M ERS

Engineering Research Symposium 2021

Schedule Book
February 5, 2021

15th Annual Engineering Research Symposium

Friday, February 5th, 2021

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Planning Committee

Office of Student Affairs Staff

Debby Covington	Director of Partnerships, Outreach, and Retention
Tiffany Porties	Assistant Director of Partnerships, Outreach, and Retention
Andria Rose	Coordinator of Graduate Programs
Shira Washington	Recruitment Coordinator

Student Volunteers

Name	**Role(s)**
Won Park	Co-Chair
Kiana Sadri	Co-Chair
Hang Yang	Co-Chair
Sajedeh Esfahani	Judging and Towner Committee Member
Mohsen Taheri Andani	Judging and Towner Committee Member (former)
Alondra Ortiz Ortiz	Judging and Towner Committee Members
Melissa Brei	Judging Committee Member
Matt Raymond	Advanced Graduate Research Competition and Towner Committee Member
Ella Fadool	Logistics Committee Member
Yiqi Cheng	Logistics Committee Member
Ariel Jean	Logistics Committee Member
Jocelyn Nabi	Logistics Committee Member
Mohammed Azzouz	Symposium Day Volunteer
Sara Azzouz	Symposium Day Volunteer

Joshua Sodicoff	Undergraduate Research Competition Committee Chair
Kamruzzaman Khan	Virtual Presentation Committee
Kaylee Smith	Virtual Presentation Committee
Susan Dowling	Virtual Presentation Committee
Amanda Bluem	Publicity / Editing Committee
Angelica Mgbeafulu	Publicity / Editing Committee
Angel Rao	Publicity / Editing Committee
Charlotte Zhao	Publicity / Editing Committee
Eric Musa	Publicity / Editing Committee
Halia Andrews	Publicity / Editing Committee
Lucy Covello	Publicity / Editing Committee
May Phoo	Publicity / Editing Committee
Michael He	Publicity / Editing Committee
Namitha John	Publicity / Editing Committee
Pritha Pal	Publicity / Editing Committee
Rishma Balakrishnan	Publicity / Editing Committee
Tony Zhang	Publicity / Editing Committee
Julia Lanier	Advanced Graduate Research Competition Committee Member
Hao Wang	Advanced Graduate Research Competition Committee Member
Nicholas Ernst	Advanced Graduate Research Competition Committee Member
Gongyu Chen	Emerging Committee
Reva Kulkarni	Emerging Committee
Julia Lanier	Emerging Committee
Tanushi Parasramka	Emerging Committee

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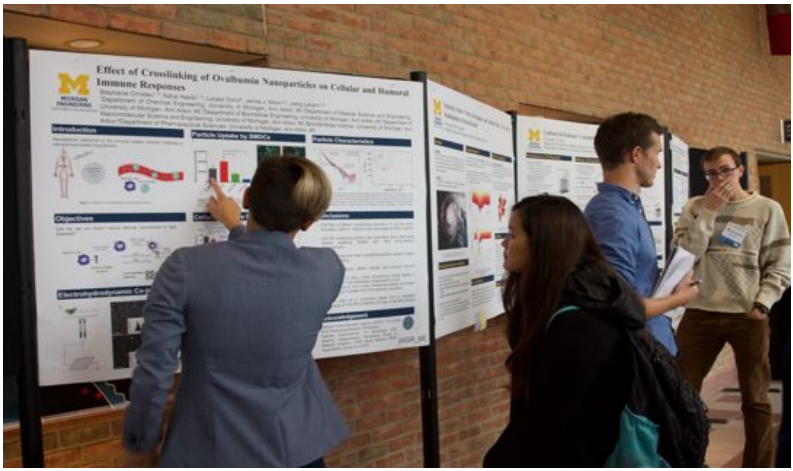

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Symposium Schedule

Friday, February 5, 2021: ERS will be held virtually on Career Fair Plus (CF+).

Time	Event
10:45 AM – 5:00 PM	Registration and Q&A ERS committee members will be available on this page for the entire symposium to answer any questions and concerns.
11:15 AM – 11:45 AM	Welcome Remarks ERS Co-Chairs Mary-Ann Mycek, Associate Dean for Graduate and Professional Education Keynote Speaker: Kon-Well Wang, Stephen P. Timoshenko Professor of Mechanical Engineering
11:45 AM – 2:00 PM	Richard and Eleanor Towner Prize for Outstanding Ph.D. Research Short Talks & Poster Competition-Session 1
11:45 AM – 1:45 PM	Undergraduate Research Competition
11:45 AM – 1:45 PM	Emerging Research Competition
2:00 PM – 3:00 PM	Coffee Chats with Sponsors
3:00 PM – 5:00 PM	Richard and Eleanor Towner Prize for Outstanding Ph.D. Research Short Talks & Poster Competition-Session 2
3:00 PM – 5:00 PM	Advanced Research Competition

This schedule may also be accessed online at the following link:
https://ers.engin.umich.edu/schedule/

Poster Presentations: Richard and Eleanor Towner Prize for Outstanding Ph.D. Research - Session 1

11:45 AM - 2:00 PM

AERO: Aerospace Engineering

Aerostructural Design Optimization of a Hydrogen-Fuel Aircraft
Benjamin Brelje

BME: Biomedical Engineering

Returning Fine, Natural Finger Control To Paralyzed Hands Using An Implantable, Brain-Controlled Neuroprosthesis
Samuel Nason

ChE: Chemical Engineering

Isolation and Characterization of Circulating Tumor Cells in Late-Stage Non-Small Cell Lung Cancer (NSCLC) Patients Predicts Treatment Response
Emma Purcell

Developing Models to Improve Oral Drug Product Development and Delivery in the Gastrointestinal (GI) Tract
Niloufar Salehi

ClaSP: Climate and Space Sciences and Engineering

Global Driving Of The Ionospheric Auroral Conductance
Agnit Mukhopadhyay

CSE: Computer Science and Engineering

Cautiously Optimistic Program Analysis for Security
Subarno Banerjee

Towards Closing the Programmability-Efficiency Gap using Software-Defined Hardware
Subhankar Pal

Environmental Engineering

Production of Platform Chemicals from Organic Waste Streams
Shilva Shrestha

IOE: Industrial and Operations Engineering

Personalized Data-Driven Learning and Optimization: Theory and Applications to Chronic Diseases
Esmaeil Keyvanshokooh

Personalized Hospital Admission Control: A Contextual Learning Approach
Mohammad Zhalechian

MACRO: Macromolecular Science and Engineering

Low Interfacial Toughness (LIT) Materials For Effective Large-Scale De-Icing
Abhishek Dhyani

ME: Mechanical Engineering

User Preference Of Applied Torque Characteristics For Bilateral Powered Ankle Exoskeletons
Kimberly Ingraham

NERS: Nuclear Engineering and Radiological Sciences

Region Of Interest Image Reconstruction For Range Verification For Proton Beam Therapy Using 3-D Position Sensitive CdZnTe

Valerie Nwadeyi

Poster Presentations: Emerging Research Competition

11:45 AM - 1:45 PM

BME: Biomedical Engineering

Wireless Monitoring of Mass Loading in Peripheral Artery Stents Using Magnetoelastic Sensor Interrogated by Electromagnetic Coils
Hind Alyahya

ChE: Chemical Engineering

Development and Evaluation of Thresholding Methods for Confocal Laser Scanning Microscope (CLSM) Biofilm Image
Baharan Meghdadi

CEE: Civil and Environmental Engineering

Genome Stability of Viral Nucleic Acids in Wastewater Influent
Katherine Harrison

Data Fusion of Financial and ESG Metrics to Accelerate the Sustainable Bond Market
Dan Li

Corporate Watershed Portfolio Risk Management Strategy
Mingyan Tian

Experimental Investigation on Energy-based Bolt Loosening Monitoring
Minghao Chen

ClaSP: Climate and Space Sciences and Engineering

Uncovering the Sources of Satellite Hazards: Wave-Particle Interactions in Space Plasma
Shannon Hill

CSE: Computer Science and Engineering

Adapting the U-net for Multi-coil MRI Reconstruction
Makarand Parigi

ECE: Electrical and Computer Engineering

Aggregate Modeling and Asynchronous, Anonymous Coordination of Distributed Air Conditioning Load Resources Under Packetized Energy Management
Oluwagbemileke Oyefeso

IOE: Industrial and Operations Engineering

Scheduling Family Medicine Residents at the American University of Beirut Medical Center to Clinics Using Optimization Methods With Multi-Objective Criteria and Priority Rules
Allison VanderStoep

Mixing Convex-Optimization Bounds for Maximum-Entropy Sampling Problem
Zhongzhu Chen

MACRO: Macromolecular Science and Engineering

Nondestructive In situ Detection of Chemical Reactions at the Buried Interface between Polyurethane and Isocyanate-Based Primer
Shuqing Zhang

MSE: Materials Science and Engineering

Nanomaterial Reinforcement of Natural Fibers for Structural Polymeric Composites
Amy Langhorst

Improved Extraction of Natural Fibers for Polymer Composite Application
Anshul Singhal

ME: Mechanical Engineering

Negative Refraction and Subwavelength Imaging for Flexural Waves in Phononic Crystal Plates
Hrishikesh Danawe

Optimal Distribution of Tasks in Human-Autonomy Teams
Haochen Wu

Low Frequency Flexural Wavefront Control via Elastic Metasurfaces
Zhenkun Lin

Experimental Characterization of Aerosol Behavior and Mitigation Strategies in Large, Open Plan, Dental Clinics
Min Zhu

Uncertainty Quantification via Multifidelity Karhunen-Loève Expansions for a Turbulent Round Jet
Aniket Jivani

Computational Investigation of Multigroup Opacities in a Radiative Shock-Driven Shear Flow
Sonya Dick

ROB: Robotics

Modeling and Phase-Based Control of Sit-to-Stand Motion with a Powered Knee-Ankle Prosthesis
Daphna Raz

A Data Driven Approach for Predicting Preferred Ankle Stiffness
Varun Satyadev Shetty

Poster Presentations: Undergraduate Research Competition

11:45 AM - 1:45 PM

AERO: Aerospace Engineering

Mode II Interlaminar Fracture Toughness Healing of Fiber-Reinforced Composite Using Dynamic Covalent Epoxy Matrix Drop-in Link
Federico Benazzo

BME: Biomedical Engineering

Wireless Monitoring of Mass Loading in Peripheral Artery Stents Using Magnetoelastic Sensor Interrogated by Electromagnetic Coils
Hind Alyahya

Computational Modeling of Pediatric Pulmonary Arterial Hypertension
Nathan Li

High-Throughput Screening Platform to Discover Agonist Antibodies that Activate Immune Receptors
Timon Lwo

Predicting Dynamic Loop Binding: A Small Molecule Pattern-Based Approach
Chloe Markey

Investigating Encapsulin Nanocompartments as a Novel Drug Delivery Platform
Eric Musa

Focused Ultrasound for Appendicular Soft-Tissue Sarcomas: Three-Dimensional Targetability Assessment
Piush Sarkar

Automatic Segmentation of Myosin From SHG Images of Skeletal Muscle Tissue Using Convolutional Neural Networks
Samantha Zerafa

Utilizing Machine Learning for the Identification of Biomarkers to Mitigate Neuroinflammation Following Intracortical Microelectrode Implantation
Jadan Law

Deconvolving Spatial Transcriptomic Data Using Heterogeneous Single-Cell Datasets
Joshua Sodicoff

ChE: Chemical Engineering

Understanding V2+/V3+ Complexation and Reaction on Glassy Carbon in Acidic Electrolytes from First Principles for Vanadium Redox Flow Batteries
Jacob Florian

Ce3+ and Ce4+ Structures and Redox Kinetics in Acidic Electrolytes
Dylan Herrera

How Male Engineering Students Perceive Gender Dynamics in First-Year Project Based Courses
Megan Keough

Electrocatalytic Hydrogenation of Model Bio-Oil Compounds on Pt and Rh
Jonathan Lee

Electro-Jet Writing of Edible Scaffolds for Oral Delivery of Therapeutic Antioxidants and Texture Enhancement
Malini Mukherji

Inertial Focusing of Particles in Curved Microchannels
Anna Kaehr

CSE: Computer Science and Engineering

The Tissue-Level Organizational Signatures of Type 2 Diabetes Using Computer Vision
Samir Agarwala

Lesion Detection on Microscopy Images of Murine H&E Stained Lung Sections Using Sparse PCA Network
Wenfei Tang

Coordinate Chart Particle Filter for Deformable Object Pose Estimation
Thomas Cohn

What I Know and When I Say It: How Trading Order and Informativeness Affect Market Prices
Blake Martin

IOE: Industrial and Operations Engineering

Incorporating Patient Deterioration When Simulating Utilization of a Cardiovascular Intensive Care Unit
Imani Carson

Using Simulation to Rightsize Prenatal Care
Amanda Naccarato

Evaluating Patient Triage Strategies for Non-Emergency Outpatient Procedures Under Reduced Capacity Due to the COVID-19 Pandemic
Advaidh Venkat

A Multi-Batch L-BFGS Method with Variance Reduction: Theory and Experiments
Zihong Yi

MSE: Materials Science and Engineering

Semiconductor Quantum Dots: Dopant versus Free Carrier Profiles
Alexandra Zimmerman

ME: Mechanical Engineering

Reliability Benefits of Wide-Area Renewable Energy Planning: Effective Load Carrying Capabilities of Wind and Solar Power across the Western United States
Julian Florez

Design and Implementation of a Safety System for an Ankle Rehabilitation Robot
Adam Kim

Manufacturing Procedure and Performance Evaluation of Multifunctional Bamboo Composites
Claire Huang

Utilizing K-Means Clustering to Analyze United States Counties Based on COVID-19 Cases, Unemployment Rate, and Median Household Income
Madhav Bhat

NAME: Naval Architecture and Marine Engineering

Examining the Challenges and Feasibility of Long Term Autonomous Vessels
Adam Magistro

NERS: Nuclear Engineering and Radiological Sciences

An Adaptive Low Pass Algorithm for the Removal of Impulse Noise from Photomultiplier Tube Signal

Jack Thiesen

Poster Presentations: Advanced Research Competition

3:00 AM - 5:00 PM

AP: Applied Physics

Evaluating the Mobility of Semiconductor Alloys with Heisenberg's Uncertainty Principle
Nick Pant

BME: Biomedical Engineering

Discovery and Optimization of Agonist Antibodies That Activate T Cell Receptors
Harkamal Jhajj

Deconstructing Metastatic Regulators Using Bi-Species Heterokaryons
Benjamin Yang

Multiphase, Vascularized Bone Constructs Comprised of Modular Vascular and Osteogenic Microtissues
Nicholas Schott

Single Cell Deconstruction of Murine Volumetric Muscle Loss Reveals Inflammatory Imbalances Preventing Muscle Stem Cell Mediated Regeneration
Jacqueline Larouche

Iron Sulfide Supraparticles as Artificial Viruses for Gene and Gene Editing Therapies
Emine Turali-Emre

Apoptotic Cell Engulfment Induces Changes in Macrophage Nuclear Morphology and Transcriptional Regulation Pathways
Rahasudha Kannan

Patient-derived Tumoroids for Exploration of Cancer Stem Cell Regulation, Chemoresistance, and Tumor Heterogeneity
Michael Bregenzer

ChE: Chemical Engineering

Design of High Affinity and Specificity Pro-Apoptotic Stapled Peptides
Marshall Case

The Role of Antibody Drug Conjugate Linker Stability in Cellular Processing and Bystander Effect
Anna Kopp

Rhodium Sulfides (RhxSy) as Halide-Resistant Nitrate Reduction Electrocatalysts for Wastewater Remediation
Danielle Richards

Characterization of PSMα1 Functional Amyloids in S. aureus Biofilm
Chloe Luyet

Role of Water Displacement on Adsorption and Surface Reaction in Aqueous Phase
James Akinola

CEE: Civil and Environmental Engineering

Performance-based, Digital Financing Model to Accelerate Adoption of Low-Carbon Agriculture Practices
Kenneth Chung

Pop-Up Kirigami Structures
Maria Redoutey

Innovating a Bendable Concrete Railroad Tie with Enhanced Fatigue Durability via Waste CO2 Utilization
Wei-Hsiu Hu

Wearable-Based Urban Sensing Framework to Detect Environmental Stressors for Seniors' Mobility
Gaang Lee

Step Attention: Sequential Pedestrian Trajectory Prediction
Ethan Zhang

ClaSP: Climate and Space Science and Engineering

Assessing the Performance of the Solar Orbiter Heavy Ion Sensor via Cross Calibration with its Ion Optical Model
Sarah A. Spitzer

ECE: Electrical and Computer Engineering

A Low Power Bluetooth Low-Energy Transmitter with a 10.5nJ Startup-Energy Crystal Oscillator
Omar Abdelatty

Building Efficient and Reliable Emerging Technology Systems
Aporva Amarnath

NDIGO: Consistent Estimation of Identifiable Nonparametric Mixture Models From Grouped Observations
Alexander Ritchie

HVAQ: A High-Resolution Vision-Based Air Quality Dataset
Tony Zhang

MINT: Deep Network Compression via Mutual Information-based Neuron Trimming
Madan Ravi Ganesh

IOE: Industrial and Operations Engineering

Modeling Hurricane Evacuation Departure Times Using Location Data
Valerie Washington

MACRO: Macromolecular Science and Engineering

Ionic Liquid Manipulations of Raw Biomass: [Dbuh][Oac] Analyzed as a Green Solvent for Converting Coffee by-Product to Fibers
Julie Rieland

MSE: Materials Science and Engineering

Techniques for Enabling Fast Charging in Energy-Dense Batteries and Their in-Depth Analysis Using Continuum Level Modeling
Vishwas Goel

Chiral Kirigami Metamaterials
Wonjin Choi

ME: Mechanical Engineering

Hysteresis and “Arrow of Time” in the Evolution of Grain Boundaries during Thermal Cycling
Zhitong Bai

Compressibility Contributions in the Collapse of a Cavitation Bubble
Minki Kim

Measuring the Human Perception of Metabolic Effort While Walking With an Assistive Exoskeleton
Roberto Medrano

Nanokelvin-Resolution Thermometry from Microscale Devices at Room Temperature
Amin Reihani

Scaling Behavior of Vortex Dipoles in Flows Induced by the Richtmyer-Meshkov Instability
Michael Wadas

Dynamic Deployment of Origami Structures
Yutong Xia

Resolving The Discrepancy Between Alternating Current and Direct Current In Diffusion Measurement Of Battery Electrode Particles
Changyu Deng

Should Drivers Be Decoupled During an Emergency? Human-Automation Control Sharing During Collision Avoidance
Akshay Bhardwaj

Optimal Capillary Rheometer methods for Newtonian fluids
Subramaniam Balakrishna

NERS: Nuclear Engineering and Radiological Sciences

STEM Characterization of Radiation Induced Dislocation Loops in FCC-Based Alloys
Pengyuan Xiu

Poster Presentations: Richard and Eleanor Towner Prize for Outstanding Ph.D. Research - Session 2

3:00 PM - 5:00 PM

AERO: Aerospace Engineering

Enhanced Schapery Theory (EST): A High-fidelity, Versatile and Efficient Computational Model for the Low Velocity Impact (LVI) of Carbon Fiber Reinforced Polymers (CFRP) Composites
Shiyao Lin

BME: Biomedical Engineering

Fiber Density Promotes Quiescent-Invasive Transition of Endothelial Cells to Initiate Angiogenesis
William Wang

CEE: Civil and Environmental Engineering

A Traveler Incentive Program For Promoting Community-Based Ridesharing
Amir Tafreshian

Multiscale Simulation and Assessment of the Seismic Resilience of Communities
Omar Sediek

ECE: Electrical and Computer Engineering

Algorithmic Solutions for Interconnecting Multiple Energy Sources to Promote Clean Energy Systems
Sijia Geng

How Do Fair Decisions Fare in Long-term Qualification?
Xueru Zhang

Environmental Engineering

Novel Approaches to Monitor Virus Fate Through Water Treatment Processes
Nicole Rockey

ME: Mechanical Engineering

Magnesium Alloys: A Competitive Yet Unexplored Materials for Improved Lightweighting
Mohsen Taheri Andani

NAME: Naval Architecture and Marine Engineering

Data Driven Propeller And Rudder Modelling For Marine Vessel Maneuvering Calculations
Bradford Knight

NERS: Nuclear Engineering and Radiological Sciences

Investigation of Long-distance, Millisecond Optical Guiding and Anti-guiding in the Wake of Ultrafast Laser-driven Filaments
Patrick Skrodzki

ROB: Robotics

Methods for Processing Trust Between Drivers and Automated Vehicles for Improved Collaboration

Hebert Azevedo Sa

Multi-Task Learning for Scalable Dense Multi-Layer Bayesian Map Inference

Lu Gan

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