

Overview

The engineering and scientific technical communities are seeing a vast digital and data-driven transformation in the ecosystems they currently operate in. This transformation includes significantly increased employment of machine learning, data science, large data sets, soft computing, augmented and virtual reality, digital twins for design, integration, and procurement – as well as new approaches that employ these approaches into classic deterministic and mechanics based models. These approaches hold significant potential.

The conference objective is to promote the development and application of machine learning and digital twins and digital engineering (MMLDE) technologies to the computational science and engineering (CSE) communities, a new series of IACM Special Interest Conferences entitled “Mechanistic Machine Learning And Digital Engineering for Computational Science, Engineering & Technology (MMLDE-CSET)” has been established with the second to be hosted at the University of Texas at El Paso during September 24-27 2023.

The main objective of MMLDE-CSET is to bring together the diverse communities that are interested in learning, developing, and applying machine learning and digital twins via computational science and engineering tools to a broad range of engineering and scientific problems. In addition, the conference seeks to promote collaborations between engineers, data and computer scientists, and mathematicians from federal agencies, academia, and industry in this field.

A strong focus will be to facilitate participation from engineering firms and computer and software companies to showcase industrial practice and identify challenges and needed MMLDE technologies in industry. In particular participation from individuals in the Advanced Manufacturing, Aerospace, and Autonomous Vehicle industries will be strongly promoted. To promote awareness of machine learning and digital twins to the general public, we will also organize special public lectures, short courses, and demonstrations open to STEM high school teachers and students from underprivileged schools in Texas and other states.

Conference Co-Chairs

Jack Chessa	University of Texas at El Paso
Zhengtao Gan	University of Texas at El Paso
Wing Kam Liu	Northwestern University
J. S. Chen	UC San Diego
Charbel Farhat	Stanford University
Francisco Chinesta	Arts et Métiers Institute of Technology
George Karniadakis	Brown University
WaiChing Sun	Columbia University
John Foster	University of Texas at Austin
Dong Qian	Mechanical Engineering, UT Dallas

2nd IACM CONFERENCE ON MECHANISTIC MACHINE LEARNING AND DIGITAL ENGINEERING FOR COMPUTATIONAL SCIENCE, ENGINEERING & TECHNOLOGY



**MMLDE
CSET**

www.utep.edu/engineering/mmlde/

Sept 24-27, 2023

The University of Texas at El Paso, El Paso, Texas, USA

The conference will take place with a hybrid format

Conference Topics

1. Multiscale Materials and Engineering Systems
2. Digital Twins in Aerospace and Defense
3. Machine learning finite element and numerical methods
4. Reduced-Order Modeling for Fluids, Solids, and Structures
5. MMLDT in STEM Education
6. Digital twins and mechanistic data science in additive manufacturing
7. Digital Thread in Product Lifecycle
8. Skills for Digital Workforce
9. Geosystems, geostatics
10. Mechanistic based machine learning for autonomous systems

To submit a proposal, complete the online form at:

<http://forms.usacm.org/mmlde-cset>

In addition, short courses in *Mechanistic Data Science*, *Digital Engineering* and *Mechanistic Machine Learning* will be available before the start of the conference.



Multi-Institution Organizing Committees

Local Organizing Committee

Jack Chessa (Chair), Aerospace and Mechanical Engineering, UTEP
Zhengtao Gan, Aerospace and Mechanical Engineering, UTEP
Eric MacDonald , Aerospace and Mechanical Engineering, UTEP
Vinod Kumar, Aerospace and Mechanical Engineering, UTEP
Joel Quintana, Aerospace and Mechanical Engineering, UTEP
Dong Qian, Mechanical Engineering, UT Dallas
John Foster, University of Texas at Austin

Northwestern University

Jian Cao, Northwestern Institute of Manufacturing Science and Innovation
Wei Chen, Integrated DEsign Automation Laboratory, IDEAL
Wing Kam Liu, Mechanical & Civil Engineering
Niall Mangan, Engineering Sciences & Applied Mathematics
Matthew Plumlee, Industrial Engineering & Management Sciences
Gregory Wagner, Mechanical Engineering

Stanford University

Eric Darve, Mechanical Engineering, ICME
Charbel Farhat, Aero. and Astronautics, Mechanical Engineering, ICME Stanford-KACST
Center of Excellence for Aero. and Astro.
Gianluca Iaccarino, Mechanical Engineering, ICME

Arts et Métiers Institute of Technology

Amine Ammar, LAMPA Lab
Ameziane Aoussat, LCPI Lab
Abdel Boudraa, French Naval Academy Research Institute
Laurent Champaney, Arts et Métiers General Director
Francisco Chinesta, Arts et Métiers Institute of Technology
Stephane Clenet, L2EP Lab
Roger Ohayon, CNAM
Ivan Iordanoff, Arts et Metiers General Director for Research & I2M Lab
Fodil Meraghni, LEM3 Lab
Lionel Roucoules, LISPEN Lab
Philippe Veron, Carnot Arts Institute

Columbia University

George Deodatis, Civil Engineering and Engineering Mechanics
Qiang Du Applied, Physics and Applied Mathematics
Jacob Fish, Civil Engineering and Engineering Mechanics
Macro Giometto, Civil Engineering and Engineering Mechanics
Ioannis Kougioumtzoglou, Civil Engineering and Engineering Mechanics
WaiChing Sun, Civil Engineering and Engineering Mechanics

Brown University

George Karniadakis, Applied Mathematics

University of California San Diego

J. S. Chen, Structural Engineering
Ken Loh, Structural Engineering,
Ilkay Altintas, San Diego Supercomputer Center
Joel Conte, Structural Engineering
Yuri Fialko, Scripps Institute of Oceanography
Michael Holst, Mathematics
Rajesh Gupta, Halicioğlu Data Science Institute
David Kamensky, Mechanical & Aerospace Engineering
Boris Kramer, Mechanical & Aerospace Engineering
Andrew B. Kahng, Computer Science and Engineering
Alicia Kim, Structural Engineering, Center for Extreme Events Research
Shabnam Semnani, Structural Engineering, Center for Extreme Events Research
Yusu Wang, Halicioğlu Data Science Institute

International Scientific Committee

Industry

Prith Banerjee (ANSYS, USA)
Frederic Barbaresco (Thales, France)
Jing Bi (Dassault Systemes Simulia Corp, USA)
Kevin Carlberg (Facebook, USA)
Sanjay Choudhry (Nvidia, USA)
Emmanuel Leroy (ESI Group)
Kenneth Garrett (Lockheed Martin)
Donald Godfrey (SLM Solutions)
Samir Khanna (BP, UK)
Dirk Hartmann (Siemens, USA)
Majid Hojjat (BMW, Germany)
Larry Loh (Lockheed Martin)
Victor Onacea (Dassault Systemes Simulia Corp, USA)
Jay Pathak (ANSYS, USA)
Melvin Redmond (Lockheed Martin)
Jesse Roitenberg (Stratasys)
Uwe Schramm (Altair, USA)
Andrew Snow (EOS)

C. T. Wu (ANSYS, USA)
Ming Zhou (Altair, USA)
Peter Kairouz (Google, USA)
Matthew James Johnson (Google, USA)
B. Ashok (Microsoft, USA)
Will Bullock (Meta, USA)
Guanghua Chi (Meta, USA)
Shourya Otta (Nvidia)

Federal Government and National Labs

Gabriel Antoniu (INRIA, France)
Prasanna Balaprakash (Argonne National Laboratory, USA)
Olle Heinonen (Argonne National Laboratory, USA)
Jaroslaw Knap (Army Research Laboratory, USA)
Katie Lewis (Lawrence Livermore National Laboratory, USA)
Frank Liu (Oak Ridge National Laboratory, USA)
Yan Lu (National Institute of Standards and Technology, USA)
John Michopoulos (Naval Research Laboratory, USA)

John Michopoulos (Naval Research Laboratory, USA)
Michael Parks (Sandia National Laboratories, USA)
Rekha Rao (Sandia National Laboratories, USA)
Gianluigi Rozza (Scuola Internazionale Superiore di Studi Avanzati, Italy)
Marc Schoenauer (INRIA, France)
Marius Stan (Argonne National Laboratory, USA)
James Stewart (Sandia National Laboratories, USA)
Eric J. Tuegel (Air Force Research Laboratory, USA)

Academic

Remi Abgrall (University of Zurich, Switzerland)
Jose E. Andrade (California Institute of Technology, USA)
Raymundo Arroyave (Texas A&M University, USA)
Yuri Bazilevs (Brown University, USA)
Greg Beroza (Stanford University, USA)
Markus Buehler (Massachusetts Institute of Technology, USA)
David Chen (National Taiwan University, Taiwan)
Didier Clouteau (Ecole Centrale Paris, France)
Ramon Codina (Universitat Politècnica de Catalunya, Spain)
Elias Cueto (Universidad de Zaragoza, Spain)
Chiara Daraio (California Institute of Technology, USA)
Suvranu De (Rensselaer Polytechnic Institute, USA)
Qiang Du (Columbia University, USA)
Weinan E (Princeton University, USA)
Fangxin Fang (Imperial College London, UK)
John Foster (University of Texas Austin)
Krishnakumar Garikipati (University of Michigan, USA)
Roger Ghanem (University of Southern California, USA)
Somnath Ghosh (Johns Hopkins University, USA)
Olivia A. Graeve (University of California San Diego, USA)
Antonio Huerta (Polytechnic University of Catalonia, Spain)
Dean Ho (National University of Singapore, Singapore)
Surya R. Kalidindi (Georgia Institute of Technology, USA)
Michael Kaliske (Technische Universität Dresden, Germany)
Kazuo Kashiwama (Chuo University, Japan)
Benjamin Klusemann (Leuphana University Lüneburg, Germany)
Dennis Kochmann (ETH Zurich, Switzerland)
Ellen Kuhl (Stanford University, USA)
Dominique Baillargeat (CNRS, Singapore)

Pierre Ladeveze (ENS Paris-Saclay, France)
Zhanli Liu (Tsinghua University, China)
Yvon Maday (UPMC, France)
Niall Mangan (Northwestern University, USA)
Bernd Markert (Rwth Aachen University, Germany)
Hermann G. Matthies (Technische Universität, Germany)
Michael Ortiz (California Institute of Technology, USA)
Stanley Osher (University of California Los Angeles, USA)
Paris Perdikaris (University of Pennsylvania, USA)
Timon Rabczuk (Bauhaus University Weimar, Germany)
Stefanie Reese (Rwth Aachen University, Germany)
Stephane Roux (ENS Paris-Saclay, France)
Lars Ruthotto (Emory University, USA)
Ruben Sevilla (Swansea University, UK)
Shaoqiang Tang (Peking University, China)
Kenjiro Terada (Tohoku University, Japan)
Michael S. Triantafyllou (Massachusetts Institute of Technology, USA)
Nien-Ti Tsou (National Chiao Tung University, Taiwan)
Conrad Tucker (Carnegie Mellon University, USA)
Yusu Wang (University of California San Diego, USA)
Wolfgang Wall (TU Munich, Germany)
Karen Willcox (University of Texas at Austin, USA)
Genki Yagawa (University of Tokyo, Japan)
Wentao Yan (National University of Singapore, Singapore)
Masayuki Yano (University of Toronto, Canada)
Shinobu Yoshimura (University of Tokyo, Japan)
Julien Yvonnet (Universite Paris-Est, France)
Jessica Zhang (Carnegie Mellon University, USA)
Xiaoying Zhuang (Leibniz University Hannover, Germany)