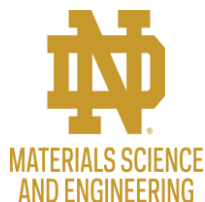


Sponsors



RESEARCH



THE GRADUATE SCHOOL

11th Annual CBE Graduate Research Symposium



Hosted by:
University of Notre Dame
Chemical & Biomolecular Engineering
Graduate Student Organization

September 26, 2025
Downes Ballroom,
Corbett Family Hall

Welcome

Overview

Welcome to the 11th Annual CBE Graduate Research Symposium!

The goal of the Chemical & Biomolecular Engineering (CBE) Graduate Research Symposium is to provide a forum for CBE graduate students and post-doctoral researchers to present their research, network with professionals from both industry and academia, and develop their professional identity.

During this event, students will showcase research from a wide range of disciplines, including catalysis, energy and sustainability, nano-fluidics, micro-fluidics, simulation and theory, materials science, nanotechnology, and bioengineering. The symposium also features invited talks by experienced and renowned personalities in chemical engineering to provide a variety of perspectives on career development for chemical engineers pursuing a PhD.

As this event has continued to grow, so too has the impact on CBE graduate student professional development and sense of community.

Thank you for attending the CBE Graduate Research Symposium.

Organizers

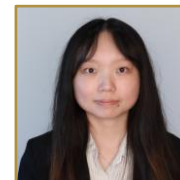
Symposium Committee



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President



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Annabelle Li
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Ashiat Bakare
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Director of Communications



Dr. William Schneider
CBE Department Chair



Dr. Jonathan Whitmer
CBE Director of Graduate Studies

Schedule of Events

Friday – September 26, 2025

9:00 AM

Check-In, Poster Setup, and Breakfast

9:45 AM

Welcome Address – Dr. Jonathan Whitmer

10:00 AM

Keynote Speech – Dr. Han Xia

10:40 AM

Poster Session 1

12:00 PM

Student Presentation 1

12:20 PM

Student Presentation 2

12:40 PM

Lunch

1:50 PM

Panel Discussion

2:30 PM

Poster Session 2

3:50 PM

Career Fair

4:40 PM

Group Photo and Poster Awards

5:00 PM

End of Symposium

Invited Speakers

Keynote Speaker – 10:00-10:40 AM



Dr. Han Xia

*Senior Advisor - Thermal Hazard Lab Lead
Eli Lilly and Company*

Dr. Han Xia earned his Ph.D. in Chemical and Biomolecular Engineering from the University of Notre Dame in 2017. Following graduation, he joined the Chemical Hazard Laboratory at Eli Lilly and Company, where he became the technical lead in 2020.

Panel Discussion – 1:50-2:30 PM



Dr. Michael Penninger

*Senior Manager
Honeywell UOP*



Dr. Manish Kelkar

*CoExIST Lead
AbbVie*



Dr. Bumjun Park

*Senior Manager
Idaho National Lab*



Dr. Emmy Radich

*Director of Research
Infiltrator Water Technologies*

Oral Presentations

Student Presentation 1 – 12:00-12:20 PM



DFT Evaluation of $\text{N}_2/\text{N}_2\text{O}$ Selectivity During $\text{NH}_3\text{-NO}_x$ SCR Over Cu-CHA Zeolite Catalysts

Raghav Saxena

Schneider Research Group

Student Presentation 2 – 12:20-12:40 PM



Phenylboronic Acid Modified Dasiglucagon for Prophylactic Hypoglycemia Protection

Emily DeWolf

The Webber Lab

Career Fair

Downes Ballroom – 3:50-4:40 PM



Honeywell

abbvie



Poster Presentations

Session 1 – 10:40 AM-12:00 PM

P.N.	Presenter	Advisor(s)	Poster Title
1	Bryan Piguave	Brett Savoie	A Novel Framework for Few-Shot Molecular Property Prediction via Multimodal Representation and Epistemic Uncertainty Quantification
3	Feng Gao	Hsueh-Chia Chang	A Hybrid FET-Ionic Circuit Biosensor
5	David Gazzo	Jeremiah Zartman	Deciphering the Functional Interplay Between SERCA and Piezo in Calcium Homeostasis and Tissue Organization
7	Henry Seungmin Lee	William Schneider	Impact of Vibrational Excitation on N ₂ Dissociative Chemisorption on Palladium Surface
9	Laurianne Estrada	William Phillip	Investigating the impact of multicomponent interactions on solute transport via high-throughput experiments
11	Andrew Marquardt	Brett Savoie	Multispectral Digital Chromatography Via Probabilistic Diffusion Architectures
13	James Magas	Nosang Myung	Identification of Avian Influenza Volatile Biomarkers Using a Smart Electronic Nose System
15	Daniel Montes Pinzon	Hsueh-Chia Chang	Tuning the Morphological Properties of Granular Hydrogels to Control Lymphatic Capillary Formation
17	Gaeun Kim	Yichun Wang	Efficient Gene Delivery for Breast Cancer Using Small Extracellular Vesicles: Chiral-Assisted siRNA Loading and pH-Responsive Peptide Functionalization

Poster Presentations

Session 1 – 10:40 AM-12:00 PM

P.N.	Presenter	Advisor(s)	Poster Title
19	Jose Rebolledo-Oyarce	William Schneider	Quantifying Cu Sites in Cu-CHA Zeolites Via Mechanistic Understanding of H ₂ Reduction
21	Logan Hennes	Jonathan Whitmer	Controlling Electrostatics and Solvation to Enhance Conductivity in Structured Electrolytes
23	Montana Carlozo	Alexander Dowling, Edward Maginn	Machine Learning to Optimize Transferable Hydrofluorocarbon Refrigerant Force Fields
27	Xinyi Huang	Matthew Webber	Modular Supramolecular Antibody Bridges via CB[8]-Mediated Host–Guest Assembly
29	Nellie Bowen	Nosang Myung, Jennifer Schaefer	Composite Polymer Electrolytes Containing Organic Charge-Transfer Complexes for All-Solid-State Lithium Battery Applications
31	Orlando Mendible	Yamil Colon	Leveraging Machine Learning Interatomic Potentials and Agentic Frameworks
33	Damian Agi	Alexander Dowling	Process modeling and systems analysis for sustainable ammonia production with biogas valorization
35	Liting Wang	Ruilan Guo	Beyond fluorine: molecular-level understanding of the effect of bromination and chlorination on polymer membrane transport property and long-term stability
37	Molly Dougher	Alexander Dowling	Modeling Multi-Component Critical Material Feed Streams to Enable Design and Optimization of Multi-Stage Diafiltration Cascades
39	Piyush Deshpande	Jennifer Schaefer	Ex-situ Analysis of Interlayer Membranes for Metal-Sulfur Batteries with Solid Polymer Electrolytes

Poster Presentations

Session 1 – 10:40 AM-12:00 PM

P.N.	Presenter	Advisor(s)	Poster Title
41	Sandra Weber	Ruilan Guo	Organosoluble Pentiptycene-containing Polybenzoxazole Membranes for High Temperature Gas Separations
43	Precious Okolo	Yamil Colon, Edward Maginn	Using Molecular Simulation and Machine Learning to Understand the Solubility of Refrigerants (HFCs) In Deep Eutectic solvents (DES)
45	Shuman Liu	Merlin Bruening	Identifying Enzymes that Degrade Polysorbate 80
47	Raeleen Sobetski	Basar Bilgicer	Evaluation Of Selective Uptake Of Multiple Myeloma Surface Marker (MSM)-Targeted Nanoparticles
49	Farbod Shirinichi	Yichun Wang	Engineering Chiral Graphene Quantum Dots with Diverse Nanostructures for Biological Interaction
51	Yu Shao	Gabriel Burks	Harmonizing Synthetic Materials with Nature: A Circular Approach to Sustainable Rubbery Materials

Poster Presentations

Session 2 – 2:30-3:50 PM

P.N.	Presenter	Advisor(s)	Poster Title
2	Natasha Armah	Merlin Bruening	Selective Lithium Transport due to Charged Polymer–Membrane Interactions in Pressure-Driven Systems
4	Fati Lukeman	Jennifer Schaefer	Effect of Non-Interacting Diluents on Ion Transport in PEO–LiTFSI Polymer Electrolytes
6	Fathya Salih	Yamil Colon	Guidelines for Sigma Profile Generation to Enhance ML Predictions of Thermophysical Properties
8	Denver Haycock	William Schneider	Pulsed Plasma Model Development to Understand Improved Ethane Dehydrogenation in Nonthermal Plasma
10	Andrew Schofield	Brett Savoie	Generalized Molecular Property Imputation Using a Flexible Transformer Architecture
12	Daniel Hardesty	Ruilan Guo	Using Carboxylated Polymer of Intrinsic Microporosity to Separate the Refrigerant Gas Mixture R410A
14	Hailey Lynch	Jonathan Whitmer	Modeling Drug Perfusion in Complex Soft Matter Systems
16	Pratham Singh	William Phillip	Influence of Anion Identity and pH on Ion Transport during Diafiltration of Lithium-Ion Battery Leachates
18	Kendra Edgett	Basar Bilgicer	Determining Antibody-Glycan Interactions in α -Gal Syndrome With Liposomal Nanoparticles

Poster Presentations

Session 2 – 2:30-3:50 PM

P.N.	Presenter	Advisor(s)	Poster Title
20	Hyunsu Jeon	Yichun Wang	Automated High-Content, High-Throughput Spatial Analysis Pipeline for Drug Screening in 3D Tumor Spheroid Inverted Colloidal Crystal Arrays
22	Michael Dunn	Alexander Dowling	Uncertainty Analysis of Temperature Control Lab Model Reformulations
24	Hannah Frankovic	Jason Hicks	Pulsed Plasma Regeneration of a Propane Dehydrogenation Catalyst
26	Shukun Zhong	William Phillip	Systematic Analysis of Polymer–Nonsolvent Interactions under Humid Intrusion Conditions
28	James Johnston	Yichun Wang	A Piezoelectric Nanofibrous Scaffold (PES) as a Stimulative Platform for Enhancing the Production of Small Extracellular Vesicles
30	Emmanuel Afreh	Nosang Myung, Jennifer Schaefer	PEG-based Single-Ion Conducting Gel Polymer Electrolytes for Ionic Thermoelectric Cooling
32	Wilson Raney	Yamil Colon	Predicting Second-Order Nonlinear Optical Properties of Metal-Organic Frameworks Using Miller Scaling
34	Connor Schmidt	Matthew Webber	Modulation Between Static and Dynamic Crosslinking Mechanisms in Supramolecular Hydrogels
36	Bamaiyi Kamji	Ruilan Guo	Fluorinated Ladder Polymer Membranes for Targeted Separation of High-GWP Refrigerants
38	Thomas Burton	Brett Savoie	Chemical Distance Pruning and Multi-Directional Exploration in CRNs

Poster Presentations

Session 2 – 2:30-3:50 PM

P.N.	Presenter	Advisor(s)	Poster Title
40	Tiago Thomaz Migliati Zanon	Yichun Wang	Engineering a 3D Spheroid-Based Bone Metastatic Prostate Cancer Model in High-Throughput High-Content Domain for Preclinical Therapeutic Testing
42	Tiger Shi	Hsueh-Chia Chang	Hypoxia-Induced Drug-Resistant Cells Bias 3D Cancer Spheroid Drug Screens
44	Paul Amagada	Yamil Colon, Edward Maginn	Machine Learning-Driven Development of Deep Eutectic Solvents (DESS) for Flow Battery Applications
46	Stephen Cini	Alexander Dowling	Applying Design of Experiments for Calcium Signaling Digital Twin Validation
48	Raul Salvador Chavez Ramirez	Nosang Myung, Jennifer Schaefer	Early Progress in High-Throughput Development of Stable Solid-Contact Ion-Selective Electrodes
50	Amish Chovatiya	William Schneider	Alloying Induced Effects on Catalytic Ammonia Oxidation Over Pt and Cu
52	Jun Wang	Merlin Bruening	Membrane-Based Strategies for Ultrahigh-Purity Isolation of Critical Metals via Diafiltration and Nanofiltration