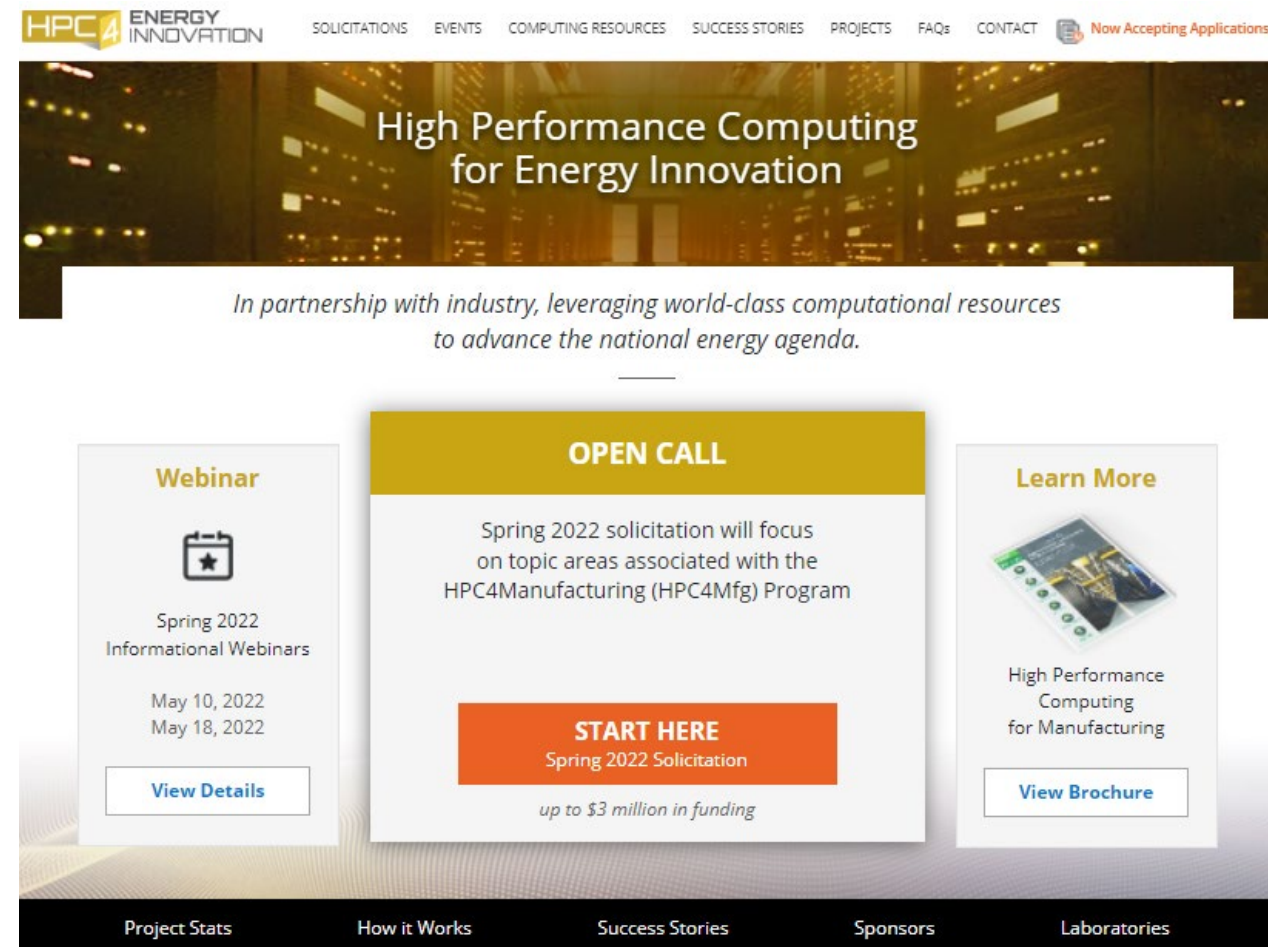
**FOA Coming soon!**

Additional information at  
[www.hpc4energyinnovation.org](http://www.hpc4energyinnovation.org)

Proposal Application Portal at  
<https://proposalshpc4.inl.gov>

Questions can be sent to [hpc4ei@llnl.gov](mailto:hpc4ei@llnl.gov)

Join the [hpc4ei-info@llnl.gov](mailto:hpc4ei-info@llnl.gov) distribution lists via the web to receive program announcements



The screenshot shows the HPC4 Energy Innovation website. The header includes the logo and navigation links: SOLICITATIONS, EVENTS, COMPUTING RESOURCES, SUCCESS STORIES, PROJECTS, FAQs, CONTACT, and a 'Now Accepting Applications' badge. The main banner features the text 'High Performance Computing for Energy Innovation' and a tagline: 'In partnership with industry, leveraging world-class computational resources to advance the national energy agenda.' Below the banner are three columns: 'Webinar' for Spring 2022 Informational Webinars on May 10 and 18, 2022; 'OPEN CALL' for the Spring 2022 solicitation focusing on the HPC4Manufacturing (HPC4Mfg) Program, with a 'START HERE' button and 'up to \$3 million in funding'; and 'Learn More' for High Performance Computing for Manufacturing with a 'View Brochure' button. The footer contains links for Project Stats, How it Works, Success Stories, Sponsors, and Laboratories.

# Project selections

**Project Title:** Modeling Moisture Management for Improved Asphalt Production  
**Company Name:** Construction Partners, Inc.  
**Lab:** LLNL

**Project Title:** HPC to Optimize Flash Processing of Steel  
**Company Name:** Flash Steelworks, Inc.  
**Lab:** ORNL

**Project Title:** Model Development for Laser Ablation of Graphite for Faster Charging Batteries  
**Company Name:** Ford Motor Company  
**Lab:** SNL

**Project Title:** Advanced Inspection Solutions for Materials Joining in Large-Scale EV Battery Manufacturing  
**Company Name:** General Motors LLC  
**Lab:** ORNL

**Project Title:** Membranes to Enhance the Production of Natural Gas Purification  
**Company Name:** GENERON (Phase 2)  
**Lab:** ORNL

**Project Title:** Process Optimization for Cost-Effective Gas-to-Methanol System  
**Company Name:** M2X Energy Inc. (Phase 2)  
**Lab:** ANL

**Project Title:** Enhancing Electrified Heating Strategies for Affordable Domestic Graphite Production  
**Company Name:** Seerstone Development  
**Lab:** ORNL

**Project Title:** Process Optimization for High Precision Semiconductor Chip Manufacturing  
**Company Name:** TEL Technology Center, America, LLC  
**Lab:** LBNL

**Project Title:** Enhancing Ethylene Oxide Production  
**Company Name:** The Dow Chemical Company  
**Lab:** NLR

**Project Title:** Improved Manufacturing Production of Solid-State Batteries  
**Company Name:** Toyota Motor Engineering and Manufacturing North America (Phase 2)  
**Lab:** LLNL

**Project Title:** Enabling Cost-Effective, Large-Scale Domestic Production of Magnesium Metal  
**Company Name:** U.S. Green Magnesium  
**Lab:** LLNL

**Project Title:** Laser Additive Manufacturing Process Optimization  
**Company Name:** DMG MORI  
**Lab:** ORNL

**12 new HPC4Mfg projects selected!**



- Presenting at a session:
  - Materials Processing Fundamentals: Towards Sustainable Process Modeling, Design, and Operation:  
HPC4EI - The High Performance Computing for Energy Innovation
  - Wednesday Mar 18<sup>th</sup> 8:30am
- LLNL Team will have a table in the Exhibition hall
  - Come visit!

The logo consists of the letters 'HPC' in a white, sans-serif font inside a yellow rectangular box. To the right of this box is a yellow square with a white number '4' inside it, which is slightly offset and appears to be a separate element.

**ENERGYINNOVATION**

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