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IOWA STATE UNIVERSITY

Center for Multiphase Flow Research and Education

December 2019 CoMFRE Newsletter

Message from the Director

As 2019 ended, I reflected on the progress and accomplishments CoMFRE made in the past year, and thought about goals for 2020. At the beginning of 2019, a dedicated CoMFRE program coordinator (Jan Seibel) started; she is currently supported through the generous commitment of the College of Engineering. We began the year with two member companies and we now have four. The number of faculty affiliates has also grown from 22 to 26; the most recent addition came from outside the College of Engineering (see story below). Our goal for 2020 is to grow the number of member companies to at least six and recruit additional faculty to join our center. Our faculty affiliates will also continue to pursue external funding in the area of multiphase flows.

I hope all of you enjoyed this holiday season with family and friends, and your interactions with multiphase flows, either from a ski slope, a sandy beach, or the comfort of your own home, were enjoyable and relaxing.

With kind regards,



Theodore (Ted) J. Heindel
Director, Center for Multiphase Flow Research and Education
Bergles Professor of Thermal Sciences



Annual CoMFRE Symposium & IAB Meeting, October 28-29, 2019



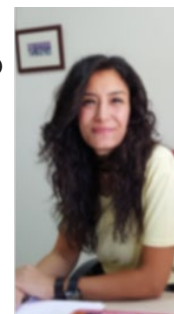
The 2019 CoMFRE Symposium and Member Meeting was held Monday-Tuesday, October 28-29, at the ISU Alumni Center in Ames, IA. Industry members met in a closed meeting on Monday afternoon to receive updates on shared research and meet with CoMFRE faculty and students to discuss future research and goals for the center. The remainder of the meeting was open to invited guests as well as CoMFRE members. In addition to presentations and a poster session, the meeting provided opportunities for networking and interaction among industry representatives, faculty, graduate students and postdocs.

Read the College of Engineering news article about the meeting [here](#). Links to posters and presentations are provided on the [meeting webpage](#).

CoMFRE and CoMFRE Affiliates in the News

- **Center welcomes assistant professor of mathematics to program as a faculty affiliate:** Pelin Guven Geredeli, assistant professor in mathematics, is bringing new ideas to the Center for Multiphase Flow Research and Education with her enthusiasm to engage in cross-disciplinary collaboration.

<https://news.engineering.iastate.edu/2019/12/03/collaboration-with-comfre-center-welcomes-assistant-professor-of-mathematics-to-program-as-a-faculty-affiliate/>



- **Studying microbubbles to treat traumatic brain injuries:** Alex Wrede, a postdoctoral researcher with the Hashemi Laboratory, is using engineering to unravel the mystery of traumatic brain injuries – and winning awards for how he tells the story of the impact of his work. <https://news.engineering.iastate.edu/2019/12/09/studying-microbubbles-to-treat-traumatic-brain-injuries/>
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Recent Degrees Granted to Students Working on Multiphase Projects

- Jeffrey C. Heylmun, “Simulation Methods for Polydisperse, Multiphase Flows using Moment Transport Methods”, Ph.D., Advisors: **Alberto Passalacqua, Rodney O. Fox.**
 - Pavan Kotrike, “Mixing in Bi-dispersed Granular Flows”, M.S., Advisor: **Alberto Passalacqua**
 - Hsiang-Lan Yeh, “Chemical and Acoustic Directed Processes for Enhancing Two Phase Porous Media Fluid Flow”, PhD, Advisor: **Jaime Juarez**
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New CoMFRE Faculty Affiliates

See “CoMFRE and CoMFRE Affiliates in the News”, above. A full list of CoMFRE faculty affiliates can be found here: <https://comfre.iastate.edu/team-2/>

Recently Awarded Publicly-Funded Grants

Feel free to contact the PI directly if you have any questions on the project below.

- “Modeling and Simulations of Electrostatically Levitated Multiphase Liquid Drops”, **Jonghyun Lee** and **Baskar Ganapathysubramanian**; Funding Agency: NASA; New Funding amount: \$550,000.
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Recent Journal Publications

Note that CoMFRE affiliates are identified by **bold** names.

- M. Akella, S. Shabaniverki, J.J. **Juárez**, “Acoustophoretic Assembly of Millimeter-scale Janus Fibers”, Royal Society of Chemistry Advances, 2020, 10: 434-443. DOI: [10.1039/C9RA09796A](https://doi.org/10.1039/C9RA09796A)
 - F. Chowdhury, B. Elchamaa, M. Ray, A. Sowinski, A. **Passalacqua**, P. Mehrani, “Apparatus Design for Measuring Electrostatic Charge Transfer Due to Particle-particle Collisions”, Powder Technology, 2019, <https://doi.org/10.1016/j.powtec.2019.11.013>.
 - A. **Passalacqua**, F. Laurent, R.O. **Fox**, “A Second-order Realizable Scheme for Moment Advection on Unstructured Grids”, Computer Physics Communications, 2019, 106993. <https://doi.org/10.1016/j.cpc.2019.106993>.
 - K.J. Sumaria, R.W. Hyers, J. **Lee**, “Numerical Prediction of Oscillation Behaviors of a Multiphase Core-Shell Droplet during Interfacial Tension Measurement”, Metallurgical and Materials Transactions, 2019, v50B, pp. 3012-3019.
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Recent Conference Publications and Presentations

- Viraj Vilas Belekar, Alberto **Passalacqua**, Theodore J. **Heindel**, Kushal Sinha and Shankar **Subramaniam**, “Continuum Simulations of Dense Granular Flow and Model Assessment”, AIChE Annual Meeting 2019, Nov. 10th – 15th, Orlando, Florida, US.
 - Barlev Nagawkar, Venkata S. P. Kotrike, Shankar **Subramaniam** and Alberto **Passalacqua**, “CFD Investigation of Autothermal Biomass Pyrolyzers”, AIChE Annual Meeting 2019, Nov. 10th – 15th, Orlando, Florida, US.
 - Nadeem, H., **Subramaniam**, S., Sinha, K., and **Heindel**, T.J., “Particle Motion in a Vertical Bladed Mixer Using X-Ray Particle Tracking Velocimetry (XPTV),” 2019 AIChE Annual Meeting, Nov. 10th – 15th, Orlando, FL, US.
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