Louisiana EPSCoR
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Louisiana researchers breaking the boundaries of science and bias

Researchers and students from the Consortium for Innovation in Manufacturing and Materials (CIMM) recently gathered in Baton Rouge for the annual symposium, a full day of networking and information sharing.

CIMM's goal for innovation in advanced manufacturing is to accelerate technology development by close integration of critical experimentation with computer modeling and simulation. CIMM was established in 2015 when the Louisiana consortium was awarded a highly competitive $20 million 5-year Research Infrastructure Improvement (RII) Track-1 award from the National Science Foundation (NSF) EPSCoR Program.

Technical presentations were given for both of the science drivers, computational tools and research areas, as well as updates on diversity, sustainability, assessment, and internal and external engagement efforts.

Dr. Dimitris Nikitopoulos provided an update on the newly expanded Core User Facilities (CUF) which is creating easy access to state-of-the-art experimental facilities for collaborative research and development to universities and industry across the entire state.

CIMM Seed Grant awardee, Dr. Jonathan Rausch from the University of Louisiana at Lafayette, gave an update on his research on the use of vacuum electrostatic levitation (ESL) to determine important thermophysical and thermochemical property measurements of titanium- and nickel-based engineering alloys. He is using a container-less oscillating drop technique at the NASA Marshall Space Flight Center.

Dr. Shengmin Guo provides a research update on laser-based metal 3D printing.

Additive manufacturing research investigates the phenomena occurring on several time and size scales, ranging from the electronic level (angstrom) to the macroscopic level (meter). The Integrated Computational Materials Engineering (ICME) team provided an update at the meeting on how supercomputers and specialized programming are being used to bridge the research data in different time and size scales together into powerful computer models.

The consortium's Industry Advisory Board (IAB) Chair, Art Kracke, and several IAB board members were in attendance, as well as the External Review Board (ERB), Diversity Advisory Council (DAC), and the external evaluation team. These VIPs provided valuable feedback and suggestions, and several also served as judges for the annual student poster competition.

One of CIMM's initiatives is to enhance recruitment and retention of women and minorities because they are underrepresented in most areas of STEM (Science Technology Engineering and Mathematics) nationwide. This reality is particularly critical in areas related to manufacturing, which is perceived to be a heavily male-dominated field.

The DAC was formed to guide the project leaders in this ongoing effort, composed of national leaders in issues related to increasing the participation of women and minori-

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ties in STEM disciplines. In their feedback, the DAC lauded CIMM for successfully increasing the diversity of undergraduate students participating in research. They recommended that everyone in STEM professions, including CIMM, to receive training to aid in the quest to further improve the climate for minorities and increase diversity.

Accordingly, while the primary focus of the symposium was on science, the symposium organizers took this great opportunity of having participants from all over the state in one place to provide a one-hour diversity workshop. The workshop focused on awareness of implicit bias, micro-aggressions, and micro-insults.

The presentation and a thought-provoking activity were led by two DAC members, Dr. Jenna Carpenter, Campbell University Dean of Engineering, and Ms. Sara Hernandez, Associate Dean for Inclusion and Student Engagement at Cornell University.

"When faculty and students aren't aware of implicit bias, they unwittingly engage in behaviors that continue the discrimination and discouragement of women and underrepresented minorities in science, mathematics, and engineering disciplines," said Dr. Carpenter.

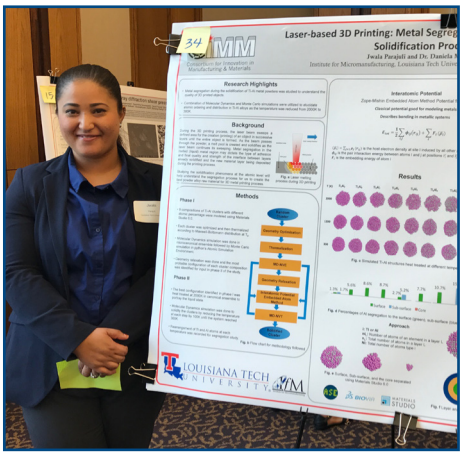
CIMM Student Research Poster Competition

The graduate poster competition at the CIMM symposium featured presentations and research papers from 48 students. In addition, 12 REU students presented their summer research.

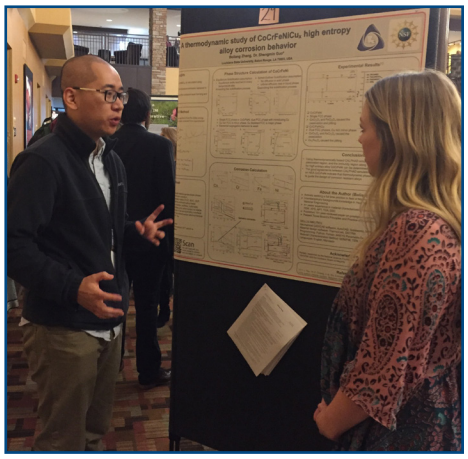
Several members of the consortium's External Review Board, Diversity Advisory Council and Industry Advisory Board provided feedback and served as judges.

Dr. Harold Silverman, External Review Board Chair and retired Senior Vice Provost from SUNY New York, remarked that the posters were "exciting and full of good work."

The top winners of the poster competition, Jwala Parajuli and Boliang Zhang, attended the NSF National EPSCoR Conference in Missoula, Montana and presented their posters in the national poster session.



Jwala Parajuli, from Louisiana Tech University, won the CIMM graduate student poster competition with her paper and poster titled, "Laser-based 3D printing: Metal segregation studies during the solidification process."



Boliang Zhang, LSU Ph.D. student, presenting his CIMM research poster, "A thermodynamic study of $CoCrFeNiCu_x$ high entropy alloy corrosion behavior," at the NSF National EPSCoR Conference in Missoula, Montana.

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