Integrated Data-Driven Modeling for Additive Manufacturing: A Workshop

Committee

Carolin Korner

Chair

Carolin Körner is the chair of materials science and engineering for metals at the Friedrich-Alexander-Universität Erlangen-Nürnberg. She also serves as a member of the control board of the Central Institute of New Materials and Research Processes ZMP, Fürth, as well as the scientific head of the division of additive manufacturing at New Materials Fürth, Ltd. She has more than 180 publications, including two books, and she holds a Ph.D. from the Friedrich-Alexander-Universität Erlangen-Nürnberg.

Wing K. Liu

Chair

Wing Kam Liu is the Walter P. Murphy Professor of Mechanical Engineering and Civil and Environmental Engineering at Northwestern University. He is a world leader in multiscale simulation-based engineering and science and has applied a spectrum of atomistic, quantum, and continuum strategies toward the understanding and design of nanomaterials, biological processes, and the use of nanomaterials for diagnostic and therapeutic applications. In 2001, he was cited by the Institute for Scientific Information as “one of the most highly cited, influential researchers in engineering and an original member of the highly cited researchers database.” He currently serves as president of the International Association for Computational Mechanics and previously served as editor of Computational Mechanics. Selected honors include the Gauss-Newton Medal from the International Association for Computational Mechanics; the Robert Henry Thurston Lecture Award, the Gustus L. Larson Memorial Award, the Dedicated Service Award, the Pi Tau Sigma Gold Medal, and the Melville Medal, (all from the American Society of Mechanical Engineers); the John von Neumann Medal and the Computational Structural Mechanics Award from the U.S. Association of Computational Mechanics; and the Computational Mechanics Awards of the International Association of Computational Mechanics and the Japanese Society of Mechanical Engineers. He received his B.S. in engineering science from the University of Illinois at Chicago and his M.S. and Ph.D. from the California Institute of Technology.

Tahany El-Wardany

Member

Tahany El-Wardany is a fellow in advanced manufacturing at United Technologies Research Center (UTRC). El-Wardany identifies and creates new technology areas in materials and manufacturing with widespread impact across United Technologies Corporation (UTC); develops capabilities in the fields of advanced manufacturing and elevator tribology; engages external networks to identify and support business development opportunities; and guides technical project work in advanced manufacturing. Previously, she served as principal engineer and a member of UTRC's Surface Mechanics Group, Physical Sciences Department. During the course of her UTRC career, she has overseen development of novel manufacturing processes (hybrid/additive manufacturing/deep rolling manufacturing, high-speed machining); contributed to ARPA-E winning project proposals; matured methods to mechanically enhance aerospace alloy surface properties; and built 5-axis flank milling model and code for process optimization of numerous machining applications within UTC business units, which was ultimately licensed externally. Her many awards and honors include winner of the 2015 Otis Safety Award; recipient of the Advanced Research Projects Agency-Energy Natural Science and Engineering Research Council of Canada Team Strategic Grant, "The Characterization, Development, and Optimization of Hard PVD Coatings for Use at Elevated Temperature"; and a 2011 Connecticut Women of Innovation Nominee. Key appointments include associate professor, University of Alexandria, Egypt; research manager, Machining System Laboratory and adjunct professor, McMaster University, Canada; and visiting professor, Mechanical Engineering Department, Imperial College, United Kingdom. El-Wardany has published more than 100 peer-reviewed journal and conference papers and holds 24 patents and patent applications in additive manufacturing, hybrid and conventional manufacturing, and the science of friction, lubrication, and wear. El-Wardany is a member of the Connecticut Academy of Science and Engineering, Society of Manufacturing Engineers, American Society of Mechanical Engineers, the Society of Women Engineers, and International Women's Leadership Association. She holds undergraduate and graduate degrees in production engineering from the University of Alexandria, Egypt, and a Ph.D. in mechanical engineering from the University of Birmingham, UK.

Ade Makinde

Member

Ade Makinde is a principal engineer at the GE Global Research Center. In this role, he supervises researchers in the use of finite element analysis, computational fluid dynamics, and the development of specialized numerical and microstructural tools to optimize manufacturing processes and part design for manufacturability. He is also part of the management staff responsible for overseeing the development of analytical tools and processes to aid the design of new products and parts for all of GE's businesses. Makinde works closely with GE's suppliers using analytical tools to solve time-sensitive technical issues and to ensure that yield and quality targets are met. His team was recently awarded a $9 million contract from the Office of Naval Research to develop a framework for enabling the rapid qualification and certification of three-dimensional printed replacement and newly designed parts for ships, aircraft, and other critical military assets.

Mustafa Megahed

Member

Mustafa Megahed is the manager for the Center of Excellence-CFD and Multiphysics at the ESI Group, where he leads a group of researchers investigating new technologies and algorithms providing leading-edge numerical solutions for industrial simulations. Prior to taking on this role, Megahed played a key role building the ESI CFD and Multiphysics business. Megahed started his career as a CFD developer in 1986 developing spray atomization and evaporation algorithms for heterogeneous combustion systems. He has since been involved in customer support and engineering services using a multitude of commercial and academic simulation tools. His research interests include multiphysics modeling, multiscale modeling, fluid mechanics and multiphase flows, electromagnetics, electrochemistry, reacting flows, and plasma phenomena. He received his Ph.D. in mechanical engineering.

Celia I. Merzbacher

Member

Celia Merzbacher is director of strategic and institutional planning at Oak Ridge National Laboratory. Prior to this position, Merzbacher was vice president at the Semiconductor Research Corporation. Merzbacher served as chair and member of the National Academies' National Materials and Manufacturing Board and served as a committee member on six National Academies' committees. She holds a B.S. in geology and earth sciences from Brown University and a Ph.D. in geochemistry and mineralogy from Penn State University.

Nancy M. Reid

Member

Nancy Reid (NAS) is a Professor of Statistical Sciences and Canada Research Chair in Statistical Theory and Applications at the University of Toronto. She has held visiting positions at University College, London, École Polytechnique Fédérale de Lausanne, Harvard Biostatistics, and the University of Texas at Austin. Dr. Reid's research interests are in theoretical statistics and on the application of statistical science to social and scientific problems. She received a B.Math from University of Waterloo, a M.Sc. from the University of British Columbia, a Ph.D. from Stanford University, and a D. Math Honoris Causa from the University of Waterloo. Dr. Reid is the Director of the Canadian Statistical Sciences Institute, a Foreign Associate of the National Academy of Sciences and an elected fellow of the Royal Society of Canada and the Royal Society of Edinburgh.

Jens Telgkamp

Member

Jens Telgkamp is the head of additive layer manufacturing research and technology at AIRBUS Operations GmbH. Prior to holding this position, he was the manager of fuselage and generic design and research at AIRBUS. Telgkamp received a Ph.D. from Dresden Universities.

Karen Willcox

Member

Karen Willcox is director of the Institute for Computational Engineering and Sciences (ICES), and a Professor of Aerospace Engineering and Engineering Mechanics, at the University of Texas at Austin. Prior to joining UT Austin in 2018, she spent 17 years as a professor at the Massachusetts Institute of Technology, where she served as Professor of Aeronautics and Astronautics, the founding Co-Director of the MIT Center for Computational Engineering, and the Associate Head of the MIT Department of Aeronautics and Astronautics. She is co-director of the DOE DiaMonD Center: an “Integrated Multifaceted Approach to Mathematics at the Interfaces of Data, Models, and Decisions.” Willcox holds a Bachelor of Engineering degree from the University of Auckland, New Zealand, and master’s and Ph.D. degrees from MIT. Prior to joining MIT in 2001, she worked at Boeing Phantom Works. Author of more than 70 papers, Willcox is an associate fellow of the AIAA and member of SIAM, ASEE, and ASME. She has served in multiple leadership positions within AIAA and SIAM, including leadership roles in the SIAM Activity Group on Computational Science and Engineering and in the AIAA Multidisciplinary Design Optimization Technical Committee. She is section editor of SIAM Journal on Scientific Computing and associate editor of AIAA Journal.

Michelle Schwalbe

Staff Officer