AIAA ICME Prize

Award Description

The AIAA Materials Technical Committee (TC) with the support of Composite Design and Manufacturing HUB (cdmHUB), NASA (National Aeronautics and Space Administration) and Rolls Royce Corporation funding have established an ICME (Integrated Computational Materials Engineering) prize for the best aerospace focused ICME project. This bi-annual award will not only include recognition at a SciTech conference itself, but will also provide a $1,500.00 team award. Furthermore, each winning project and project team will be given special consideration for internship or follow-on effort to further realize the benefit of the proposed project with one or more of the sponsoring organizations: cdmHUB, NASA, and/or Rolls-Royce.

Proposed project abstracts for SciTech 2020 will be submitted to:

- SciTech 2020’s ScholarOne submission site, from 9 – 29 June 2020 only.
- To apply for submission privileges, contact John F. Matlik by email: John.F.Matlik@rolls-royce.com.
- Proposed project abstracts submitted after 29 June 2020 will not be considered.

2020-2022 ICME Prize Time Schedule:

- Letter of intent to propose due to the ICME award team (preferred, not required) - February 7, 2020
- Proposed Project - Abstracts Due to ICME Award Team - June 26, 2020
- Acceptance (or rejection) letter to Contestants - August 7, 2020
- Final Project Report due to the ICME award team - June 11, 2021
- Each team must give final presentation at SciTech SciTech 2022

Background & Context

ICME (Integrated Computational Materials Engineering) enables “the optimization of the materials, manufacturing processes, and component design long before components are fabricated, by integrating the computational processes involved into a holistic system.” (National Academies Press, 2008).

While recognizing that computational materials is a critical element, the emphasis in this competition should be on the “I” for integrated and “E” for engineering. We seek entries where the key ingredient is the linkage of manufacturing processes to material microstructure, which in turn influence material properties and their variability, thereby enabling tailoring (engineering) of materials to optimize performance for their intended usage. Consequently, it is very important to understand the input, output, and uncertainties at each scale in order to develop rigorous approaches to bridging length and time scales, enable the necessary transfer
of information and computational linkages between these scales, and enable a designer/analyst to optimally and confidently achieve their design objectives (performance metrics). The interconnection of these scales along with the development and validation of accurate processing/ microstructure/ property/ performance relationships as well as information management throughout the process are of primary interest. Winning entries will recognize that computational material modeling is a means to an end, but not the end itself.

We are looking for projects that not only demonstrate the above scale linkage with respect to customer performance requirements, but also address specific business benefit. Consequently, it is anticipated that these projects will be necessarily multi-disciplinary to include cross-supply chain, cross-life cycle, and cross-functional expertise from all relevant disciplines.

**Requirements for Participation**

It is preferred (not required) that the participants submit a Letter of Intent to propose to the ICME award team by 7 February 2020. It is mandatory, however, that interested participants submit an extended abstract clearly describing the proposed ICME prize project by the noted 26 June 2020 deadline.

To be considered for participation in the 15-month competition, the abstract submission must contain the following information:

1. Names and affiliation of all team members/participants & the team lead
2. Identified customer industry
3. Customer requirements and associated business case
4. A non-confidential description of the proposed project including - objectives, criteria for success from both a technical and business case standpoint, proposed metric(s) to measure success, novelty and how the entity or technology developed or utilized will advance the state of the art with respect to ICME and impact the bottom line business case of the customer.
5. A clear statement of work with associated time line and required resources.
6. Metric(s) for measuring success of the project.

The ICME prize selection committee will assess the submitted abstract for completeness per above and send out notification to submitting teams of acceptance, rejection, or suggested modification to progress to the next project report stage.

**Judging Criteria**

The AIAA material technical committee will assemble an award panel to evaluate each proposed project (based on its own merits) from all those accepted projects for the given 15-month competition timeframe. Based on all proposed subject matter at least four AIAA discipline experts along with representatives from each donor organization will be assembled to judge contestant’s work. The ICME prize selection committee will evaluate each proposal
response based against its own described merits, presentation of final project results and accompanying material.

Contestants will be judge based on the following criteria:
1. Technical scope, difficulty and quality (35 points)
2. Achievement of stated goals (20 points)
3. Business Impact – Return on Investment (15 points)
4. Extent and quality of multidisciplinary team (10 points)
5. Quality of Final Report (10 points)
6. Quality of Final Presentation (10 points)

**2018-2020 AIAA ICME Prize Selection Committee**

- Steve Engelstad (Lockheed Martin) - Structures Technical Committee
- Barron Bichon (Southwest Research Institute) – Non-Deterministic Approaches (NDA) Technical Committee
- H. Alicia Kim (University of California, San Diego) – Multi-Disciplinary Optimization (MDO) Technical Committee
- Mat French (LibertyWorks/Rolls-Royce) – Systems Engineering Technical Committee
- Wenbin Yu (Purdue, cdmHUB) – Structures and Materials Technical Committee
- Steve Arnold (NASA) – Materials Technical Committee
- John Matlik (Rolls-Royce) – Materials Technical Committee

The 2020-2022 AIAA ICME Prize selection committee has not yet been decided.