

2nd World Congress on
AIM
ARTIFICIAL INTELLIGENCE IN
MATERIALS & MANUFACTURING 2024

Symposium on
**DIGITAL & ROBOTIC
FORMING 2024**

ACCELERATING DISCOVERY
FOR MECHANICAL BEHAVIOR
OF MATERIALS 2024

TMS SPECIALTY CONGRESS 2024

JUNE 16-20, 2024

Cleveland Hilton | Cleveland, Ohio, USA

TECHNICAL PROGRAM

THANK YOU TO OUR SPONSORS:



TMS

The Minerals, Metals & Materials Society

www.tms.org/SpecialtyCongress2024

Specialty Congress 2024: All-Congress Plenary Session

Monday AM | June 17, 2024

Hope Ballroom D | Hilton Cleveland Downtown

Session Chair: Srinivas Chada, General Dynamics Mission Systems (TMS 2024 President); Daniel B. Miracle, Air Force Research Laboratory (TMS 2024 Vice-President)

8:20 AM Introductory Comments

8:30 AM Plenary

Recovering Resources from the Past: How AI Can Enable a More Circular Future: *Emily Molstad*¹; Caleb Ralphs¹; Benjamin Longo¹; Sean Kelly²; Diran Apelian³; ¹VALIS Insights, Inc.; ²Solvus Global, LLC; ³University of California-Irvine

Discovery, design and fabrication of the latest and greatest materials have resulted in groundbreaking progress across every industry from medicine to transportation to energy. What happens when these materials reach their end of life? How can we ensure the valuable materials needed to support a modern society are available for future generations and are produced sustainably? The recycling industry is critical to keeping precious resources out of landfills and is essential in the fight against climate change as material demand continues to grow and natural reserves are increasingly depleted. Artificial intelligence, and broadly Industry 4.0 capabilities, presents a wealth of opportunities to enhance circularity and ensure the materials of yesterday are properly recovered for the demands of tomorrow. This talk will focus on the current and future impact of AI on recycling with a focus on major metals such as aluminum and copper.

9:10 AM Plenary

Thriving in the Digital Epoch of Materials and Manufacturing: *Charles Ward*¹; ¹Editor-in-Chief, IMMI

In an era witnessing profound shifts in the generation, transfer, and application of information and knowledge used to develop, manufacture, and employ materials, a landscape of immense opportunities and challenges emerges for society. The synergy of global advocacy for open science, unprecedented insights into physical phenomena, a myriad of data-centric analysis techniques, the advent of digitally-native characterization and manufacturing equipment, and the widespread embrace of model-based engineering in industry are reshaping how we approach problems and innovate solutions. It is fitting that the three co-located meetings within this specialty congress represent exemplar topics that harness the full potential of these transformative changes. This talk will delve into the transformative journey we are undertaking, highlighting both the challenges that lie ahead and the abundant opportunities that await exploration in the rapidly evolving intersection of these advancements.

9:50 AM Break

10:20 AM Plenary

Navigating the Digital Transformation in Materials Science and Engineering and Your Role in Shaping Tomorrow: *Christoph Eberl*¹; ¹Fraunhofer IWM / University of Freiburg

The digital transformation of Materials Science and Engineering represents a paradigm shift in how we conduct research and brings forth many opportunities as well as challenges. This evolution seeks to expedite materials development, processing, lifetime predictions, and the sustainable practices of reuse and recycling, paving the way for a circular economy. A cornerstone of this paradigm shift is the collaborative creation of a materials knowledge graph grounded in aligned ontologies, coupled with a distributed FAIR data research platform.

In contrast to traditional text-based knowledge transmission, knowledge graphs provide a revolutionary approach by interconnecting diverse concepts—such as atomic bonds, chemical composition, crystal structure, grain boundaries, deformation, annealing processes, and mechanical properties—in a format comprehensible to both humans and machines. Especially in an interdisciplinary research environment as in MSE, this is a tremendous game changer, facilitating a seamless exchange of insights. Notably, knowledge graphs have been embraced by leading tech companies like Google, Facebook, Microsoft, Amazon, and LinkedIn, forming the technological backbone for search algorithms and AI applications.

This lecture aims to sketch out how an ontology based decentralized materials data infrastructure can capture the hierarchical dependencies between processes, microstructure, properties, and behavior for advanced materials. Furthermore, the opportunities of exponential growth in a digital infrastructure shall be described, alongside the risks associated with not actively participating and embracing data literacy.

In the second part of the lecture, 'lessons learned' will be offered, outlining strategies for participation at various levels. How can individual scientists, research groups, and institutions reach long hanging fruits and become more productive will be discussed.

Finally, this talk invites you to participate in this joined effort. Building up such a research infrastructure for us all is unprecedented and requires collaboration across borders. Hence, to guide the effort, several initiatives and hubs have been initiated (NFDI, NFDI-MatWerk since 2021 & MaterialDigital since 2019) or will be set in motion soon (Advance Materials Initiative 2025, EU).

11:00 AM Plenary

Advancing Materials Science: Intelligent Agents in Data-driven Discovery: *Ian Foster*¹; ¹Argonne National Lab & University of Chicago

The convergence of enormous data, cloud services, supercomputers, robotic laboratories, and advanced simulation and machine learning promises unprecedented opportunities in materials design and discovery. However, harnessing these capabilities to tackle societal challenges, from energy to economic growth, demands nuanced orchestration beyond current norms. I propose that intelligent agents, working in tandem with human expertise, are pivotal for this quantum leap in materials science. These agents will not only automate routine tasks but also bring new capabilities: from synthesizing and interpreting vast literature to designing and managing complex experimental setups. Illustrating this, I will share insights from pioneering work at Argonne National Laboratory and other leading institutions. Finally, I will discuss emerging directions and the potential for new collaborations to shape the future of materials science.

11:40 AM Question and Answer Period

Digital & Robotic Forming 2024: Keynote

Monday PM | June 17, 2024
Center Street Room B&C | Hilton Cleveland Downtown

Session Chair: Sarah Wolff, Ohio State University

1:40 PM Introductory Comments

1:50 PM Keynote

Evolution of Advanced Manufacturing Technologies in the Data Analytics and Computational Modeling Era: *David Furrer*¹; ¹Pratt & Whitney

Traditional forging methods have evolved over many decades to enable development of unique microstructures and component capabilities. Introduction of Industry-4.0 approaches have driven a range of sensors and control technologies and methods to further enhanced material and component capabilities. Computer controls are becoming commonplace for many manufacturing methods including press and hammer forging methods. Computational modeling and simulation for location-specific component design and hybrid approaches are leading to increasingly efficient methods for future component design and manufacture. Traditional blacksmithing to modern computer-controlled deformation and hybrid processing will be discussed.

Accelerating Discovery for Mechanical Behavior of Materials 2024: Keynote

Monday PM | June 17, 2024
Hope Ballroom D | Hilton Cleveland Downtown

Session Chair: To Be Announced

3:00 PM Introductory Comments

3:10 PM Keynote

Modeling Location-specific Material Behavior in Polycrystalline Ti Alloys With Material Design Implications: *Somnath Ghosh*¹; ¹Johns Hopkins University

Location-specific property distribution, through differential material distributions, is a desirable attribute for structural components. For polycrystalline metals and alloys, this translates into location-specific distributions of grain size, crystallographic orientations, micro-texture, etc. that can be harnessed to deliver optimal mechanical behavior and failure/life response. A necessary ingredient for material design is multiscale models of deformation, fatigue, and failure, that explicitly incorporate lower-scale material descriptors in higher-scale material constitutive models.

This talk will discuss a parametrically upscaled constitutive and crack nucleation modeling (PUCM/PUCNM) platform for predicting structural-scale fatigue crack nucleation in Ti alloys. The thermodynamically consistent PUCM/PUCNMs incorporate a parametric representation of lower-scale microstructural descriptors in higher-scale constitutive coefficients. These coefficients are expressed as functions of Representative Aggregated Microstructural Parameters (RAMPs), representing descriptors of local microstructural morphology and crystallography in lower-scale statistically equivalent representative volume elements. The talk will discuss the effect of the local microstructural variabilities on the fatigue crack nucleation.

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): High-Throughput Synthesis & Characterization

Monday PM | June 17, 2024
Hope Ballroom A | Hilton Cleveland Downtown

Session Chair: Janith Wannan, University of Wisconsin Madison

1:40 PM Invited

High Performance Computing and Artificial Intelligence Enabled Materials Characterization and Experimental Automation: *Mathew Cherukara*¹; ¹Argonne National Laboratory

2:10 PM

AI-simulation Workflow to Accelerate Computational Screening of Metal-organic Framework Structures: *Xiaoli Yan*¹; ¹Hyun Park²; ²Logan Ward³; ³Eliu Huerta³; ³Ian Foster³; ³Emad Tajkhorshid²; ²Santanu Chaudhuri¹; ¹University of Illinois at Chicago; ²University of Illinois Urbana-Champaign; ³Argonne National Laboratory

2:30 PM

Leveraging Segmentation Models for Platinum Particle Identification on BWR Nuclear Reactor Components: *Txai Sibley*¹; ¹Elizabeth Holm¹; ¹Kevin Field¹; ¹University of Michigan

2:50 PM

High-throughput Approach to Support-free LPBF of Inconel 718 With In-situ High-speed Thermal Imaging: *Chun Kit Sit*¹; ¹Yunlong Tang¹; ¹Louis Chiu¹; ¹Aijun Huang¹; ¹Monash University

3:10 PM Poster Pitch

Learning a Reliable Compression of In-situ, High-speed Camera Data for Additive Manufacturing: *Tian Yu Yen*¹; ¹Anthony Garland¹; ¹Daniel Moser¹; ¹Cody Lough²; ²Ben Brown²; ²Jon Zettwoch²; ¹Sandia National Laboratories; ²KCNSC

3:30 PM Networking Break

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Image Processing I

Monday PM | June 17, 2024
Hope Ballroom B | Hilton Cleveland Downtown

Session Chair: Pawan Tripathi, Case Western Reserve University

1:40 PM Invited

Development of a Machine Learning Based Tool for Defect Detection in Cold Spray Aluminum: *Joseph Indeck*¹; ¹Bruno Zamorano-Senderos¹; ¹Boeing Research & Technology

2:10 PM

A Unified Microstructure Segmentation Approach Through Incorporating Domain Knowledge Into Machine Learning: *Juwon Na*¹; ¹Se-Jong Kim¹; ¹Chang Dong Yim¹; ¹Korea Institute of Materials Science

2:30 PM

A Texture Synthesis Approach for Generating Synthetic Microstructural Images for Training ML Models in a Low-data Regime: *Martin Mueller*¹; ¹Frank Muecklich²; ¹Materials Engineering Center Saarland; ²Saarland University

2:50 PM

Boundary Monitoring for Optimized Sintering Processes: *Mohamed Boosiri Hassan Uvaise*¹; ¹Lucideon

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Machine Learning - Manufacturing I

Monday PM | June 17, 2024

Hope Ballroom C | Hilton Cleveland Downtown

Session Chair: Xiawa Wu, Pennsylvania State University

1:40 PM Invited

Machine Learning Assisted Discovery of Deposition Conditions for Binary Metallic Alloys: *Saaketh Desai*¹; Manish Jain¹; Sadhvikas Addamane¹; Frank Rio¹; Remi Dingreville¹; Brad Boyce²; David Adams¹; ¹Sandia National Laboratories

2:10 PM

Data Driven Modeling for Yield Improvement in Gas Atomization Process: *Michael Ridenhour*¹; Shankarjee Krishnamoorthi¹; David Bryan¹; Darryl Glanton¹; John Goetz¹; ¹ATI Specialty Materials

2:30 PM

Digital Twin for In-situ Process Monitoring and Control of Aerosol Jet Printing: *Vikash Kumar*¹; Jianjing Zhang¹; Pawan Tripathi¹; Laura Bruckman¹; Roger French¹; Robert Gao¹; ¹Case Western Reserve University

2:50 PM

Integrating Machine Learning Into Constitutive Material Modeling for the Creep Age Forming Process: *Yo-Lun Yang*¹; ¹National Taipei University of Technology

3:10 PM Poster Pitch

Physics Inspired Modelling of the Milling Process Using a Combined Deep Learning and Symbolic Regression Approach for an Efficient Production of Battery Materials: *Ahmed Eisa*¹; ¹Technical University of Braunschweig

3:30 PM Networking Break

Accelerating Discovery for Mechanical Behavior of Materials 2024: Accelerated Approaches I

Monday PM | June 17, 2024

Center Street Room A | Hilton Cleveland Downtown

Session Chair: To Be Announced

1:40 PM Invited

Automated Feature Extraction for Identifying Structure-property Relationships: William Frieden Templeton¹; Justin Miner¹; *Sneha Prabha Narra*¹; ¹Carnegie Mellon University

2:10 PM

Learning Full-rank Elastic Tensors With Equivariant Neural Networks: *Mingjian Wen*¹; ¹University of Houston

2:30 PM

Temperature and Dwell Hold Dependences of Fatigue Life by High-throughput High-resolution Digital Image Correlation: *J.C. Stinville*¹; D. Anjaria¹; C. Bean¹; R.L. Black¹; S. Sanandiyaa¹; S. Hemery²; ¹University of Illinois Urbana-Champaign; ²Institut PPrime

2:50 PM Break (Keynote Session Occurs)

4:20 PM

Use of Indentation Plastometry for Inference of Stress-strain Behavior in Case-hardened Components: *Patrick Anderson*¹; Mangesh Pantawane¹; ¹Timken Company

4:40 PM

Accelerated Discovery of Structural Materials for Harsh Environments: *Rameshwari Naorem*¹; Hailong Huang¹; Gaoyuan Ouyang¹; Prashant Singh¹; Duane Johnson¹; Jun Cui¹; Ryan Ott¹; Iver Anderson¹; Nicolas Argibay¹; ¹Ames National Laboratory

5:00 PM

An Experimental Investigation on the Tribological Behaviour of Electroless NiP-MoS₂-Gr Composite Coatings: *Elayaperumal A*¹; Subaash R¹; Karthikeyan M¹; Samrakshana E²; ¹Anna University; ²Madras Institute of Technology, Anna University

Accelerating Discovery for Mechanical Behavior of Materials 2024: Mechanics of Novel Materials I

Monday PM | June 17, 2024

Hope Ballroom D | Hilton Cleveland Downtown

Session Chair: To Be Announced

1:40 PM Invited

Mechanical Properties Assessment of AM Deposited Metallic Materials With the Use Miniaturized Samples: *Jan Dzugan*¹; Daniel Melzer¹; Ying Li¹; Radek Prochazka¹; Martin Rund¹; John Lewandowski²; ¹Comtes Fht; ²Case Western Reserve University

2:10 PM

Scorpions and Goatheads Examined With Nanoindentation: *Stanislav Zak*¹; Megan Cordill¹; ¹Erich Schmid Institute of Materials Science, Austrian Academy of Sciences

2:30 PM

Advancing Dental Implant Engineering: A Hybrid Solid-Lattice Design Approach in Dental Implants to Optimize Stress Distribution: *Dawit Alemayehu*¹; Masahiro Todoh¹; Song-Jeng Huang²; ¹Hokkaido University; ²National Taiwan University of Science and Technology

2:50 PM Break (Keynote Session Occurs)

4:20 PM

Improvement of the Mechanical Properties of M2 High-speed Steel With Tungsten Carbide: *Miroslav Urbanek*¹; ¹COMTES FHT a.s.

4:40 PM

Research on the Microstructure and Properties of Ultralight Mg-Li-X Alloys: *Yan Yang*¹; ¹Chongqing University

Symposium on Digital & Robotic Forming 2024: Industry Applications I

Monday PM | June 17, 2024

Center Street Room B&C | Hilton Cleveland Downtown

Session Chair: Kester Clarke, Los Alamos National Laboratory

2:20 PM Invited

Technology Training Transfer for Advanced Manufacturing Technologies: Lori Baukus¹; *Paul Boulware*¹; ¹Arctos Technology Solutions

2:50 PM Invited

In-space Manufacturing of Large Reticulated Structures via Deformation Processing: *Zachary Cordero*¹; ¹Massachusetts Institute of Technology

3:20 PM

Starting a Digital & Robotic Forming Company – Why, How, and the Role of Different Stakeholders: *Babak Raeisinia*¹; Edward Mehr¹; Glenn Daehn²; ¹Machina Labs, Inc.; ²The Ohio State University

3:40 PM Networking Break

4:20 PM

Incremental Robotic Forging: An Initial Cyber-physical System: *Michael Groeber*¹; Stephen Niezgoda¹; Adam Buynak¹; Brian Thurston¹; Ben Turner¹; Jared Glover²; ¹Ohio State University; ²CapSen Robotics

4:40 PM

Enabling Manufacturing of Next-gen Aerostructures Through Digital & Robotic Forming: *Babak Raeisinia*¹; Glenn Daehn²; ¹Machina Labs, Inc.; ²The Ohio State University

5:00 PM Invited

Toward Achieving Autonomy in Incremental Forming: *Mihaela Banu*¹; ¹University of Michigan

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Image Processing II

Tuesday AM | June 18, 2024

Hope Ballroom B | Hilton Cleveland Downtown

Session Chair: Joseph Indeck, Boeing Research & Technology

8:30 AM Invited

Optimizing the Microstructure of Additively Manufactured Al Alloy Using Deep Learning: *Deepak Kumar*¹; Quansheng Zha¹; Sandeep Sahu¹; Shuncai Wang¹; Nong Gao¹; ¹University of Southampton

9:00 AM

A Materials Data Segmentation Garden for Benchmarking Segmentation Models: *Pawan Tripathi*¹; Tommy Ciardi¹; Mingjian Lu¹; Kristen Hernandez¹; Max Ligett²; Andrew Ballen²; Jean-Baptiste Forien³; Brian Giera³; Manyalibo Matthews³; Mengjie Li²; Kristopher Davis²; John Lewandowski¹; Laura Bruckman¹; Yinghui Wu¹; Roger French¹; Vipin Chaudhary¹; ¹Case Western Reserve University; ²University of Central Florida; ³Lawrence Livermore National Laboratory

9:20 AM

Semantic Segmentation of Scanning Electron Microscopy Images for Contact Degradation Analysis in Field-aged Photovoltaic Modules: Andrew Ballen¹; *Max Liggett*¹; Dylan Colvin¹; Pawan Tripathi²; Roger French²; Kristopher Davis¹; Mengjie Li¹; Dana Kern³; ¹University of Central Florida; ²Case Western Reserve University; ³National Renewable Energy Laboratory

9:40 AM

Identification of Binder Jet Spreading Anomalies Through Semantic Segmentation: *Alexander Gourley*¹; Jonathan Kaufman²; Bashu Aman¹; Edwin Schwalbach³; Jack Beuth¹; Lisa Rueschhoff³; B. Reesja-Jayan¹; ¹Carnegie Mellon University; ²UES Inc.; ³Air Force Research Lab

10:00 AM Break

10:20 AM

Optical to Scanning Electron Microscopy Style Transfer of Steel Micrograph Using Machine Learning: *Nicholas Amano*¹; Bo Lei²; Martin Müller³; Dominik Britz³; Elizabeth Holm¹; ¹University of Michigan; ²Lawrence Livermore National Laboratory; ³Steinbeis-Forschungszentrum Material Engineering Center Saarland

10:40 AM

Image Analysis of Fractography: Defect Feature Comparisons: Kristen Hernandez¹; Austin Ngo¹; Ayorinde Emmanuel Olatunde¹; Thomas Ciardi¹; Pawan Tripathi¹; Anirban Mondal¹; John Lewandowski¹; Laura Bruckman¹; Roger French¹; *Anthony Lino*¹; ¹Case Western Reserve University

11:00 AM

Patch-wise Canonical Correlation Analysis in SEM: Advancing 3D Serial Sectioning Image Registration: *Zachary Varley*¹; Marc De Graef¹; Gregory Rohrer¹; Megna Shah¹; Michael Uchic¹; ¹Carnegie Mellon University

11:20 AM

Microstructural Diffusional Variational Autocoder for Generation of Microstructure Ensembles: *Stephen Niezgoda*¹; Maxwell Brown¹; Simon Mason¹; Dennis Dimiduk²; ¹Ohio State University; ²BlueQuartz Software

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Machine Learning - Manufacturing II

Tuesday AM | June 18, 2024

Hope Ballroom C | Hilton Cleveland Downtown

Session Chair: To Be Announced

8:30 AM Invited

Neural Networks as Surrogate Models for Real-time Optimization of Additive Manufacturing: *Devin Roach*¹; Adam Cook²; Andrew Rohskopf³; ¹Oregon State University; ²Sandia National Laboratories; ³Apple Inc.

9:00 AM

Analyzing the Impact of Design Factors on Solar Module Thermomechanical Durability Using Interpretable Machine Learning: *Xin Chen*¹; Todd Karim²; Anubhav Jain¹; ¹Lawrence Berkeley National Laboratory; ²PVEL

9:20 AM

Assessment of an Intelligent System for Additive Manufacturing Product Evaluation: *Sumaila Omeiza Jimoh*¹; ¹Federal University of Technology

9:40 AM Cancelled

10:00 AM Break

10:20 AM

Capturing AM Process Defects on Fatigue Fracture Surfaces Through Machine Learning Segmentation: Austin Ngo¹; Kristen Hernandez²; Oluwatumininu Adeeko¹; Ayorinde Olatunde³; Anirban Mondal¹; Roger French²; *John Lewandowski*¹; ¹Case Western Reserve University; ²Materials Data Science for Stockpile Stewardship, Case Western Reserve University

10:40 AM

Pyrometry Mapping of Segmented Porosity in Computed Tomography: *Peter Pak*¹; Francis Ogoke¹; Andrew Polonsky²; Dan Bolinteanu²; Daniel Moser²; Anthony Garland²; Jesse Adamczyk²; Michael Heiden²; Amir Farimani¹; ¹Carnegie Mellon University; ²Sandia National Laboratories

11:00 AM

Application of Data-driven Digital Twins in Advanced Manufacturing: Kristen Hernandez¹; Hein Htet Aung NA¹; Alexander Bradley¹; Thomas Cairdi¹; Rachel Yamamoto¹; Arafath Nihar¹; Robert Gao¹; Pawan Tripathi¹; Laura Bruckman¹; *Roger French*¹; ¹Case Western Reserve University

11:20 AM

Flexible Robotic Assembly through Human-Interpretable State Machine Synthesis: *Brennan Swick*¹; Sean Donegan²; Andrew Gillman²; Michael Groeber¹; ¹The Ohio State University; ²Air Force Research Laboratory

11:40 AM

Simulation of spray processes to train machine learning algorithm for autonomous path generation: *Erik Furterer*¹; Mike Groeber¹; ¹The Ohio State University

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Machine Learning - Modeling and Simulation

Tuesday AM | June 18, 2024

Hope Ballroom A | Hilton Cleveland Downtown

Session Chair: Mingjian Wen, University of Houston

8:30 AM Invited

Assessing the Performance of Machine Learning Universal Interatomic Potentials on Intermetallic Systems: *Giancarlo Trimarchi*¹; Qing Chen¹; ¹Thermo-Calc Software AB

9:00 AM

Accelerated Development of Materials Using High-throughput Strategies and AI/ML: *Surya Kalidindi*¹; ¹Georgia Institute of Technology

9:20 AM

Improved Methods to Predict the Mixing Enthalpy of Liquid Alloys for CALPHAD Databases With Artificial Neural Networks: Hai-Lin Chen¹; Qing Chen¹; *Paul Mason*²; ¹Thermo-Calc Software AB; ²Thermo-Calc Software Inc.

9:40 AM Cancelled**10:00 AM Break****10:20 AM**

Predicting Microstructure From Process Conditions Using Multimodal Machine Learning: *Ankit Shrivastava*¹; Matias Kalaswad¹; Marta D'Elia¹; Dave Adams¹; Habib Najm¹; ¹Sandia National Lab

10:40 AM

Hybrid Denoising Diffusion Models for Statistically Conditioned Generation: *Andreas Robertson*¹; Conlain Kelly¹; Michael Buzzy¹; Surya Kalidindi¹; ¹Georgia Institute of Technology

11:00 AM

Thermodynamically Consistent Neural Networks for Modeling of Inelastic Material Responses: *Liam Mackin*¹; Bradley Davidson¹; Rohan Patel¹; Reed Kopp¹; David Najera¹; ¹ATA Engineering

11:20 AM

Exploring Graph Neural Network Surrogates for Microstructure Analysis: *Kyle Farmer*¹; Elizabeth Holm¹; ¹University of Michigan

11:40 AM

Multi-axial Fatigue Life Prediction of Additively Manufactured Ti6Al4V Alloy Using Machine Learning Techniques: Raviraj Verma¹; *Guru Shreyaas*¹; Jayaganthan R.¹; ¹Indian Institute of Technology Madras

Accelerating Discovery for Mechanical Behavior of Materials 2024: Accelerated Approaches II

Tuesday AM | June 18, 2024

Center Street Room A | Hilton Cleveland Downtown

Session Chair: To Be Announced

8:30 AM Invited

High-throughput Fatigue Behavior of Additively Manufactured Functionally-graded Metals: *Jason Carroll*¹; Robert Rhein¹; J.C. Stinville²; ¹Eaton Corporation; ²University of Illinois

9:00 AM

Discovery of Hard and Conductive Pt-Au Thin Films Utilizing Multimodal Large Datasets and Machine Learning: *Manish Jain*¹; Saaketh Desai¹; David Adams¹; Matias Kalaswad¹; Sadhvikas Addamane¹; Frank Delrio¹; Remi Dingreville¹; Brad Boyce¹; ¹Sandia National Laboratories

9:20 AM

Transforming Materials Science With Ontologies, ELN, and LIMS: Semantic Web Solutions for Digitalization and Data Excellence: *Markus Schilling*¹; Bernd Bayerlein¹; Sebastian Bruns²; Matthias Grönwald²; Philipp von Hartrott³; Jörg Waitelonis⁴; Henk Birkholz⁵; June Lau⁶; Birgit Skrotzki¹; ¹Federal Ministry of Materials Research and Testing; ²TU Darmstadt; ³Fraunhofer-Institut für Werkstoffmechanik (IWM); ⁴FIZ – Leibniz Institute for Information Infrastructure; ⁵Leibniz-Institut für Werkstofforientierte Technologien (IWT); ⁶National Institute of Standards and Technology (NIST)

9:40 AM

Mechanical Properties Prediction of Functionally Graded Metallic Materials Through High-throughput Characterization and Machine Learning: *Christopher Bean*¹; Dhruv Anjaria¹; Rephayah Black¹; Jackson Nie¹; Marie Charpagne¹; Jean-Charles Stinville¹; ¹University of Illinois Urbana-Champaign

10:00 AM Break**10:20 AM**

High-throughput Characterization and Process-Structure-Property Optimization of LPBF SS316L: *Janith Wann*¹; Dan Thoma¹; ¹University of Wisconsin Madison

10:40 AM

Accelerated Correlation of Microstructure-mechanical Property Relationships in Ni Based Superalloys: *Kevin Schmalbach*¹; Toshio Osada²; Eric Hintsala¹; Douglas Stauffer¹; Takahito Ohmura²; ¹Bruker Nano; ²National Institute for Materials Science

11:00 AM

Crystal Plasticity Finite Element Method Accelerated by Efficient GPU-computing: *Fanglei Hu*¹; Fan Chen¹; Stephen Niezgoda²; Tianju Xue³; Jian Cao¹; ¹Northwestern University; ²The Ohio State University; ³The Hong Kong University of Science and Technology

11:20 AM

Exploiting Metastable Phase Transformations to Achieve Low-cost High Room-temperature Strength Printable Al-alloys: *Benjamin Glaser*¹; S. Mohadeseh Taheri-Mousavi¹; ¹Carnegie Mellon University

11:40 AM

Eliminating Fatigue of Metals by Advanced Casting: *John Campbell*¹; ¹University of Birmingham

12:00 PM Mechanical Behavior Luncheon

Accelerating Discovery for Mechanical Behavior of Materials 2024: Mechanics of Novel Materials II

Tuesday AM | June 18, 2024
Hope Ballroom D | Hilton Cleveland Downtown

Session Chair: To Be Announced

8:30 AM Invited

Optimizing the Mechanical Performance of Interlocking Metamaterials for Extreme Environments: *Philip Noell*¹; Brad Boyce²; Benjamin Young¹; Ophelia Bolmin¹; Nathan Brown¹; ¹Sandia National Laboratories

9:00 AM

Computational Material Design and Performance Evaluation of Sintered SiALON/TiCN Tool Inserts: *Syed Sohail Akhtar*¹; Muhammad Faizan²; Abba Abubakar¹; ¹King Fahd University of Petroleum and Minerals; ²Khalifa University

9:20 AM

Coupling Effects of Grain Size and Dislocation Density on Stress-induced Martensitic Transformation of Nanocrystalline NiTi Alloys: A Molecular Dynamics Study: *Zhihao Zhao*¹; ¹Tongji University

9:40 AM Cancelled

10:00 AM Break

10:20 AM

Key Aspects on Mechanical Properties for DED Deposited Functionally Graded Materials: *Jan Dzugan*¹; Ying Li¹; Daniel Melzer¹; ¹Comtes Fht

10:40 AM

The Effect of Devulcanized (DR) and Non-devulcanized (NDR) Rubber in the Thermo-mechanical Behavior of Thermoplastic Polymer Blends: *Surafel Ashenafi Jemberu*¹; ¹Ethiopian Quality Award Organization

11:00 AM

Composition Dependence of the Thermoelastic Recovery in Additive Manufactured NiTi Shape Memory Alloys: *Arnab Chatterjee*¹; Foster Feni¹; Mique Gonzales¹; Reginald Hamilton¹; ¹Penn State University

11:20 AM

Thermal Stability and Wear Behaviour of TiCN-Co-Si3N4-Cr3C2 Based Cermets Modified by B4C: *Balasivanandha Prabu Shanmugavel*¹; Anannya Murugan¹; Jisha Raja¹; ¹Anna University

12:00 PM Mechanical Behavior Luncheon

Symposium on Digital & Robotic Forming 2024: Incremental Forming

Tuesday AM | June 18, 2024
Center Street Room B&C | Hilton Cleveland Downtown

Session Chair: Baback Raeisinia, Machina Labs, Inc.

8:30 AM Invited

Metallurgy of Incremental Forming Processes: A Spin Forming Review: *Melissa Thrun*¹; Alexandra Glover²; Matthew Zappulla¹; Kayla Molnar¹; *Paul Gibbs*¹; ¹Los Alamos National Laboratory; ²Michigan Technical University

9:00 AM

Differences in Material Behavior and Limitations during Metal Spinning of 304 SS and 6061 Al: *Kayla Molnar*¹; Melissa Thrun¹; Matthew Zappulla¹; Paul Gibbs¹; ¹Los Alamos National Laboratory

9:20 AM

Utilizing Strain Rate Jump Testing to Predict Flow Formability of Al Alloys Sensitive to Portevin-Le Chatelier Instabilities: *Mary Cecilia Mulvaney*¹; David Stegall¹; Stephen Hales¹; James Fitz-Gerald²; Sean Agnew²; ¹NASA; ²University of Virginia

9:40 AM

Integrated English Wheeling System: *Derick Suarez*¹; Fan Chen¹; Putong Kang¹; Ben Forbes¹; Margaret Gao¹; Kevin Benton²; Nicholas Dewberry²; Balakrishna Gokaraju²; Kornel Ehmann¹; Jian Cao¹; *Fanglei Hu*¹; ¹Northwestern University; ²North Carolina Agricultural and Technical State University

10:00 AM Break

Symposium on Digital & Robotic Forming 2024: AI/ML in Forming

Tuesday AM | June 18, 2024
Center Street Room B&C | Hilton Cleveland Downtown

Session Chair: Baback Raeisinia, Machina Labs, Inc.

10:20 AM Invited

Toward Autonomous Research and Co-development of Alloys and Their Manufacturing: *Aaron Stebner*¹; ¹Georgia Institute of Technology

10:50 AM

Application of Scientific Machine Learning for Robotic Forming: *Yeping Hu*¹; Bo Lei¹; Victor Castillo¹; ¹Lawrence Livermore National Laboratory

11:10 AM

Metamorphic Manufacturing (MM): Some Related Efforts Since the 2019 TMS Accelerator Study Report on MM: *George Spanos*¹; Glenn Daehn²; ¹TMS; ²Ohio State University

11:30 AM

Metamorphic Manufacturing: a Tutorial Review: *Glenn Daehn*¹; ¹Ohio State University

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): AI Non-Destructive Evaluation

Tuesday PM | June 18, 2024
Hope Ballroom C | Hilton Cleveland Downtown

Session Chair: To Be Announced

1:40 PM Invited

Virtual Inspection of Advanced Manufacturing via Process-scale Digital Twins: *Brian Giera*¹; ¹Lawrence Livermore National Laboratory

2:10 PM

Improved Deep Learning Image Classification of Rare Material Defects in Non-destructive-testing Processes by Utilizing Data Imbalance Methods and Synthetic Data: *Yann Schöbel*¹; Martin Mueller²; ¹MTU Aero Engines AG; ²Materials Engineering Center Saarland

2:30 PM

High-throughput Microstructural-based Remnant Life Assessment of High-temperature Steels: *Johan Westraadt*¹; Lindsay Westraadt¹; ¹Nelson Mandela University

2:50 PM

Realtime In-process Monitoring of Porosity via Convolutional Neural Networks During Additive Manufacturing and Laser Welding: Bin Zhang¹; *Yung Shin*¹; ¹Purdue University

3:10 PM Networking Break

4:00 PM

PV-VISION: A Deep Learning Based Package for Automated Solar Module Inspection: *Xin Chen*¹; Anubhav Jain¹; ¹Lawrence Berkeley National Laboratory

4:20 PM

Generative Super-resolution for Inexpensive In-situ Layerwise Optical Imaging: *Odinakachukwu Ogoke*¹; Sumesh Suresh¹; Jesse Adamczyk²; Dan Bolintineanu²; Anthony Garland²; Michael Heiden²; Amir Barati Farimani¹; ¹Carnegie Mellon University; ²Sandia National Laboratories

4:40 PM

Classification of 2D Diffractograms Into "Spotty" and "Continuous" Patterns Using Deep Neural Networks Trained By ab-Initio Simulations: *Mohammad Redad Mehdi*¹; Weiqi Yue¹; Pawan Tripathi¹; Matthew Willard¹; Roger French¹; Frank Ernst¹; ¹Case Western Reserve University

5:00 PM

Federated Learning Approaches: Data-decentralized Analysis on Synchrotron X-ray Diffraction Data: *Weiqi Yue*¹; Pawan Tripathi¹; Roger French¹; Vipin Chaudhary¹; Donald Brown¹; Erman Ayday¹; ¹Case Western Reserve University

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Deep Learning for Materials Discovery

Tuesday PM | June 18, 2024
Hope Ballroom B | Hilton Cleveland Downtown

Session Chair: To Be Announced

1:40 PM Invited

Physics-constrained, Inverse Design of High-temperature, High-strength, Printable Al Alloys Using Machine Learning Methods: *S. Mohadeseh Taheri-Mousavi*¹; ¹Carnegie Mellon University

2:10 PM

Unraveling the Mechanisms of Stability in CoMoFeNiCu High Entropy Alloys via Physically Interpretable Graph Neural Networks: Miguel Tenorio¹; *James Chapman*¹; ¹Boston University

2:30 PM

Machine Learning Customized Novel Metals for Energy-efficient 4D Printing: *Chaolin Tan*¹; ¹Singapore Institute of Manufacturing Technology(SIMTech), A*STAR

2:50 PM

High-throughput In-silico Multi-objective Materials Screening for Accelerated Polymer Design and Discovery: Joydeep Munshi¹; Ghanshyam Pilia¹; Jonathan Doll¹; Dung-Yi (Jackson) Wu¹; Paul Smigelski¹; Vipul Gupta¹; Kareem Aggour¹; *Akshay Peshave*¹; ¹GE Research

3:10 PM Networking Break

4:00 PM

Predicting Interfacial Solute Segregation in Nanocrystalline Alloys Using Advanced Atomic Descriptors and Machine Learning Schemes: Jacob Tavenner¹; Ankit Gupta²; *Garritt Tucker*²; ¹KBR, Inc, Intelligent Systems Division, NASA Ames Research Center; ²Baylor University

4:20 PM

AI-driven Topology Optimization of Photonic Structures With Manufacturing Constraints: *Alok Sutradhar*¹; Fariha Haque¹; ¹The Ohio State University

4:40 PM

Electronic Structure Prediction of Multi-million Atom Systems Through Uncertainty Quantification Enabled Transfer Learning: *Shashank Pathrudkar*¹; Ponkrshnan Thiagarajan¹; Shivang Agarwal²; Amartya Banerjee²; Susanta Ghosh¹; ¹Michigan Technological University; ²University of California, Los Angeles

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Machine Learning - Processing I

Tuesday PM | June 18, 2024
Hope Ballroom A | Hilton Cleveland Downtown

Session Chair: Hein Htet Aung, Case Western Reserve University

1:40 PM Invited

Rethinking Materials Simulations: Blending Direct Numerical Simulations With Neural Operators: *Vivek Oommen*¹; Khemraj Shukla¹; Saaketh Desai²; Remi Dingreville²; George Karniadakis¹; ¹Brown University; ²Sandia National Laboratories

2:10 PM

Deep Material Network Trained With Local Field Information: Predictions of Homogenized and Local Field Distribution: *Dongil Shin*¹; Remi Dingreville¹; ¹Sandia National Laboratories

2:30 PM

Intelligent Data Sampling for Autonomous Parameterization: A Gaussian-Process-Ensemble Approach: *Erick Braham*¹; Marshall Johnson²; Andrew Fassler¹; Surya Kalidindi²; James Hardin³; ¹UES / Air Force Research Laboratory; ²Georgia Institute of Technology; ³Air Force Research Laboratory

2:50 PM

Bayesian SegNet for Semantic Segmentation With Improved Interpretation of Microstructural Evolution During Irradiation of Materials: *Marjolein Oostrom*¹; Karl Pazdernik¹; Alexander Hagen¹; Nicole Lahaye¹; ¹Pacific Northwest National Laboratory

3:10 PM Networking Break

4:00 PM

Training Requirements of a Deep Learning Network With Physics-based Regularization Functions Enforcing Stress Equilibrium: *Ashley Lenau*¹; Dennis Dimmiduk²; *Stephen Niezgodá*¹; ¹Ohio State University; ²BlueQuartz Software LLC

4:20 PM

A Manufacturing Technology Roadmap for AI-enhanced Multimodal Sensing of Materials and Processes for Complete Product Lifecycle Performance: *John Lewandowski*¹; Nick Barendt¹; Robert Gao¹; Ken Loparo¹; ¹Case Western Reserve University

4:40 PM

A Surrogate-assisted Uncertainty Quantification and Sensitivity Analysis of a Ni-base Superalloy Hot Isostatic Pressing Finite Element Model: *Alon Mazar*¹; Swapnil Patil¹; Ryan Jacobs¹; Vipul Gupta¹; Timothy Hanlon¹; ¹GE Aerospace Research

Accelerating Discovery for Mechanical Behavior of Materials 2024: Accelerated Approaches III

Tuesday PM | June 18, 2024

Center Street Room A | Hilton Cleveland Downtown

Session Chair: To Be Announced

1:40 PM Invited

Autonomous Design of Tough Structures Using Self-driving Labs: *Keith Brown*¹; ¹Boston University

2:10 PM

Towards a Fatigue-based Process Window: Influence of LPBF Build Parameters on Process Defect Characteristics and Mechanical Properties in Ti-6Al-4V: *Austin Ngo*¹; *David Scannapieco*¹; *Tharun Reddy*²; *Oluwatumininu Adeeko*¹; *Christian Gobert*²; *Justin Miner*²; *Sneha Narra*²; *Jack Beuth*²; *Anthony Rollett*²; *John Lewandowski*¹; ¹Case Western Reserve University; ²Carnegie Mellon University

2:30 PM

Accelerated Alloy Design Workflow Through Laser-scanning of Arc-melted Al Alloys: Are They Representative of Additively Manufactured Ones? *Zhaoxuan Ge*¹; *S. Mohadeseh Taheri-Mousavi*¹; ¹Carnegie Mellon University

2:50 PM

Investigating High Throughput Structure-property Relationships in Compositionally Graded Transitions From Ni-base Superalloy to Nb-base Refractory Alloy: *David Collins*¹; *Marcus Hansen*²; *James Haley*¹; *Brian Jordan*¹; *Yousub Lee*¹; *Soumya Nag*¹; ¹Oak Ridge National Laboratory; ²Texas A&M University

3:10 PM Networking Break

4:00 PM

High-throughput Vibration-based Fatigue Testing to Produce S-N Curves of HCF Life in an Afternoon: *Brandon Furman*¹; *Jeffrey Wagner*¹; *Jacob Rigby*¹; *Jacob Heninger*¹; *Tate Adams*¹; *Sam Mulhall*¹; *Ryan Berke*¹; ¹Utah State University

4:20 PM

Fundamental Design of Alloys Resistant to H-embrittlement: Nanoscale H-defect Interactions Using Large Scale Simulations: *Matthew Melfi*¹; *S. Mohadeseh Taheri-Mousavi*¹; ¹Carnegie Mellon University

Accelerating Discovery for Mechanical Behavior of Materials 2024: Mechanics of Novel Materials III

Tuesday PM | June 18, 2024

Hope Ballroom D | Hilton Cleveland Downtown

Session Chair: To Be Announced

1:40 PM Invited

Characterizing and Tuning the Mechanical Properties of Nanoparticle Assemblies: *Gang Feng*¹; ¹Villanova University

2:10 PM

Optimized Microstructure for Enhanced Properties of Novel Ecofriendly Green Plants Wastes Hybridized Ultrafine Grained Al7Si2Cu0.5Ni Eco-composite Inoculated by Al-Nb-V-Zr Master Alloy: *Kingsley Nnakwo*¹; ¹Nnamdi Azikiwe University

2:30 PM

Microstructure, Texture, and Tensile Properties of the 50% Hot-rolled and Subsequent Heat Treated Ti6Al4V-5Cu Alloy: *Solomon Yeshanew*¹; ¹Dire Dawa University

2:50 PM Poster Pitches

3:10 PM Networking Break

4:00 PM

The Influence of Alloying Elements on the Mechanical Properties and Microstructure of Nickel-based Alloys: *Elyorjon Jumaev*¹; *Orifjon Mikhliev*¹; *Sarvar Rozikhodjaev*¹; *Dilshodbek Usmonov*¹; ¹FIE UZLITI Engineering LLC

4:20 PM

Study on the Changes in Microstructure and the Mechanical Characteristics of the Quaternary High Entropy Alloys: *Orifjon Mikhliev*¹; *Elyorjon Jumaev*¹; *Khasanjon Shanazarov*¹; *Dilshodbek Usmonov*¹; *Mukhammadjon Usmonov*¹; *Sarvar Rozikhodjaev*¹; *Azizbek Norov*²; ¹FIE UZLITI Engineering LLC; ²Enter Engineering Pte Ltd

4:40 PM

Fabrication and Characterization of a Strong Aluminum Foam Using Al-Si-Cu Alloy as a Matrix and Cermet Hollow Spheres as Pores-creating Agents: *Fisseha Zewdie Weldemariam*¹; *Naresh Bhatnagar*¹; ¹Indian Institute of Technology, Delhi

Symposium on Digital & Robotic Forming 2024: Control in Incremental Forming

Tuesday PM | June 18, 2024
Center Street Room B&C | Hilton Cleveland Downtown

Session Chair: Mary Cecilia Mulvaney, NASA

1:40 PM Invited

A Paradigm Change in Metal Forming: From Formability to Usability: *Erman Tekkaya*¹; ¹TU Dortmund University

2:10 PM

Digital Incremental Forming System: *Robert Landers*¹; Zongze Li¹; Balark Tiwari¹; Cindy Huang¹; David Akinsanya¹; ¹University of Notre Dame

2:30 PM

Control System Problem Formulation of Robotic Forming, With Robotic Plate Forming as a Case Study: *Yixue Chen*¹; Tyler Babinec²; Brian Thurston²; Javier Vasquez-Armendariz²; Luis Olivas-Alanis²; Ciro Rodriguez³; Kornel Ehmann⁴; David Dean²; Kenneth Loparo¹; Robert Gao¹; David Hoelzle²; ¹Case Western Reserve University; ²Ohio State University; ³Tecnologico de Monterrey; ⁴Northwestern University

2:50 PM

Constitutive Law Selection for Finite Element Modeling of Incremental Rotary Forming: *Elizabeth Urig*¹; David Stegall²; Leonid Zhigilei³; ¹Analytical Mechanics Associates; ²NASA Langley Research Center; ³University of Virginia

3:10 PM Networking Break

4:00 PM Poster Pitch

Predictive Modeling of Material Deformation Using English Wheel Under Varying Loading Conditions: Ahmad Mitoubsi¹; Sam St John¹; Vispi Karkaria²; Derick Suarez²; Jie Chen²; Fan Chen²; Wei Chen²; Kornel Ehmann²; Jian Cao²; Nicholas Dewberry³; Chandra Jaiswal³; Kevin Benton Benton³; Issa AlHmoud³; Balakrishna Gokaraju³; Anahita Khojandi¹; *Fanglei Hu*²; ¹University of Tennessee; ²Northwestern University; ³North Carolina Agricultural and Technical State University

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Data Management - Materials Science I

Wednesday AM | June 19, 2024
Hope Ballroom C | Hilton Cleveland Downtown

Session Chair: Olatunde Akanbi, Case Western Reserve University

8:30 AM Invited

A Materials Data Segmentation Benchmark (MDSB): Pawan Tripathi¹; Kristen Hernandez¹; Tommy Ciardi¹; Mingjian Lu²; Max Liggett²; Andrew Ballen²; Jean-Baptiste Forien³; Brian Giera³; Manyalibo Matthews³; Mengjie Li²; Kristopher Davis²; John Lewandowski¹; Laura Bruckman¹; Yinghui Wu¹; Roger French¹; *Vipin Chaudhary*¹; ¹Case Western Reserve University; ²University of Central Florida; ³Lawrence Livermore National Laboratory

9:00 AM

FAIRification of Data-centric AI: Programmatic JSON-LD Creation and OWL Generation: *Balashanmuga Priyan Rajamohan*¹; Alexander Harding Bradley¹; Erika Barcelos¹; Hayden Caldwell¹; Arafath Nihar¹; Laura Bruckman¹; Yinghui Wu¹; Roger French¹; ¹Case Western Reserve University/SDLE

9:20 AM

A FAIR-framework for Integrating Advanced Manufacturing Multimodal Data Sets: *Hein Htet Aung*¹; Kristen Hernandez²; Erika Barcelos¹; Balashanmuga Priyan Rajamohan¹; Alexander Harding Bradley¹; Arafath Nihar¹; Laura Bruckman¹; Yinghui Wu¹; Roger French¹; ¹Case Western Reserve University

9:40 AM

Empowering Non-Destructive Powder Evaluation with Accessible AI Tools: *Stephen Price*¹; Kyle Tsaknopoulos¹; Danielle Cote¹; Rodica Neamtu¹; ¹Worcester Polytechnic Institute

10:00 AM Break

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Large Language Models for Materials

Wednesday AM | June 19, 2024
Hope Ballroom B | Hilton Cleveland Downtown

Session Chair: To Be Announced

8:30 AM Invited

MatGPT™ - Accelerated Alloy Development by Combining LLMs, Machine Learning, Simulation & Validation: *Achim Tappe*¹; Rüdiger Franke²; Golnar Geramifard²; Jun-Gyu Kim¹; Sebastian Jäger¹; Yiwen Wen¹; Shameem Ebna Hai¹; Arnab Mukherjee¹; Taylor Sparks³; Hasan Sayeed³; ¹Fehrmann MaterialsX; ²Fehrmann Materials; ³University of Utah

9:00 AM

Using Large Language Models to Aid Materials Design Workflows: *James Saal*¹; ¹Citrine Informatics

9:20 AM

AI for Science: Data-centric AI by Utilizing D/HPC and FAIRified Scientific Analysis Workflows: *Roger French*¹; Arafath Nihar¹; Thomas Ciardi¹; Rachel Yamamoto¹; Erika Barcelos¹; Priyan Rajamohan¹; Alexander Harding¹; Rounak Chawla¹; Pawan Tripathi¹; Vipin Chaudhary¹; Laura Bruckman¹; Yinghui Wu¹; ¹Case Western Reserve University

9:40 AM

MIPAR Spotlight: Integrating Zero-Shot, Deep Learning, and Conventional Processing for Advanced Micrograph Analysis: Pavel Sul¹; *John Sosa*¹; ¹MIPAR Software LLC

10:00 AM Break

Accelerating Discovery for Mechanical Behavior of Materials 2024: Design I

Wednesday AM | June 19, 2024
Hope Ballroom A | Hilton Cleveland Downtown

Session Chair: To Be Announced

8:30 AM Invited

Bulk Rare Earth Free Permanent Magnets by Severe Plastic Deformation: *Andrea Bachmaier*¹; Lukas Weissitsch¹; Stefan Wurster¹; Heinz Krenn²; ¹Erich Schmid Institute, Austrian Academy of Sciences; ²Institute of Physics, University of Graz

9:00 AM

Impact of Microstructure on Mechanical Property and Multi-property Optimization in Porous Materials: *Longsheng Feng*¹; Bo Wang¹; Sourav Chatterjee¹; Donglin Li²; Natalie Hwee¹; Sijia Huang¹; Jianchao Ye¹; Sangil Kim²; Tae Wook Heo¹; Juergen Biener¹; ¹Lawrence Livermore National Lab; ²University of Illinois at Chicago

9:20 AM Poster Pitches

Accelerating Discovery for Mechanical Behavior of Materials 2024: ML Applications and Accelerated Approaches

Wednesday AM | June 19, 2024
Center Street Room A | Hilton Cleveland Downtown

Session Chair: To Be Announced

8:30 AM Invited

Mesoscale Investigations of Dislocation-grain Boundary Interactions in Metals and Alloys: *Abigail Hunter*¹; ¹Los Alamos National Laboratory

9:00 AM

High Dimensional Fatigue Life Process Window Modeling of Ti-6Al-4V Laser Powder Bed Fusion, Enabled by Graph-based Data Fusion: *Alex Gonzalez*¹; ¹Colorado School of Mines

9:20 AM

Determination of Intrinsic Mechanical Properties of Polycrystalline Nickel-based Superalloy Using Spherical Indentation and Bayesian Inference: *Hyung Kim*¹; Michael Buzzy¹; Camilla Johnson¹; Surya Kalidindi¹; ¹Georgia Institute of Technology

Symposium on Digital & Robotic Forming 2024: Industry Application II

Wednesday AM | June 19, 2024
Center Street Room B&C | Hilton Cleveland Downtown

Session Chair: Sarah Wolff, Ohio State University

8:30 AM Invited

Architectural Applications and Workflows for Robotic Incremental Forming: *Paul William Nicholas*¹; ¹Royal Danish Academy, School of Architecture

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Data Management - Materials Science II

Wednesday PM | June 19, 2024
Hope Ballroom C | Hilton Cleveland Downtown

Session Chair: Erika Barcelos, Case Western Reserve University

1:40 PM Invited

MICRO2D: Statistically Conditioned Deep Generative Models for Curating Big Microstructure Datasets: *Andreas Robertson*¹; Adam Generale¹; Conlain Kelly¹; Michael Buzzy¹; Surya Kalidindi¹; ¹Georgia Institute of Technology

2:10 PM

Dataset Generation and Verification for Additive Manufacturing Using Explainable AI: *Jennifer Ruddock*¹; Robert Weeks²; James Hardin¹; Jennifer Lewis²; ¹AFRL; ²Harvard University

2:30 PM

Not as Simple as We thought: A Rigorous Examination of Data Aggregation in Materials Informatics: *Taylor Sparks*¹; Federico Ottomano²; Giovanni De Felice²; Vladimir Gusev²; ¹University of Utah; ²University of Liverpool

2:50 PM Cancelled

3:10 PM Networking Break

4:00 PM

Managing Scientific Data in Characterization Investigations With FAIR: *Erika Barcelos*¹; Alexander Bradley¹; Balashanmuga Rajamohan¹; Hayden Caldwell¹; Mengjie Li¹; Leean Jo¹; Laura Bruckman¹; Yinghui Wu¹; Roger French¹; ¹Case Western Reserve University

4:20 PM

Spatiotemporal Scene Graph Representations for Terabyte Scale X-ray Computed Tomography Datasets of AlMg: Thomas Ciardi¹; Pawan Tripathi¹; John Lewandowski¹; Roger French¹; *Maliisha Sumudumalie Kalutotage*¹; ¹Case Western Reserve University

4:40 PM

A FAIRification Framework for Synchrotron High Energy X-ray Diffraction Datasets: *Pawan Tripathi*¹; Weiqi Yue¹; Mohammad Mehdi¹; Erika Barcelos¹; Balashanmuga Rajamohan¹; Alexander Bradley¹; Dan Savage²; Don Brown²; Laura Bruckman¹; Yinghui Wu¹; Roger French¹; ¹Case Western Reserve University; ²Los Alamos National Laboratory

5:00 PM

Overcoming Integration Barriers for Multivariate Big Geospatiotemporal Data: *Olatunde Akanbi*¹; Deepa Bhuvanagiri¹; Erika Barcelos¹; Jeffrey Yarus¹; Yinghui Wu¹; Roger French¹; ¹Case Western Reserve University

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Machine Learning - Processing II

Wednesday PM | June 19, 2024
Hope Ballroom B | Hilton Cleveland Downtown

Session Chair: Janith Wann, University of Wisconsin Madison

1:40 PM Invited

Autonomous Learning of Atomistic Structural Transitions via Physics-inspired Graph Neural Networks: Bamidele Aroboto¹; Shaohua Chen²; Tim Hsu³; Brandon Wood³; Yang Jiao²; *James Chapman*¹; ¹Boston University; ²Arizona State University; ³Livermore National Laboratory

2:10 PM

Fracture Toughness and Fatigue Life Prediction of Additively Manufactured Al 2024 Alloy Using Machine Learning Models: Saurabh Gairola¹; Sneha Jayaganthan²; *R. Jayaganthan*¹; ¹Indian Institute of Technology Madras; ²Stanford University

2:30 PM

Intrinsic Dimensionality Estimates for Microstructural Data: Veera Sundararaghavan¹; *Megna Shah*²; Jeff Simmons²; ¹University of Michigan; ²Air Force Research Laboratory

2:50 PM

HotSpotNet: A Deep Learning Approach to Predicting Stress Hot Spots in Materials Based on Microstructural Features: Karthik Narayanan Giriprasad¹; *Michael Groeber*¹; Steve Niezgoda¹; ¹The Ohio State University

3:10 PM Networking Break

4:00 PM

Reinforcement Learning Approaches to Developing Policies for Incremental Robotic Forging: *Michael Groeber*¹; Stephen Niezgoda¹; Josh Groves¹; Anahita Khojandi²; Sam St. John²; ¹Ohio State University; ²University of Tennessee - Knoxville

4:20 PM

Space Launch System Weld Process Optimization Using Informatics and Machine Learning: *Joshua Stuckner*¹; ¹NASA Glenn Research Center

4:40 PM

Unveiling Metal Additive Manufacturing Microstructure Through Data-driven Unsupervised Clustering of Crystallographic Texture: *Aashique Rezwani*¹; David Montes de Oca Zapiain¹; Daniel Moser¹; Michael Heiden¹; Theron Rodgers¹; ¹Sandia National Laboratories

5:00 PM

A Data-driven Laplacian-penalized Non-rigid iterative Closest Point Reverse Deformation Model for Net-shape Investment Castings: *Jiayu Cui*¹; Jun Wang¹; Donghong Wang¹; Da Shu¹; Baode Sun¹; ¹Shanghai Jiao Tong University

Accelerating Discovery for Mechanical Behavior of Materials 2024: Design II

Wednesday PM | June 19, 2024

Hope Ballroom A | Hilton Cleveland Downtown

Session Chair: To Be Announced

1:40 PM Invited

Generative Methods to Discover Materials With Enhanced Mechanical Properties: Markus Buehler¹; *Alireza Ghafarollah*¹; ¹Massachusetts Institute of Technology

2:10 PM

Maximizing Tensile Properties Through Partially Active Grain Boundary Segregation in Nanocrystalline Sterling Silver Alloys: *Pavel Nikitin*¹; Frederic Sansoz¹; ¹The University of Vermont

2:30 PM

Discovering Superhard High-entropy Diboride Ceramics via a Hybrid Data-driven and Knowledge-enabled Model: *Jiaqi Lu*¹; William Yi Wang¹; ¹Northwestern Polytechnical University

2:50 PM Poster Pitches

3:10 PM Networking Break

4:00 PM

Defect Populations and Their Linkage to Strength Distribution Parameters in Additively Manufactured Alumina: Sarah Boardman¹; *Corinne Packard*¹; ¹Colorado School of Mines

4:20 PM

Mechanical Behavior and Microstructural Evolution of Additively Manufactured Ti Modified Al 2024 Alloy: Saurabh Gairola¹; *R. Jayaganthan*¹; ¹Indian Institute of Technology Madras

Accelerating Discovery for Mechanical Behavior of Materials 2024: ML Applications and Extreme Environments

Wednesday PM | June 19, 2024

Center Street Room A | Hilton Cleveland Downtown

Session Chair: To Be Announced

1:40 PM Invited

Understanding and Mitigating Bias in Autonomous Materials Characterization and Discovery: *Jason Hattrick-Simpers*¹; ¹University of Toronto

2:10 PM

Accelerated Discovery of Material Physics Using AI/ML Approaches: *Surya Kalidindi*¹; ¹Georgia Institute of Technology

2:30 PM

Tailoring Metastability Due to Rapid Solidification to Achieve High-strength Printable Al Alloys: *S. Mohadeseh Taheri-Mousavi*¹; ¹Carnegie Mellon University

2:50 PM

Advancing Multiscale Materials Characterization Through Machine Learning Integration: Reeru Pokharel¹; *Ashley Lenau*²; ¹Los Alamos National Laboratory; ²Ohio State University

3:10 PM Networking Break

4:00 PM

Elucidating Aging Effects in Alloys Through High Throughput Experiments Using Diffusion Multiples, Nanoindentation, and Machine Learning: *Andrew Hoffman*¹; ¹Catalyst Science Solutions

4:20 PM

Approaching Plasticity Through Elastic-plastic Strain Gradients: Saurabh Kumar¹; Bhargav Sudhakar¹; Namit Pai¹; *Indra Samajdar*¹; ¹Indian Inst of Tech

4:40 PM

Corrosion Fatigue Behaviour of Repetitive Corrugation and Straightening Processed AA5083 Alloy: *Balasisivanandha Prabu Shanmugavel*¹; Sri Rathinamani Ramdoss¹; Manikandan Murugan¹; Pooja Kathiresan¹; ¹Anna University

5:00 PM

Eliminating Brittle Failure by Advanced Casting: *John Campbell*¹; ¹University of Birmingham

Symposium on Digital & Robotic Forming 2024: Microstructure In Deformation Processing

Wednesday PM | June 19, 2024

Center Street Room B&C | Hilton Cleveland Downtown

Session Chair: Mary Cecilia Mulvaney, NASA

1:40 PM

Modifying AM Microstructure and Process Defects by Post-process Forging: Austin Ngo¹; Noah Kohlhorst²; Svitlana Fialkova³; Glenn Daehn²; Bradley Jared⁴; Jian Cao⁵; *John Lewandowski*¹; ¹Case Western Reserve University; ²The Ohio State University; ³North Carolina Agricultural and Technical State University; ⁴University of Tennessee, Knoxville; ⁵Northwestern University

2:00 PM

Refinement of Microstructure and Mechanical Properties of Robotic Wire Arc Additively Manufactured (WAAM) AISI 316LSi Using Forging: *Vishnu Ramasamy*¹; Brett Ley¹; Noah Kohlhorst²; Glenn Daehn²; Jan Dzugan³; Zhigang Xu⁴; Bradley Jared⁵; Tony Schmitz⁵; Jian Cao⁶; Jennifer Carter¹; John Lewandowski¹; ¹Case Western Reserve University; ²Ohio State University; ³COMTES FHT a.s.; ⁴North Carolina Agricultural and Technical State University; ⁵University of Tennessee; ⁶Northwestern University

2:20 PM

Generating Digital Shadows of Workpiece Temperature During Thermomechanical Processes: *Albert Ostlind*¹; Suzanne Tkach²; Rob Mayer³; Amy Clarke¹; Kester Clarke¹; ¹Colorado School of Mines; ²Tkach Consulting; ³Queen City Forging Company

2:40 PM

Deep Drawing and Spin Forming: A Comparison Study: *Melissa Thrun*¹; Allie Glover¹; Matthew Zappulla¹; Kayla Molnar¹; Paul Gibbs¹; ¹Los Alamos National Laboratory

3:00 PM Networking Break

4:00 PM

Adaption of Double-cone Forming Geometry to Reduce the Experimental Expenditures Necessary to Create Forming Process Maps: Brett Ley¹; Vishnu Ramasamy¹; Jackson Smith¹; Caleb Campbell²; Brett Brady²; Noah Kohlhorst³; Brian Thurston³; Glenn Daehn³; Bradley Jared²; Zhigang Xu⁴; John Lewandowski¹; *Jennifer Carter*¹; ¹Case Western Reserve University; ²University of Tennessee, Knoxville; ³The Ohio State University; ⁴North Carolina A&TSU

4:20 PM

Microstructural Evolution and Corrosion Resistance of 316 Stainless Steel by Double-sided Incremental Sheet Forming: *Nhung Nguyen*¹; Putong Kang¹; Fanglei Hu¹; Zhigang Xu²; Svitlana Fialkova²; Jian Cao¹; ¹Northwestern University; ²North Carolina A&T University

4:40 PM

Influence of Feedrate on Microstructure and Hardness of Conventionally Spin-formed 6061-O Plate: *Andrew Boddorff*¹; Cecilia Mulvaney¹; ¹NASA Langley Research Center

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Machine Learning - Microstructure

Thursday AM | June 20, 2024

Hope Ballroom B | Hilton Cleveland Downtown

Session Chair: Xiawa Wu, Pennsylvania State University

8:30 AM Invited

Reproducible Quantification of the Microstructure of Complex Quenched and Quenched and Tempered Steels Using Modern Methods of Machine Learning: *Björn Bachmann*¹; Martin Müller¹; Dominik Britz²; Marie Stiefel¹; Frank Mücklich¹; ¹Saarland University; ²Materials Engineering Center Saarland

9:00 AM

Enhancing Machine Learning Classification of Microstructures: A Workflow Study on Joining Image Data and Metadata in CNN: Marie Stiefel¹; *Martin Müller*¹; Frank Mücklich¹; ¹Saarland University

9:20 AM

Impact of Different Training Datasets on Machine Learning Based Grain Growth Model and Grain Growth Kinetics: Vishal Yadav¹; Joseph Melville¹; Amanda Krause²; Joel Harley¹; Michael Tonks¹; *Yang Kang*¹; Tian Zhiling³; ¹University of Florida; ²Carnegie Mellon University; ³Central Iron & Steel Research Institute

9:40 AM

Equivariant Neural Networks for Controlling Dynamic Spatial Light Modulators: *Sumukh Vasisht Shankar*¹; Rui Wang²; Darrel D D'Souza³; Jonathan Singer³; Robin Walters¹; ¹Northeastern University; ²MIT; ³Rutgers University

10:00 AM Break

10:20 AM

Using Unsupervised Learning to Cluster Fatigue Life Based on Small Crack Characteristics: *Katelyn Jones*¹; Paul Shade²; Patrick Golden²; Reji John²; Elizabeth Holm³; Anthony Rollett¹; ¹Carnegie Mellon University; ²Air Force Research Laboratory; ³University of Michigan, Ann Arbor

10:40 AM

Persistent Homology for Microstructure Manifold Construction: *Simon Mason*¹; Jeff Simmons²; Megna Shah²; Stephen Niezgod¹; ¹Ohio State University; ²AFRL

11:00 AM

Utilizing Machine Learning to Generate Representative Euler Angles for Large EBSD Datasets: *Janith Wann*¹; Dan Thoma¹; ¹University of Wisconsin Madison

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Machine Learning Simulations

Thursday AM | June 20, 2024

Hope Ballroom C | Hilton Cleveland Downtown

Session Chair: To Be Announced

8:30 AM Invited

Machine Learning Approach to Phase Recognition and Prediction of Mechanical Properties: Bin Zhang¹; Aiyshie Jin¹; Akanksha Parmar¹; *Yung Shin*¹; ¹Purdue University

9:00 AM

Inverse Design of High-temperature Al-alloys Using Hybrid CALPHAD-based ICME Techniques: *Benjamin Glaser*¹; S. Mohadeseh Taheri-Mousavi¹; ¹Carnegie Mellon University

9:20 AM

Real-time Predictions of Distortion and Residual Stress Resulting From Weld Sequences Using Machine-learning Algorithms: *James Sobotka*¹; Matthew Robinson¹; Jake Janssen¹; ¹Southwest Research Institute

9:40 AM

In-situ Melt Pool Morphology Estimation From Thermal Imaging via Vision Transformers: *Odinakachukwu Ogoke*¹; Peter Pak¹; Alexander Myers¹; Guadalupe Quirarte¹; Jack Beuth¹; Jonathan Malen¹; Amir Barati Farimani¹; ¹Carnegie Mellon University

10:00 AM Break

10:20 AM

Machine Learning-enhanced Prediction of Surface Smoothness for Inertial Confinement Fusion Target Polishing Using Limited Data: *Antonios Alexos*¹; Junze Liu¹; Akash Tiwari²; Kshitij Bhardwaj³; Sean Hayes³; Satish Bukkapatnam³; Pierre Baldi¹; Suhas Bhandarkar³; ¹University of California, Irvine; ²Texas A&M University; ³Lawrence Livermore National Laboratory

10:40 AM

Graph-based Machine Learning to Assess Particle Growth Kinetics From Image Sequences: *Sameera Nalin Venkat*¹; Thomas Ciardi¹; Preston DeLeo¹; Mingjian Lu¹; Frank Ernst¹; Yinghui Wu¹; Roger French¹; Laura Bruckman¹; ¹Case Western Reserve University

11:00 AM

Uncertainty Quantification in Machine-learning Models for Predicting β -phase Volume Fraction From Synchrotron X-ray Diffraction Patterns: *Ayorinde Olatunde¹; Weiqi Yue¹; Pawan Tripathi¹; Roger French¹; Anirban Mondal²; ¹Materials Data Science for Stockpile Stewardship: Center of Excellence, Case Western Reserve University; ²Case Western Reserve University*

11:20 AM

Closing the Loop in Direct-chill Casting of Aluminium Alloys, a Deep Learning Approach: *Loic Fracheboud¹; Julien Valloton¹; ¹GAP Engineering SA*

Accelerating Discovery for Mechanical Behavior of Materials 2024: Design III

Thursday AM | June 20, 2024

Hope Ballroom A | Hilton Cleveland Downtown

Session Chair: To Be Announced**9:00 AM**

Tungsten Carbide-modified Nimonic 80A Alloy: *Martina Koukolikova¹; Pavel Podany¹; Sylwia Rzepa¹; David Hradil¹; Michal Brazda¹; ¹COMTES FHT a.s.*

9:20 AM

Adapting FAIR Practices in Materials Science: Digital Representation of Material-specific Characterization Methods: *Bernd Bayerlein¹; Markus Schilling¹; Jörg Waitelonis²; Philipp von Hartrott³; Thomas Hanke³; Henk Birkholz⁴; June Lau⁵; Birgit Skrotzki¹; ¹Bundesanstalt für Materialforschung und -prüfung; ²Leibniz-Institut für Informationsinfrastruktur; ³Fraunhofer-Institut für Werkstoffmechanik (IWM); ⁴Leibniz-Institut für Werkstofforientierte Technologien; ⁵National Institute of Standards and Technology*

9:40 AM

A Crystal Plasticity Study on the Effects of Strength Anisotropy on the Deformation Response of BCC Polycrystal: *Ezra Mengiste¹; Dominic Piedmont²; Mark Messner³; Meimei Li³; James Stubbins²; Jun-Sang Park³; Xuan Zhang³; Matthew Kasemer¹; ¹University of Alabama; ²University of Illinois Urbana-Champaign; ³Argonne National Laboratory*

10:00 AM Break**10:20 AM**

Microstructural Investigation of Wire Arc Additively Manufactured 316LSi in the As-deposited Condition and After Forging: *Brett Ley¹; Vishnu Ramasamy¹; Noah Kohlhorst²; Glenn Daehn²; Bradley Jared³; Zhigang Xu⁴; Kornel Ehmann⁵; Jennifer Carter¹; John Lewandowski¹; ¹Case Western Reserve University; ²The Ohio State University; ³University of Tennessee; ⁴North Carolina Agricultural and Technical State University; ⁵Northwestern University*

10:40 AM

A Strong Fracture-resistant High-entropy Alloy With Nano-bridged Honeycomb Microstructure: A Critical Role of 3D Printing in Promoting Strength Without Compromising Toughness: *Punit Kumar¹; Sheng Huang²; David Cook¹; Kai Chen³; Upadrasta Ramamurthy⁴; Xipeng Tan⁵; Robert Ritchie⁶; ¹Lawrence Berkeley National Laboratory; ²Massachusetts Institute of Technology; ³Xi'an Jiaotong University; ⁴Nanyang Technological University, Singapore; ⁵National University of Singapore; ⁶University of California Berkeley*

11:00 AM

Designing Materials With Engineered Interfaces by Exploiting Underlying Structure-property Linkages: *Ankit Gupta¹; Garritt Tucker¹; ¹Baylor University*

11:20 AM

Effects of Process Parameters on Mechanical Behavior of Wire Arc Additively Manufactured (WAAM) AISI 316LSi: *Vishnu Ramasamy¹; Brett Ley¹; John Lewandowski¹; ¹Case Western Reserve University*

11:40 AM

Investigating the Nucleation and Growth of Deformation Twinning in HfNbTaTi Refractory High Entropy via a Machine Learned Interatomic Potential: *Wenqing Wang¹; Madelyn Payne²; Pedro Borges¹; David Cook¹; Punit Kumar¹; Mark Asta¹; Robert Ritchie¹; ¹Lawrence Berkeley National Lab*

Accelerating Discovery for Mechanical Behavior of Materials 2024: In-situ and In-process of Extreme Environments

Thursday AM | June 20, 2024

Center Street Room A | Hilton Cleveland Downtown

Session Chair: To Be Announced**8:30 AM Invited**

In-situ XRD Fragmentation Experiments to Accurately Measure Film Fracture Stresses: *Megan Cordill¹; ¹Erich Schmid Institute of Materials Science*

9:00 AM

Solute Hydrogen Leads to Residual Stress Changes in Surface Engineered High Strength Steels: *David Bahr¹; Jia-Huei Tien¹; Megan Reger¹; David Johnson¹; ¹Purdue University*

9:20 AM

Review About In-Situ Studies at Very High-temperatures of Superalloys Using Neutrons and Complementary Methods: *Ralph Gilles¹; Frank Kümmerl¹; Massimo Fritton¹; Cecilia Solis²; Alexander Mutschke¹; Andreas Kirchmayer³; Steffen Neumeier³; Masood Haghghat⁴; Bodo Gehrman⁴; ¹TU Munich; ²Helmholtz-Zentrum Hereon GmbH; ³Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU); ⁴VDM Metals International GmbH*

9:40 AM Cancelled**10:00 AM Break****10:20 AM**

Uncovering Superelastic Energy Dissipation in Monazite Ceramics via Elevated Temperature Nanoindentation: *Henry Afful¹; Corinne Packard¹; ¹Colorado School of Mines*

10:40 AM

Fracture of Refractory High Entropy Alloys in Extreme Temperature Environments: *David Cook¹; Punit Kumar²; Calvin Belcher³; Madelyn Payne¹; Pedro Borges¹; Wenqing Wang¹; Flynn Walsh¹; Mingwei Zhang²; Mark Asta¹; Andrew Minor¹; Enrique Lavernia³; Diran Apelian³; Robert Ritchie¹; ¹University of California, Berkeley; ²Lawrence Berkeley National Labs; ³University of California, Irvine;*

11:00 AM

Delineating the Alloying Elements on the Formation of Fe-Zn Intermetallics During the Liquid-metal Embrittlement of Advanced High-strength Steel: *Seungchang Han¹; Sang-Ho Uhm²; Du-Youl Choi²; Tijmen Vermeij³; Krzysztof Wiecek³; Xavier Maeder³; Dario Sanchez⁴; Daniel Grolimund⁴; Tea-Sung Jun¹; ¹Incheon National University; ²POSCO; ³Empa; ⁴Paul Scherrer Institut*

2nd World Congress on Artificial Intelligence in Materials & Manufacturing (AIM 2024): Poster Session

Tuesday PM | June 18, 2024
Hope Ballroom E | Hilton Cleveland Downtown

Development for an Intelligent System for Controlling the Peripheral Temperature of the Blast Furnace: *Sumaila Omeiza Jimoh*¹; ¹Mechanical Federal University of Technology

Fluoroelastomers Genome: Analysis of Fluoroelastomers Growth Behavior Based on Spatio-temporal Scene Graphs: *Mingjian Lu*¹; Sameera Venkat¹; Thomas Ciardi¹; Pawan Tripathi¹; Roger French¹; Yinghui Wu¹; ¹Case Western Reserve University

Learning a Reliable Compression of In-situ, High-speed Camera Data for Additive Manufacturing: *Tian Yu Yen*¹; Anthony Garland¹; Daniel Moser¹; Cody Lough²; Ben Brown²; Jon Zettwoch²; ¹Sandia National Laboratories; ²KCNSC

Machine Learning to Identify Composition and Heat Treatment Schedule of Low-alloyed TRIP-aided Steel Sheets With the Strength-ductility Trade-off: *Chang-Seok Oh*¹; Jiwon Park¹; ¹Korea Institute of Materials Science

Physics Inspired Modelling of the Milling Process Using a Combined Deep Learning and Symbolic Regression Approach for an Efficient Production of Battery Materials: *Ahmed Eisa*¹; ¹Technical University of Braunschweig

An Insight Into Predictive Modelling of NiTi Shape Memory Alloys: *Sina Hossein Zadeh*¹; Amir Behbahanian²; John Broucek²; Mingzhou Fan²; Guillermo Vazquez²; Mohammad Noroozi³; William Trehern²; Xiaoning Qian²; Ibrahim Karaman²; Raymundo Arroyave²; ¹Texas A&M; ²Texas A&M University; ³University of South Florida

CRowdsourced Materials Data Engine for Unpublished X-ray Diffraction: *Abhishek Daundkar*¹; Mengying Wang¹; Hanchao Ma¹; Yiyang Bian¹; Alp Sehrioglu¹; Yinghui Wu¹; ¹Case Western Reserve University

Extreme Value Statistics Analysis of Process Defects in Additive Manufacturing Materials: *Ayorinde Olatunde*¹; Kristen Hernandez¹; Austin Ngo²; Arafath Nihar¹; Thomas Ciardi¹; Rachel Yamamoto¹; Pawan Tripathi¹; Anirban Mondal²; Roger French¹; John Lewandowski²; ¹Materials Data Science for Stockpile Stewardship; Center of Excellence, Case Western Reserve University; ²Case Western Reserve University

Accelerating Discovery for Mechanical Behavior of Materials 2024: Poster Session

Tuesday PM | June 18, 2024
Hope Ballroom E | Hilton Cleveland Downtown

PMD Core Ontology: Building Bridges at the Mid-level – A Community Effort for Achieving Semantic Interoperability in Materials Science: *Bernd Bayerlein*¹; Markus Schilling¹; Henk Birkholz²; Matthias Jung³; Jörg Waitelonis⁴; Lutz Mädler⁵; Harald Sack⁴; ¹Bundesanstalt für Materialforschung und -prüfung; ²Leibniz-Institut für Werkstofforientierte Technologien; ³Fraunhofer-Institut für Werkstoffmechanik (IWM); ⁴Leibniz-Institut für Informationsinfrastruktur; ⁵Universität Bremen

The role of Stacking Faults and Twinning on Mechanical Properties of High Strength and Ductility High Entropy Alloys: *Khaled Youssef*; Farah El-makaty¹; ¹Qatar University

Predicting Charpy Toughness From Fractographic Images: *Nathan Bianco*¹; Kaitlynn Fitzgerald¹; Dale Cillessen¹; Nathan Brown¹; Jay Carroll¹; Kimberly Bassett¹; Brad Boyce¹; ¹Sandia National Laboratories

Symposium on Digital & Robotic Forming 2024: Poster Session

Tuesday PM | June 18, 2024
Hope Ballroom E | Hilton Cleveland Downtown

Control System Development for a Lab-scale Forging Manipulator for Deformation Model Validation Experiments: *Lennard Poliakov*¹; Evan Penczek¹; Albert Ostlind¹; Natalie Compton¹; Mason Weems¹; Kester Clarke²; ¹Colorado School of Mines; ²Los Alamos National Laboratory

Development of a Low-cost Open-source Wire Arc Additive Manufacturing (WAAM) Machine: *Vishnu Ramasamy*¹; Bathlomew Ebika¹; Robert Gao¹; Kenneth Loparo¹; Bradley Jared²; Tony Schmitz²; Michael Groeber³; Sun Yi⁴; Kornel Ehmann⁵; John Lewandowski¹; ¹Case Western Reserve University; ²University of Tennessee; ³Ohio State University; ⁴North Carolina Agricultural and Technical State University; ⁵Northwestern University

Predictive Modeling of Material Deformation Using English Wheel Under Varying Loading Conditions: *Ahmad Mitoubssi*¹; Sam St John¹; Vispi Karkaria²; Derick Suarez²; Jie Chen²; Fan Chen²; Wei Chen²; Kornel Ehmann²; Jian Cao²; Nicholas Dewberry³; Chandra Jaiswal³; Kevin Benton Benton³; Issa AlHmoud³; Balakrishna Gokaraju³; Anahita Khojandi¹; *Fanglei Hu*²; ¹University of Tennessee; ²Northwestern University; ³North Carolina Agricultural and Technical State University

- A**
- Abubakar, A7
 Adamczyk, J5, 8
 Adams, D4, 6
 Adams, T9
 Addamane, S4, 6
 Adeeko, O5, 9
 A, E4
 Afful, H14
 Agarwal, S8
 Aggour, K8
 Agnew, S7
 Akanbi, O10, 11
 Akhtar, S7
 Akinsanya, D10
 Alemayehu, D4
 Alexos, A13
 AlHmoud, I10, 15
 Aman, B5
 Amano, N5
 Anderson, I4
 Anderson, P4
 Anjaria, D4, 6
 Apelian, D2, 14
 Argibay, N4
 Aroboto, B11
 Arroyave, R15
 Asta, M14
 Aung, H8, 10
 Ayday, E8
- B**
- Babinec, T10
 Bachmaier, A10
 Bachmann, B13
 Bahr, D14
 Baldi, P13
 Ballen, A5, 10
 Banerjee, A8
 Banu, M5
 Barati Farimani, A8, 13
 Barcelos, E10, 11
 Barendt, N9
 Bassett, K15
 Baukus, L4
 Bayerlein, B6, 14, 15
 Bean, C4, 6
 Behbahanian, A15
 Belcher, C14
 Benton, K7, 10, 15
 Berke, R9
 Beuth, J5, 9, 13
 Bhandarkar, S13
 Bhardwaj, K13
 Bhatnagar, N9
 Bhuvanagiri, D11
 Bianco, N15
 Bian, Y15
- Biener, J11
 Birkholz, H6, 14, 15
 Black, R4, 6
 Boardman, S12
 Boddorff, A13
 Bolintineanu, D5, 8
 Bolmin, O7
 Borges, P14
 Boulware, P4
 Boyce, B4, 6, 7, 15
 Bradley, A5, 11
 Brady, B13
 Braham, E9
 Brazda, M14
 Britz, D5, 13
 Broucek, J15
 Brown, B3, 15
 Brown, D8, 11
 Brown, K9
 Brown, M5
 Brown, N7, 15
 Bruckman, L4, 5, 10, 11, 13
 Bruns, S6
 Bryan, D4
 Buehler, M12
 Bukkapatnam, S13
 Buynak, A5
 Buzzy, M6, 11
- C**
- Cairdi, T5
 Caldwell, H10, 11
 Campbell, C13
 Campbell, J6, 12
 Cao, J6, 7, 10, 12, 13, 15
 Carroll, J6, 15
 Carter, J13, 14
 Castillo, V7
 Chapman, J8, 11
 Champagne, M6
 Chatterjee, A7
 Chatterjee, S11
 Chaudhary, V5, 8, 10
 Chaudhuri, S3
 Chawla, R10
 Chen, F6, 7, 10, 15
 Chen, H6
 Chen, J10, 15
 Chen, K14
 Chen, Q6
 Chen, S11
 Chen, W10, 15
 Chen, X5, 8
 Chen, Y10
 Cherukara, M3
 Chiu, L3
 Choi, D14
 Ciardi, T5, 10, 11, 13, 15
- Cillessen, D15
 Clarke, A13
 Clarke, K5, 13, 15
 Collins, D9
 Colvin, D5
 Compton, N15
 Cook, A5
 Cook, D14
 Cordero, Z4
 Cordill, M4, 14
 Cote, D10
 Cui, J4, 12
- D**
- Daehn, G4, 5, 7, 12, 13, 14
 Daundkar, A15
 Davidson, B6
 Davis, K5, 10
 Dean, D10
 De Felice, G11
 De Graef, M5
 DeLeo, P13
 D'Elia, M6
 Delrio, F6
 Desai, S4, 6, 8
 Dewberry, N7, 10, 15
 Dimiduk, D5
 Dimmiduk, D9
 Dingreville, R4, 6, 8, 9
 Doll, J8
 Donegan, S6
 D'Souza, D13
 Dzugan, J4, 7, 13
- E**
- Eberl, C2
 Ebika, B15
 Ehmman, K7, 10, 14, 15
 Eisa, A4, 15
 El-makaty, F15
 Ernst, F8, 13
 E, S4
- F**
- Faizan, M7
 Fan, M15
 Farimani, A5
 Farmer, K6
 Fassler, A9
 Feng, G9
 Feng, L11
 Feni, F7
 Fialkova, S12, 13
 Field, K3
 Fitz-Gerald, J7
 Fitzgerald, K15
 Forbes, B7
 Forien, J5, 10

Foster, I	2, 3
Fracheboud, L	14
Franke, R	10
French, R	4, 5, 8, 10, 11, 13, 14, 15
Frieden Templeton, W	4
Fritton, M	14
Furman, B	9
Furrer, D	3
Furterer, E	6

G

Gairola, S	11, 12
Gao, M	7
Gao, N	5
Gao, R	4, 5, 9, 10, 15
Garland, A	3, 5, 8, 15
Gehrmann, B	14
Generale, A	11
Geramifard, G	10
Ge, Z	9
Ghafarollah, A	12
Ghosh, S	3, 8
Gibbs, P	7, 13
Giera, B	5, 8, 10
Gilles, R	14
Gillman, A	6
Giriprasad, K	12
Glanton, D	4
Glaser, B	6, 13
Glover, A	7, 13
Glover, J	5
Gobert, C	9
Goetz, J	4
Gokaraju, B	7, 10, 15
Golden, P	13
Gonzales, M	7
Gonzalez, A	11
Gourley, A	5
Groeber, M	5, 6, 12, 15
Grolimund, D	14
Grönewald, M	6
Groves, J	12
Gupta, A	8, 14
Gupta, V	8, 9
Gusev, V	11

H

Hagen, A	9
Haghighat, M	14
Hai, S	10
Hales, S	7
Haley, J	9
Hamilton, R	7
Hanke, T	14
Hanlon, T	9
Han, S	14
Hansen, M	9
Haque, F	8

Harding, A	10
Harding Bradley, A	10
Hardin, J	9, 11
Harley, J	13
Hassan Uvaise, M	3
Hatrick-Simpers, J	12
Hayes, S	13
Heiden, M	5, 8, 12
Hemery, S	4
Heninger, J	9
Heo, T	11
Hernandez, K	5, 10, 15
Hintsala, E	6
Hoelzle, D	10
Hoffman, A	12
Holm, E	3, 5, 6, 13
Hossein Zadeh, S	15
Hradil, D	14
Hsu, T	11
Huang, A	3
Huang, C	10
Huang, H	4
Huang, S	4, 11, 14
Huerta, E	3
Hu, F	6, 7, 10, 13, 15
Hunter, A	11
Hu, Y	7
Hwee, N	11

I

Indeck, J	3, 5
-----------	------

J

Jacobs, R	9
Jäger, S	10
Jain, A	5, 8
Jain, M	4, 6
Jaiswal, C	10, 15
Janssen, J	13
Jared, B	12, 13, 14, 15
Jayaganthan, R	11, 12
Jayaganthan, S	11
Jemberu, S	7
Jiao, Y	11
Jimoh, S	5, 15
Jin, A	13
John, R	13
Johnson, C	11
Johnson, D	4, 14
Johnson, M	9
Jo, L	11
Jones, K	13
Jordan, B	9
Jumaev, E	9
Jung, M	15
Jun, T	14

K

Kalaswad, M	6
Kalidindi, S	6, 9, 11, 12
Kang, P	7, 13
Kang, Y	13
Karaman, I	15
Karin, T	5
Karkaria, V	10, 15
Karniadakis, G	8
Kasemer, M	14
Kathiresan, P	12
Kaufman, J	5
Kelly, C	6, 11
Kelly, S	2
Kern, D	5
Khojandi, A	10, 12, 15
Kim, H	11
Kim, J	10
Kim, S	3, 11
Kirchmayer, A	14
Kohlhorst, N	12, 13, 14
Kopp, R	6
Koukolikova, M	14
Krause, A	13
Krenn, H	10
Krishnamoorthi, S	4
Kumar, D	5
Kumar, P	14
Kumar, S	12
Kumar, V	4
Kümmel, F	14

L

Lahaye, N	9
Landers, R	10
Lau, J	6, 14
Lavernia, E	14
Lee, Y	9
Lei, B	5, 7
Lenau, A	9, 12
Lewandowski, J	4, 5, 9, 10, 11, 12, 13, 14, 15
Lewis, J	11
Ley, B	13, 14
Li, D	11
Liggett, M	5
Liggett, M	5, 10
Li, M	5, 10, 11, 14
Lino, A	5
Liu, J	13
Li, Y	4, 7
Li, Z	10
Longo, B	2
Loparo, K	9, 10, 15
Lough, C	3, 15
Lu, J	12
Lu, M	5, 10, 13, 15

M		
Mackin, L.	6	
Mädler, L.	15	
Maeder, X.	14	
Ma, H.	15	
Malen, J.	13	
Mason, P.	6	
Mason, S.	5, 13	
Matthews, M.	5, 10	
Mayer, R.	13	
Mazor, A.	9	
Mehdi, M.	8, 11	
Mehr, E.	4	
Melfi, M.	9	
Melville, J.	13	
Melzer, D.	4, 7	
Mengiste, E.	14	
Messner, M.	14	
Mikhliiev, O.	9	
Miner, J.	4, 9	
Minor, A.	14	
Mitoubisi, A.	10, 15	
M, K.	4	
Molnar, K.	7, 13	
Molstad, E.	2	
Mondal, A.	5, 14, 15	
Montes de Oca Zapiain, D.	12	
Moser, D.	3, 5, 12, 15	
Mücklich, F.	13	
Muecklich, F.	3	
Mueller, M.	3, 8	
Mukherjee, A.	10	
Mulhall, S.	9	
Müller, M.	5, 13	
Mulvaney, C.	13	
Mulvaney, M.	7, 10, 12	
Munshi, J.	8	
Murugan, A.	7	
Murugan, M.	12	
Mutschke, A.	14	
Myers, A.	13	
N		
Nag, S.	9	
NA, H.	5	
Na, J.	3	
Najera, D.	6	
Najm, H.	6	
Nalin Venkat, S.	13	
Naorem, R.	4	
Narra, S.	4, 9	
Neamtu, R.	10	
Neumeier, S.	14	
Ngo, A.	5, 9, 12, 15	
Nguyen, N.	13	
Nicholas, P.	11	
Nie, J.	6	
Niezgoda, S.	5, 6, 9, 12, 13	
Nihar, A.	5, 10, 15	
Nikitin, P.	12	
Nnakwo, K.	9	
Noell, P.	7	
Noroozi, M.	15	
Norov, A.	9	
O		
Ogoke, F.	5	
Ogoke, O.	8, 13	
Oh, C.	15	
Ohmura, T.	6	
Olatunde, A.	5, 14, 15	
Olivas-Alanis, L.	10	
Oommen, V.	8	
Oostrom, M.	9	
Osada, T.	6	
Ostlind, A.	13, 15	
Ottomano, F.	11	
Ott, R.	4	
Ouyang, G.	4	
P		
Packard, C.	12, 14	
Pai, N.	12	
Pak, P.	5, 13	
Pantawane, M.	4	
Park, H.	3	
Park, J.	14, 15	
Parmar, A.	13	
Patel, R.	6	
Pathrudkar, S.	8	
Patil, S.	9	
Payne, M.	14	
Pazdernik, K.	9	
Penczek, E.	15	
Peshave, A.	8	
Piedmont, D.	14	
Pilania, G.	8	
Podany, P.	14	
Pokharel, R.	12	
Poliakov, L.	15	
Polonsky, A.	5	
Price, S.	10	
Prochazka, R.	4	
Q		
Qian, X.	15	
Quirarte, G.	13	
R		
Raeisia, B.	4, 5	
Raja, J.	7	
Rajamohan, B.	10, 11	
Rajamohan, P.	10	
Ralphs, C.	2	
Ramamurty, U.	14	
Ramasamy, V.	13, 14, 15	
Ramdoss, S.	12	
Reddy, T.	9	
Reeja-Jayan, B.	5	
Reger, M.	14	
Rezwan, A.	12	
Rhein, R.	6	
Ridenhour, M.	4	
Rigby, J.	9	
Rio, F.	4	
Ritchie, R.	14	
R., J.	6	
Roach, D.	5	
Robertson, A.	6, 11	
Robinson, M.	13	
Rodgers, T.	12	
Rodriquez, C.	10	
Rohrer, G.	5	
Rohskopf, A.	5	
Rollett, A.	9, 13	
Rozikhodjaev, S.	9	
R, S.	4	
Ruddock, J.	11	
Rueschhoff, L.	5	
Rund, M.	4	
Rzepa, S.	14	
S		
Saal, J.	10	
Sack, H.	15	
Sahu, S.	5	
Samajdar, I.	12	
Sanandiyaa, S.	4	
Sanchez, D.	14	
Sansoz, F.	12	
Savage, D.	11	
Sayed, H.	10	
Scannapieco, D.	9	
Schilling, M.	6, 14, 15	
Schmalbach, K.	6	
Schmitz, T.	13, 15	
Schöbel, Y.	8	
Schwalbach, E.	5	
Sehirlioglu, A.	15	
Shade, P.	13	
Shah, M.	5, 11, 13	
Shanazarov, K.	9	
Shanmugavel, B.	7, 12	
Shin, D.	9	
Shin, Y.	8, 13	
Shreyaas, G.	6	
Shrivastava, A.	6	
Shu, D.	12	
Shukla, K.	8	
Sibley, T.	3	
Simmons, J.	11, 13	
Singer, J.	13	
Singh, P.	4	

Sit, C	3
Skrotzki, B	6, 14
Smigelski, P	8
Smith, J	13
Sobotka, J	13
Solis, C	14
Sosa, J	10
Spanos, G	7
Sparks, T	10, 11
Stauffer, D	6
Stebner, A	7
Stegall, D	7, 10
Stiefel, M	13
Stinville, J	4, 6
St John, S	10, 15
St. John, S	12
Stubbins, J	14
Stuckner, J	12
Suarez, D	7, 10, 15
Sudhakar, B	12
Sul, P	10
Sumudumalie Kalutotage, M	11
Sun, B	12
Sundararaghavan, V	11
Suresh, S	8
Sutradhar, A	8
Swick, B	6
T	
Taheri-Mousavi, S	6, 8, 9, 12, 13
Tajkhorshid, E	3
Tan, C	8
Tang, Y	3
Tan, X	14
Tappe, A	10
Tavener, J	8
Tekkaya, E	10
Tenorio, M	8
Thiagarajan, P	8
Thoma, D	6, 13
Thrun, M	7, 13
Thurston, B	5, 10, 13
Tien, J	14
Tiwari, A	13
Tiwari, B	10
Tkach, S	13
Todoh, M	4
Tonks, M	13
Treher, W	15
Trimarchi, G	6
Tripathi, P	3, 4, 5, 8, 10, 11, 14, 15
Tsakopoulos, K	10
Tucker, G	8, 14
Turner, B	5
U	
Uchic, M	5
Uhm, S	14
Urbanek, M	4
Urig, E	10
Usmonov, D	9
Usmonov, M	9
V	
Valloton, J	14
Varley, Z	5
Vasisht Shankar, S	13
Vasquez-Armendariz, J	10
Vazquez, G	15
Venkat, S	15
Verma, R	6
Vermeij, T	14
von Hartrott, P	6, 14
W	
Wagner, J	9
Waitelonis, J	6, 14, 15
Walsh, F	14
Walters, R	13
Wang, B	11
Wang, D	12
Wang, J	12
Wang, M	15
Wang, R	13
Wang, S	5
Wang, W	12, 14
Wanni, J	3, 6, 11, 13
Ward, C	2
Ward, L	3
Weeks, R	11
Weems, M	15
Weissitsch, L	10
Weldemariam, F	9
Wen, M	4, 6
Wen, Y	10
Wertz, J	5
Westraadt, J	8
Westraadt, L	8
Wieczerszak, K	14
Willard, M	8
Wood, B	11
Wu, D	8
Wurster, S	10
Wu, X	4, 13
Wu, Y	5, 10, 11, 13, 15
X	
Xue, T	6
Xu, Z	13, 14
Y	
Yadav, V	13
Yamamoto, R	5, 10, 15
Yang, Y	4
Yan, X	3
Yarus, J	11
Ye, J	11
Yen, T	3, 15
Yeshanew, S	9
Yim, C	3
Yi, S	15
Young, B	7
Youssef, K	15
Yue, W	8, 11, 14
Z	
Zak, S	4
Zamorano-Senderos, B	3
Zappulla, M	7, 13
Zettwoch, J	3, 15
Zhang, B	8, 13
Zhang, J	4
Zhang, M	14
Zhang, X	14
Zhao, Z	7
Zha, Q	5
Zhigilei, L	10
Zhiling, T	13