REQUEST FOR PROPOSALS
RFP-2 WAVE 1

LET US KNOW OF ANY OBJECTIONS PRIOR TO THE WEBINAR’S START
THE MEETING WILL BE RECORDED

WE INVITE YOU TO SHARE IN THE VISION.
• All proposers are strongly encouraged to read the Technical Roadmap and the Request for Proposal (RFP) carefully and adhere to the stated submission requirements.

• This presentation summarizes the RFP. Any inconsistencies between the RFP and this presentation or statements from CESMII personnel, default to the RFP.

• CESMII website https://www.cesmii.org/questions-and-answers/

• If you believe there is an inconsistency, please contact CESMII at roadmapprojects.info@cesmii.org
AGENDA

• CESMII Mission, Strategy, Role, Objectives
• CESMII Technical Roadmap Overview
• RFP Process Overview & Timeline
• CESMII Projects (Roadmap & Application)
• RFP-2 Wave 1 Technical Areas of Interest
• Award Information
• Eligibility Information
• Cost Sharing
• Proposal Templates
• Roadmap Project Evaluation Criteria
• CESMII Links & Questions
CESMII’s Mission, Strategy and Role

Improve Energy Efficiency through Sensing, Control, Modeling, Analytics & Platform Technologies

The home of Smart Manufacturing

Founded & funded by the US .gov in 2017

Private/public partnership - $140M over 5 years

We bring together the best minds in the industry to unleash innovation

Invest in technology, learning & practices aligned with our strategy

We represent the ‘Voice of Manufacturing’

• NOT a Vendor, NO product to sell

We engage the SM Ecosystem through a membership model

• Manufacturers on a digital transformation journey
• Vendors looking to innovate
• Academia looking to drive relevance
• SI’s looking to build their digital portfolio
CESMII Overall Objectives

1. Lead a national effort to develop, research, test, and widely validate SM technologies and practices in a continuously evolving manner;

2. Develop a roadmap for SM technologies, practices, services, and training and update the roadmap periodically as needed;

3. Support SM Research & Development, to provide capabilities for and collaboration in open, pre-competitive work among multiple parties;

4. Establish a technical education and workforce development program that leverages regional networks;

5. Stimulate growth of a SM domestic supply chain;

6. Demonstrate participation of underrepresented groups in CESMII; and

7. Be financially self-sustaining after the five-year period of federal funding.
1. Energy Productivity: Energy productivity gains in U.S. manufacturing will be doubled in 10 years.

2. Energy Efficiency: 15% improvement in energy efficiency in first-of-a-kind industrial testbeds will be achieved within 5 years.

3. Industry Deployment Costs: Cost of deploying SM technologies including hardware and software in existing manufacturing processes will be reduced 50% relative to state-of-the-art in 5 years.

4. Adoption Costs: Installed and operating cost for adoption of SM technologies including hardware and software will be recovered through energy savings and productivity improvements in 10 years.

5. Workforce: SM workforce capacity in U.S. will be increased two-fold by 2020 and five-fold by 2030.

6. Supply Chain: SM supply chain will increase value and participation 40% by 2030.
ROADMAP AND APPLICATION PROJECTS DIRECTLY SUPPORT THE TECHNOLOGY PILLARS

Democratizing SM Knowledge
Democratizing SM Technology

Realizing Our Mission through An Integrated ROADMAP

Roadmap Projects
- Collaborative R&D
- Develop key technologies
- Robust & configurable
- Integration into SM system

Application Projects
- SM Platform & Marketplace
- Enable reuse of technologies
- Secure, flexible, scalable
- Cost effective deployment

R&D Projects
Capability Projects
Innovation Projects

Create/Build

Needs/Gaps

Validate/Demonstrate

CESMII $$ + Member $$$

Member $$$

CESMII $$ + Member $$$

SMART Platform & Marketplace

Roadmap and Application Projects directly support the Technology Pillars.

Democratizing SM Knowledge
- Facilitate SM adoption
- Develop value proposition
- Mitigate risks and barriers
- Provide strategies & tools

Democratizing SM Technology
- Build & sustain SM skills
- Customized training
- Resources & programs
- Technology & practices

Realizing Our Mission through An Integrated ROADMAP
ROADMAP PROJECTS – PROCESS OVERVIEW (Stage Gate Process)

**Areas of Interest**
- Concept / White Papers **
- White Papers Selection **
- Proposal Preparation & Submittal
- Evaluation & Selection
- Projects Negotiations
- Detail SOPOS, WBS, and Budgets
- Technical, Financial & Contracting Review
- DOE SOPO Mod Approval
- UCLA Contractual Review
- UCLA Sub recipient Agreements

**Estimated Duration**
- Gate 1: RFP & White Papers Selection - 4 Weeks
- Gate 2: Full Proposals Completion & Selection - 1-2 Weeks
- Gate 3: Final Project Packages Approved - 6-8 Weeks *
- Gate 4: SOPO Mod & UCLA Sub Agreements - 6-7 Weeks *
- 8 – 9 Months (31-37 Weeks)

* Assuming 5 projects in the selected portfolio
** For Capability and Innovation projects these tasks will be the Requirement Specifications and Proposal Request.

Miguel Corcio, P.E. – Smart Manufacturing & Technical Projects

Teams Memberships & Letters of intent
- CESMII
- AFFINITY GROUPS
- MEMBERS
- DOE
- CESMII
- EVALUATION COMMITTEE
- CESMII
- MEMBERS
- UCLA
- CESMII
- MEMBERS
- UCLA/OCGA
- MEMBERS
- RMC

NOI, RFP, Webinars

Technical, Financial & Contracting Review

Gate 1
- RFP & White Papers Selection

Gate 2
- Full Proposals Completion & Selection

Gate 3
- Final Project Packages Approved

Gate 4
- SOPO Mod & UCLA Sub Agreements

EXECUTE

CONTRACTING
- STAGE 4

NEGOTIATE & FINALIZE
- STAGE 3

PROJECT REVIEW AND SELECTION
- STAGE 2

RFP DEVELOPMENT & ISSUEANCE
- STAGE 1

Team Memberships & Letters of intent

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<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
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<tbody>
<tr>
<td>Notice of intent Wave I</td>
<td>June 27&lt;sup&gt;th&lt;/sup&gt;, 2019</td>
</tr>
<tr>
<td>Request for proposals issue date</td>
<td>July 16&lt;sup&gt;th&lt;/sup&gt;, 2019</td>
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<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; Information Webinar</td>
<td>July 26&lt;sup&gt;th&lt;/sup&gt;, 2019</td>
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<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Information Webinar</td>
<td>July 31&lt;sup&gt;st&lt;/sup&gt;, 2019</td>
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<tr>
<td>Submission deadline for whitepapers</td>
<td>August 26&lt;sup&gt;th&lt;/sup&gt;, 2019</td>
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<tr>
<td>Expected date for whitepapers selection notifications</td>
<td>September 6&lt;sup&gt;th&lt;/sup&gt;, 2019</td>
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<tr>
<td>Submission deadline for full proposals</td>
<td>October 28&lt;sup&gt;th&lt;/sup&gt;, 2019</td>
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<tr>
<td>Expected date for proposals selection notifications</td>
<td>November 29&lt;sup&gt;th&lt;/sup&gt;, 2019</td>
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<tr>
<td>Expected project start date</td>
<td>April 1&lt;sup&gt;st&lt;/sup&gt;, 2020</td>
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<td>RFP-2 Wave 2 NOI (Platform Capability &amp; WF Development)</td>
<td>August 2019</td>
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<tr>
<td>RFP-2 Wave 3 NOI (Innovation Projects Profiles, Apps)</td>
<td>September 2019</td>
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TECHNICAL AREAS OF INTEREST: ENABLING R&D
ADDRESS SPECIFIC GAPS IN BUILDING BLOCK TECHNOLOGIES (INCLUDING SENSING, PROCESS CONTROL, MODELING AND ANALYTICS) THAT HELP ADDRESS COMMON TECHNICAL CHALLENGES IN THE ADOPTION OF SMART MANUFACTURING.
CROSS-CUTTING TECHNOLOGIES:

a) Innovative solutions for common challenges in energy intensive industries and processes.

b) Innovative applications of emerging technologies for manufacturing applications.

Energy intensive processes span industries such as petroleum, chemicals, glass, metals, food & beverage and pulp & paper. Many of them have common technical challenges (in sensing, control or modeling), or common process such as thermal processing. CESMII is inviting project proposals that outline the challenges, what technical gaps exists in overcoming these challenges, and how these gaps can be closed through development and demonstration of Smart Manufacturing technologies.

5G technology promises to significantly impact the bandwidth and data transfer rates for communications, AI holds untapped potential for impact on automated decision making and control while cybersecurity remains a formidable challenge for manufacturing systems. CESMII is seeking proposals that can assess, test and validate these emerging technologies for manufacturing applications, including the impact on existing shop floor communication networks as well as human-machine interactions.
ADVANCED SENSING:

a) Advanced real-time, non-intrusive sensing for harsh environments and in-line product characteristics.

b) Modular sensor wrapping solutions for legacy equipment.

Many manufacturing processes are unable to leverage the full potential of Smart Manufacturing due to lack of adequate real-time sensing in harsh environments such as high temperature, high pressure or corrosive media. Gaps also exist in real-time (relative to the speed of manufacture) measurements that provide feedback on the process (for example composition, dimensions, surface, properties). CESMII seeks proposals that address these challenges, particularly with application to multiple industries.

A majority of manufacturers, small and large, struggle to obtain real-time sensory information from legacy equipment and connect it to the state of the art enterprise level SM systems. CESMII is seeking proposals for modular (plug and play), reusable (across different processes) ‘sensor wrapping’ solutions (hardware and/or software) for a broad class of sensors and equipment to overcome this barrier to SM adoption.
Many manufacturing processes, particularly discrete, require control systems to meet multiple objectives related to precision, productivity and performance. A recipe for higher throughput may conflict with a recipe that optimizes energy usage. A process control scheme for optimizing product quality may conflict with that for dimensional precision. CESMII is seeking advanced reusable techniques for such multi-objective process control algorithms and techniques that can be applied to different types of unit processes or linked process flows.

Characteristics and properties of the final product in discrete manufacturing depend on the processing conditions at each of the discrete steps along the manufacturing flow path. CESMII is seeking proposals for control and optimization of operating conditions along the flow path in order to reduce energy consumption and/or improve yield and quality.
MODELING AND ANALYTICS:

a) Modeling and optimization of cross industry thermal processes.

b) Hybrid modeling (physics based + data driven) approaches for real-time process control and optimization.

Thermal processes such as heat treatment and drying are inherently energy intensive processes. CESMII is seeking proposals on model-based optimization of such processes to improve performance and energy consumption. Examples include efficient ramp up and ramp down of batch furnace operations to minimize energy consumption and optimal placement of parts for uniform heat treatment.

With the rapid rise in availability of computing power, the ability to combine the use of high fidelity physics-based models and data driven models for manufacturing applications has become promising. CESMII invites proposals for the development and application of these hybrid approaches for real-time process control and optimization for unit processes as well as linked flow paths.
SMART MANUFACTURING PLATFORM:

a) End to end requirements for a Smart Manufacturing Platform.

CESMII’s SM Platform is expected to reach a vast diversity of potential users, and an equally vast diversity of potential contributors. It will represent a unique combination of OT and IT technologies that will need to meet a **broad spectrum of requirements** for its users.

CESMII is inviting proposals to help identify and develop these requirements specifications for the SM Platform. The proposal should address **end to end capabilities** that are sought by manufacturers of all types and sizes, and should consider key aspects such as interoperability, reusability, flexibility and scalability.
AWARD INFORMATION:

Estimated Funding
$3,125,000 of federal funding available for new awards under Wave I. Projects will also be required to provide 50% cost share.
PERIOD OF PERFORMANCE

For this RFP, CESMII anticipates making awards with period of performance up to 18 months (but not less than 6 months).

- All projects are state-gated
- At least one Go/No-Go decision point for every BP
- Expected first phase of project to be from April 1, 2020 – December 2020, with a Go/No-Go decision point required at this point.

If applicable, the second phase will occur on January 2021. Additionally, UCLA will negotiate a sub recipient agreements with lead organizations of each of the project teams.
ELIGIBLE APPLICANTS

- MUST BE IN GOOD STANDING BY THE TIME THE PROJECT IS AWARDED TO CESMII
  - Good standing means a completed membership agreement and are current with their annual dues
  - Information regarding CESMII Membership can be found at the CESMII website, https://www.cesmii.org/membership-information/.

- Participation by Foreign Entities
  - Approved CESMII members who are foreign entities may apply for project funding. If any project work will be done in a foreign country, CESMII will work with the project team to complete a Foreign Work Waiver (FWW) that will be submitted to DOE for review and approval.
  - All work to be performed in the US unless a Foreign Work Waiver (FWW) is approved by the DOE
COST SHARING

• The cost share must be at least 50% of the total allowable costs for the project (i.e., the sum of the CESMII share and the recipient share of allowable costs equals the total allowable cost of the project) and must come from non-Federal sources unless otherwise allowed by law.

• Each Project Team is free to determine how best to allocate the cost share requirement among the team members.

• The Team members may provide cost share in the form of cash or in-kind contributions.

• Upon selection for award negotiations, all Project Team Members are required to provide written assurance of their proposed cost share contributions in their final SOPOs. Each organization providing cost share in support of the Project must submit a Letter of Commitment.
PROPOSAL TEMPLATES & SUPPORTING DOCUMENTATION

- RFP-2 Proposal Documentation
- RFP-2 White Paper Template
- RFP-2 Full Proposal Template
- Intellectual Property Management Plan Guidance
- CESMII Intellectual Property Plan
- DOE Intellectual Property Clauses

- The application templates and instructions are available on the CESMII website: [https://www.cesmii.org/resources]
SELECTION CRITERIA
Whitepapers Selection. Relevance to full proposals selection criteria.

1. **General Criteria**
2. Technical evaluation Criteria
3. Portfolio Selection Criteria

<table>
<thead>
<tr>
<th>1- General Criteria</th>
<th>Metrics</th>
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<tr>
<td><strong>Business Impact</strong></td>
<td>% improvement in energy reductions % manufacturing productivity</td>
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<td>Other financial savings</td>
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<td>Alignment with CESMII goals</td>
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<td><strong>Technical significance</strong></td>
<td>Identification of key technical barrier(s) to be overcome</td>
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<td>Reusable technologies and Components for Platform</td>
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<td>Alignment with the CESMII technical roadmap</td>
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<td><strong>Project Execution</strong></td>
<td>Clear project objectives and scope statement</td>
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<td>High-level project plan to meet milestone dates</td>
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<td>Key resources identified and confirmation of availability.</td>
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<td>Integration requirements defined</td>
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<td>Project deliverables identified</td>
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<td>Complete cost breakdown including sub recipient budget</td>
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<td>Measure of success</td>
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<td>Project risks</td>
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# Evaluation & Selection Criteria

## Whitepapers Selection. Relevance to:

1. General Criteria
2. **Technical evaluation Criteria**
3. Portfolio Selection Criteria

<table>
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<th>2- Technical Evaluation Criteria</th>
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<tr>
<td><strong>Technical Merit (Weight: 40%)</strong></td>
<td>The extent to which the project addresses the areas of interest stated in this RFP. The extent to which the project, if successfully carried out, will make a valuable contribution to the field of smart manufacturing, SM Platform, CESMII and its members. The project objectives are clearly stated, challenging, well-conceived, and technically feasible. The degree to which this project will provide valuable new tools, engineering processes, devices, or hardware/software/data to support adjacent Institute activities. Project will materially advance the mission of the Institute.</td>
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<td><strong>Technical Approach (Weight: 35%)</strong></td>
<td>Adequacy and feasibility of the applicant’s approach to achieving the stated objectives of the project. The extent to which the project plan, methods, analysis, and technology are properly developed, well integrated, and appropriate to the objectives of the project. Appropriateness rationale, and completeness of the proposed Project Proposal. Degree to which the applicant has identified high risk challenges and presented reasonable mitigation strategies. There is a high degree of innovation, novelty or originality in the approach. Adequacy and appropriateness of the proposed schedule, staffing plan, and proposed travel.</td>
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<td><strong>Technical and Management Capabilities (Weight: 25%)</strong></td>
<td>Likelihood that the proposed work can be accomplished within the proposed budget and performance period by the technical team, given their experience, expertise, past accomplishments, available resources, institutional commitment, and access to technologies. Clarity, completeness and appropriateness of the project plan and timeline. Clarity, logic, and effectiveness of the project organization, including sub awardees to successfully complete the project. Credentials, capabilities, experience of the key personnel. Adequacy and availability of personnel, facilities, and equipment (both hardware and software) to perform the proposed project within the budget specified.</td>
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Whitepapers Selection. Relevance to:
1. General Criteria
2. Technical evaluation Criteria
3. **Portfolio Selection Criteria**

<table>
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<tr>
<th>3- Portfolio Selection Criteria</th>
<th>To create a balanced portfolio CESMII will select projects that are complementary and support the accomplishment of CESMII objectives. This will include but not limited to the following criteria:</th>
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| Criteria                        | 1. Meets strategic goals of the Institute  
2. Fit with current Budget Period (BP) funding profiles  
3. Cross-industry applicability and broad-based impact  
4. Utilization and enhancement of the SM Platform core capabilities and SM Marketplace  
5. Full compliance with DOE and CESMII requirements  
6. Broader base application across other industries for reusability  
7. High-level fit to create balance in the Institute’s project portfolio  
8. Whether the proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty |
QUESTIONS CAN BE SUBMITTED TO ROADMAPPROJECTS.INFO@CESMII.ORG

QUESTIONS & ANSWERS CAN BE FOUND AT WWW.CESMII.ORG/QUESTIONS-AND-ANSWERS/.

RFP-2 WAVE I RELATED INFORMATION CAN BE FOUND AT WWW.CESMII.ORG/REQUEST-FOR-PROPOSAL

MEMBERSHIP ELIGIBILITY CAN BE FOUND AT HTTPS://WWW.CESMII.ORG/MEMBERSHIP-INFORMATION/
