

10th Annual Research Symposium



Location: MSC

Date: 6th March 2023



Artie McFerrin Department of
CHEMICAL ENGINEERING
TEXAS A&M UNIVERSITY

ChEGSA
TEXAS A&M UNIVERSITY

WELCOME NOTE

We hope to highlight the research conducted in the Chemical Engineering Department of Texas A&M University through the 10th Annual CHEGSA symposium and provide students an opportunity to showcase their work to their peers and industry professionals. We gratefully appreciate the industrial and internal Texas A&M sponsors for their generous monetary and technical support. Our goal is to offer a forum for the discussion of ideas that will enhance science and technology. We hope the event is successful and productive for all attendees.

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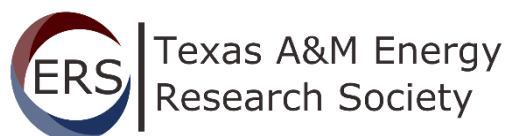


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Division of Research



Texas A&M University Good Bull Fund

SCHEDULE

Monday (6 th March 2023), Memorial Student Center				
Time	Event			
07:15 - 08:00	Registration (MSC 2400)			
	Breakfast (MSC 2400)			
08:00 - 08:15	Opening Remarks (MSC 2400)			
08:15 - 09:05	Keynote Address: Shell (MSC 2400)			
09:05 - 09:15	Transition			
09:15 - 11:00	Oral Presentations			
	Advanced Materials and Nanotechnology	Health and Bioengineering	PSE and Data Science	Safety
	(MSC 2501)	(MSC 2502)	(MSC 2503)	(MSC 2504)
11:00 - 11:10	Transition			
11:10 - 11:50	Panel Discussion I (MSC 2406)			
11:50 - 12:35	Plenary Talk: Albemarle (MSC 2406)			
12:35 - 13:30	Lunch (MSC 2400)			
13:30 - 14:15	Keynote Address 2: Dow (MSC 2406)			
14:15 - 14:55	Panel Discussion II (MSC 2406)			
14:55 - 15:10	Transition			
15:10 - 16:30	Poster & Networking Session (MSC 2400)			
16:30 - 17:00	Closing Remarks & Awards (MSC 2400)			

ORAL PRESENTATIONS

Time	Advanced Materials and Nanotechnology	Health and Bioengineering	PSE and Data Science	Safety
09:15 - 09:30	<p>Deniz Ebeperi</p> <p><i>Embedding Information in Additively Manufactured Metals via Magnetic Property Grading for Traceability and Counterfeiting Prevention</i></p>	<p>Qiang Hu</p> <p><i>Glycan detection based on Surface-enhanced Raman scattering and machine learning</i></p>	<p>Ifeoluwa Babalola</p> <p><i>Embedded hands-on classroom activities tailored to personality preferences enhance student learning in core undergraduate chemical engineering courses</i></p>	<p>Mohammad Zaid Kamil</p> <p><i>A Hybrid Risk Assessment Approach of Multi-Source Heterogeneous Data</i></p>
09:30 - 09:45	<p>David Kumar Yesudoss</p> <p><i>Engineering of Titanium Carbonitride MXene for Pt-like HER activity by surface modification with Ruthenium</i></p>	<p>Nidhi</p> <p><i>Interdisciplinary Perspective of 3D Printing Incorporating 2D Nanomaterials</i></p>	<p>Marcello Di Martino</p> <p><i>Modeling and optimization strategies for multi-scale food-energy-water nexus systems</i></p>	<p>Mohammad Sadiq Saeed</p> <p><i>Human health risk assessment model due to growing concern of microplastic intake by the Arctic people</i></p>
09:45 - 10:00	<p>Eugenie Marie Pranada</p> <p><i>Subsurface Oxygen Reduction Reaction Activity on Ti₂N MXene Revealed by In-situ Raman Spectroelectrochemistry</i></p>	<p>Bhavya Jaiswal</p> <p><i>Bacteria Transformation using Microfluidic Continuous Electroporation in Paper (μCEP)</i></p>	<p>Natasha Jane Chrisandina</p> <p><i>Multi-scale integration of resilient distributed energy systems</i></p>	<p>Yutian Qian</p> <p><i>Constructing a Process Safety Risk Index Empowered by ASPEN Plus Simulation</i></p>
10:00 - 10:15	<p>Bright Ngozichukwu</p> <p><i>Stability and Optoelectronic Properties of Two-Dimensional Titanium Nitride Ti₄N₃T_x MXene</i></p>	<p>Liangyu Qian</p> <p><i>Discovery of sequence fingerprints governing the substrate specificity in a microbial oxidoreductase</i></p>	<p>Silabrata Pahari</p> <p><i>Optimal feedback morphology control of amphiphile self-assembly using Markov state models: numerical studies and experimental validation</i></p>	<p>Mitchell Huffman</p> <p><i>Design of future energy systems with embedded life cycle emission considerations</i></p>

Time	Advanced Materials and Nanotechnology	Health and Bioengineering	PSE and Data Science	Safety
10:15 - 10:30	<p>Ray Yoo</p> <p><i>Optimizing Ti₂N MXene Reactivity Through Decoupling Surface and Bulk Phenomena</i></p>	<p>Vijay Ravisankar</p> <p><i>Development of rational design criteria for point of care (POC) microfluidic Rayleigh-Bénard convective polymerase chain reaction (RB-PCR)</i></p>	<p>Ebtihal Youssef</p> <p><i>Examining the Efficacy of Contemporary Alternative Oxidation Reactions Towards Green Hydrogen Production</i></p>	<p>Sankhadeep Sarkar</p> <p><i>Fundamentals of Battery Safety in Electric Vehicles</i></p>
10:30 - 10:45	<p>Kailash Arole</p> <p><i>Effects of Ti₃C₂T_z MXene nanoparticle additive on fluidic properties and tribological performance</i></p>	<p>Niraj Ashutosh Vidwans</p> <p><i>Real-time Study of Photocatalysis-induced Viability Loss of Escherichia coli Using Single-cell Level Measurements of Cell Motility</i></p>	<p>Moustafa Ali</p> <p><i>Process Modeling, Design, and Intensification of Oxidative Coupling of Methane (OCM) Process</i></p>	
10:45 - 11:00	<p>Cheng-Che Hsiao</p> <p><i>Electrochemically Activated Ti₄N₃T_x MXene Electrodes for Batteries and Supercapacitors</i></p>	<p>Minchen Mu</p> <p><i>Multifunctional metal-free coating with antibacterial and antiadhesion capabilities based on mesoporous silica</i></p>	<p>Colson Johnson</p> <p><i>Experimental Analysis of Autoignition as it Pertains to Fire Prevention</i></p>	

KEYNOTE ADDRESS I

Opportunities for Chemical Engineers in Accelerating the Transport Sector Energy Transition

Time: 8:15 - 9:05 AM (MSC 2400)



Shyamal Bej, Shell

Shyamal Bej is a Senior Principal Science Expert in the Process Development Group of Shell and currently supporting several projects related to low carbon renewable fuels, waste plastic to chemicals and carbon dioxide abatement. Before joining Shell in 2012, he worked for the Indian Institute of Petroleum, the University of Michigan, ConocoPhillips and British Petroleum (BP) in the areas of petroleum refining, petrochemicals and specialty chemicals. Shyamal has a total experience of about 32 years in fundamentals of catalysis and reaction engineering, catalyst and process development, technology due diligence and derisking, support to commercialization and trouble shooting in commercial plants. He was heavily involved in developing, commercializing and improving several technologies. Shyamal received his PhD in Chemical Engineering from the Indian Institute of Technology, Kanpur, India and did his postdoctoral research in Catalysis from the University of Michigan, Ann Arbor, USA.



PANEL DISCUSSION I

Current Challenges and Solutions in Chemical Engineering

Time: 11:10 AM to 11:50 AM

Location: MSC 2406



Steven Alferi
Albemarle



Mark Barteau
Texas A&M University



Ron Presswood
Elemental Recycling



Joseph Kwon
(Moderator)
Texas A&M University



Qing Sun
Texas A&M University



Nazmul Rahmani
Texas A&M University

PLENARY TALK

Lessons Learned the Hard Way: The Evolution of a Reactive Hazard Program

Time: 11:50 AM - 12:35 PM (MSC 2406)



Daniel Smith, Albemarle

Dan Smith is a Distinguished Advisor with Albemarle Corporation, and the technical leader of Albemarle's Chemical Reactivity and Engineering Fundamentals group which provides technical expertise in chemical reactive hazards and pressure safety relief design. Dan has 37 years of experience in the chemical process industry - the last 20 emphasizing process safety. Dan is an AIChE Senior Member and an active member in the Design Institute of Emergency Relief Systems (DIERS). Dan is a teacher of the DIERS Basic Emergency Relief System Design (CH172) and Advanced Emergency Relief System Design (CH173) AIChE courses. He has a B.S. degree with honors in Chemical Engineering from the University of Arkansas.



KEYNOTE ADDRESS II

Nonlinear Mixed-Effects Models for Parameter Estimation

Time: 1:30 - 2:15 PM (MSC 2406)



Daniel A. Hickman, The Dow Chemical Company

Dan Hickman is a Senior R&D Fellow in the Engineering and Process Science department of Dow's Core Research & Development. He received his B.S. in chemical engineering from Iowa State University (1988) and his Ph.D. in chemical engineering from the University of Minnesota (1992). In 29 years with Dow, Dan has served as a subject matter expert and technical leader in reaction engineering and process development for numerous reaction systems across many Dow businesses and technologies. His industrial reaction engineering experience includes working with stirred tank reactors, fixed bed reactors, trickle bed reactors, and fluidized bed reactors. His contributions at Dow include the conceptual design of new reactor systems for three commercial processes and the development of training and resources that facilitate efficient and reliable reactor scale-up from the laboratory. Dan holds 24 patents and has authored 31 journal articles and book chapters and more than 200 internal Dow reports. Dan was named the Mid-Michigan AIChE Chemical Engineer of the Year in 2014, received the CRE Practice Award from the Catalysis and Reaction Engineering Division of AIChE in 2015, and currently serves the global reaction engineering community as the president of the board of directors for ISCRE.



PANEL DISCUSSION II

Career Options for PhDs: Academia, Industry, and National Labs

Time: 2:15 PM to 2:55 PM

Location: MSC 2406



Daniel Hickman
Dow



Sukaran Arora
Dow



Manish Shetty
Texas A&M University
(Moderator)



Jeetain Mittal
Texas A&M University



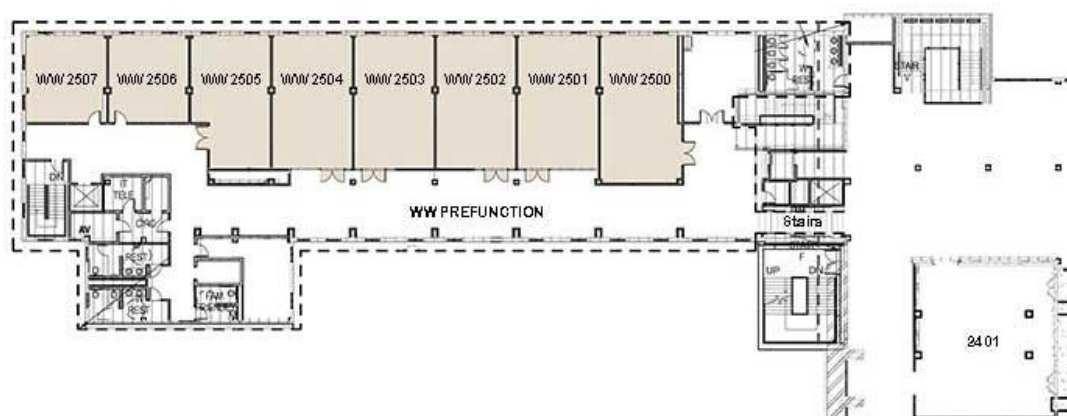
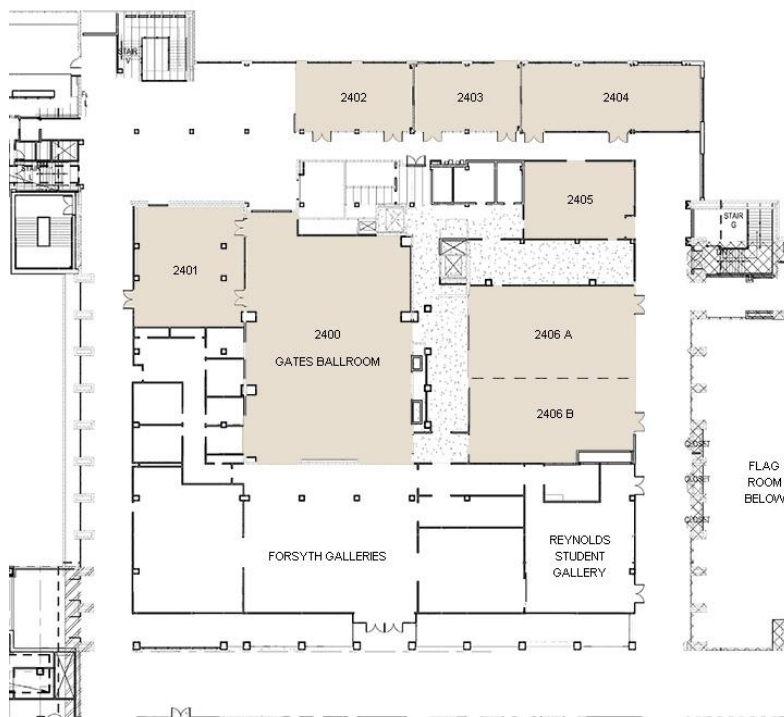
Micah Green
Texas A&M University

POSTER PRESENTATIONS

Poster No.	Presenter	Presentation Title
P1	Krishna Chaitanya Gadepally	Image Complexity and Convolutional Layers
P2	Tamunoemi Opakirite Braide	Divalent Cation Effects in Poly(diallyldimethylammonium)-Poly(styrene sulfonate) Complexes
P3	Razeen Shaikh	Sloppy models in Systems Biology: a case study of the Smad signaling model
P4	Austin Johnes	A Framework for Applying Safety Indices into the Design and Optimization of Dynamic Chemical Supply Chains
P5	Silabrata Pahari	Accelerated kinetic Monte Carlo (kMC) simulations and density functional theory (DFT) to predict turn-over frequencies in heterogeneous complex catalytic reactions
P6	Parth Shah	Achieving optimal paper properties: a layered multiscale kMC and LSTM-ANN-based control approach for Kraft pulping
P7	Bhushan Pawar	Resilience assessment framework for fast response process systems
P8	Svetlira Van Jakovich	Credential Sharing on High Performance Computing Systems
P9	Ankush Rout	Design of Disaster Resilient, Reliable and Resourceful Hydrogen Generation unit
P10	Rahul Kakodkar	Energiapy - a decision making and risk analysis software framework
P11	Yilun Lin	Multi-scale modeling and optimization framework for the design of future circular energy economies focusing on material transition
P12	Bhavana Bhadriraju	Safety in Energy Storage
P13	Siddhesh Shirish Borkar	Hydrogenolysis of polyolefins over supported metal catalysts
P14	Swaminathan Sundar	Design of future energy systems with embedded life cycle emission considerations
P15	Dustin Kenefake	Efficient Integration of Neural Networks into Model Predictive Control - A Multi-parametric Approach
P16	Ahmed Elkady	Identification of Risk Factors in offshore wind-integrated hydrogen production system
P17	Abani	Inverse Emulsion-Crosslinked Cyclodextrin Polymer Nanoparticles for Selective Adsorption and Chemiresistive Sensing

FLOOR PLAN

Memorial Student Center, TAMU





TEXAS A&M UNIVERSITY

Artie McFerrin Department of
Chemical Engineering

Rankings

#12

Undergraduate program
ranked No. 12 (Public)
U.S. News & World Report, 2022

#16

Graduate program
ranked No. 16 (Public)
U.S. News & World Report, 2023

Degrees Conferred

- 242** B.S. Chemical Engineering
- 5** M.S. Chemical Engineering
- 6** M.S. Safety Engineering
- 9** Masters in Biotechnology
- 13** M.Eng Chemical Engineering
- 31** Ph.D. Chemical Engineering

Research Expenditures

\$25.6 Million *(2022)*

By the Numbers

- 48** Faculty Members
- 1,034** Students *(Fall 22)*
 - 770** Undergraduates
 - 265** Graduates

Research Areas

- Biomedicine and Biomolecules
- Biofuels and Biotechnology
- Catalysis
- Computational Chemical Engineering
- Complex Fluids, Microfluidics and Soft Matter
- Nanotechnology
- Energy
- Process Systems Engineering
- Environmental and Sustainability
- Reaction Engineering
- Materials and Microelectronics
- Process Control and Process Safety


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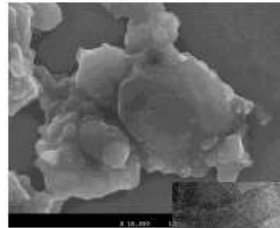
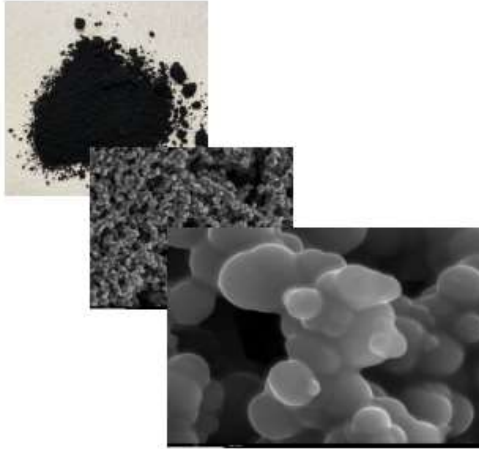
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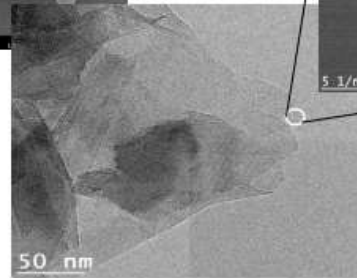
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Manufacturing High Purity CO₂e Neutral
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SEM



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In Association with IChemE and C-RISE

October 11-13, 2023



Texas A&M Engineering Experiment Station

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26th Process Safety International Symposium

