Catalysis Club of Chicago

2026 Spring Symposium

Program Booklet

Monday, May 4th, 2026
7:45 AM – 5:00 PM CDT

Held at GTI Energy

1700 S Mt Prospect Rd, Des Plaines, IL 60018
(Parking entrance near 60 Wille Rd, Des Plaines, IL 60018)

Symposium Chairs: Dr. Chris Keturakis (Honeywell UOP),
Prof. Siddarth Krishna (UW-Madison), Prof. Alex Mironenko (UIUC)

Symposium Schedule

7:45 **Registration, Breakfast**

8:30 **Welcome and Introduction**

8:40 **Alkanol Reactions on TiO_2: the Site Requirements for Dehydration and Oxidative and Nonoxidative Dehydrogenation Pathways**
Prof. Stephanie Kwon, Colorado School of Mines

9:20 **Flash Talk #1: Selective and Unselective Pathways in Catalytic Oxidative Dehydrogenation of Propionic Acid**
Chuer Bao, University of Minnesota

9:35 **A radical approach: Paramagnetic Nickel and Palladium Species in Catalysis**
Prof. Liviu M. Mirica, University of Illinois Urbana-Champaign

10:25 **Vendor Pitch:** Anton Paar

10:30 **Poster Session #1: Odd-Numbered Posters**

11:20 **Flash Talk #2: Dual-OSDA Synthesis and Structural Analysis of Medium-pore MFI/TON Zeolite Intergrowths**
Dr. Soonhyoung Kwon, Purdue University

11:35 **Real-time Electrocatalytic Control of C-H and C-C Bond Transformation and Fuel Formation**
Prof. Marcel Schreier, University of Wisconsin - Madison

12:15 **Group Photo**

12:25 **Lunch**

1:25 **Methods and Tools to Meet the Synthetic Needs of Process Chemistry**
Dr. Shashank Shekhar, AbbVie (**2026 Herman Pines Awardee**)

2:15 **Flash Talk #3: A Statistics-Driven XAS Framework for Active Phase Identification in Pd–Zn/C Catalysts for CO2 Hydrogenation**
Dr. Sumant Phadke, Argonne National Laboratory

2:30 **Vendor Pitch:** Malvern Panalytical

2:35 **Poster Session #2: Even-Numbered Posters**

3:25 **Flash Talk #4: Quantifying Rates and Active Sites on Carbonaceous Surfaces that Catalyze Non-Oxidative Coupling of Methane**
Justin Rosa-Rojas, Purdue University

3:40 **Catalysis on Crowded Surfaces**
Prof. Aditya Bhan, University of Minnesota

4:30 **Flash Talk #5: Stabilizing Pd Catalysts for Liquid-Phase Hydrogenation of N-Heterocyclic Hydrogen Carriers through Zeolite Encapsulation**
Sara Ahsan, University of Wisconsin-Madison

4:45 **Closing Remarks**

Alkanol Reactions on TiO_2: the Site Requirements For Dehydration and Oxidative and Nonoxidative Dehydrogenation Pathways

Prof. Stephanie Kwon

Assistant Professor

Chemical and Biological Engineering Department

Colorado School of Mines

Abstract. Alkanol dehydration offers a pathway for upgrading biomass-derived short-chain alkanols into alkenes, which are important building blocks in the chemical industry. Bulk and surface oxides with Lewis acid-base pairs, such as TiO_2, have been widely used for this process due to their high efficiency and low cost. However, the inherent heterogeneity of commercially available TiO_2 has led to conflicting reports on reactivity and product selectivity, further complicated by the diverse reaction conditions employed in previous studies. This work aims to update our understanding of alkanol reactions on anatase TiO_2 catalysts, by integrating transient, titration, kinetic, and spectroscopic methods. Under anerobic conditions, 2-propanol primarily undergoes dehydration to form propene and water. A minor pathway forms acetone via nonoxidative dehydrogenation, but only after an induction period during which surface oxygen vacancies accumulate. Notably, propene formation rates remain largely constant, even as acetone formation rates decrease by ~60% during the initial induction period. These transient behaviors, together with pretreatment and characterization data, suggest that dehydration predominantly occurs on smaller TiO_2 crystallites that provide most of the surface area, whereas dehydrogenation is favored on larger crystallites with smaller band gap energies. In situ pyridine titration was used to quantify the number of active sites for each pathway, enabling accurate turnover rate normalization. Detailed kinetic analysis showed that both dehydration and nonoxidative dehydrogenation are inhibited by 2-propanol, water, and 2-propanol–water dimers, but to different extents. The rate constant for non-oxidative dehydrogenation reflects a significantly lower activation enthalpy than that for the oxidative route; however, this is offset by a large entropic penalty, resulting in higher free energy barriers at relevant temperatures and thus a lower overall rate constant. This kinetic framework offers mechanistic insight into the temperature- and pressure-dependent shifts in reaction rates and product selectivity, while also reconciling prior discrepancies reported in the literature. The presented methods and results are expended to other TiO_2-based catalysts (i.e., rutile and dispersed TiO_x on mesoporous SiO_2) to provide detailed structure-function relationships that determine their reactivities and selectivity for alkanol reactions.

Bio. Dr. Stephanie Kwon is an assistant professor in the Chemical and Biological Engineering Department at the Colorado School of Mines. Her research focuses on heterogeneous catalysis and sustainability, with an emphasis on elucidating surface reaction mechanisms at the molecular level. She combines kinetic studies with in-situ spectroscopy, microkinetic modeling, and density functional theory to provide fundamental insights that guide the design of catalytic systems with enhanced energy and atomic efficiency. Before joining Mines, she earned her Ph.D. from Northwestern University and completed a postdoctoral fellowship at the University of California, Berkeley. Her research program has been recognized with several honors, including the NSF CAREER Award, the Hanwha Non-Tenured Faculty Award, and the DOE Small Innovative Projects in Solar (SIPS) Award. She currently serves as Programming Co-Chair for the AIChE CRE Division (2026–2027) and as a Member-at-Large for the ACS Catalysis (CATL) Division.

A Radical Approach: Paramagnetic Nickel and Palladium Species in Catalysis

Prof. Liviu Mirica

Janet and William H. Lycan Professor of Chemistry

Department of Chemistry

University of Illinois Urbana-Champaign

Abstract. Paramagnetic Ni and Pd complexes have been proposed to play an important role in a number of C-C and C-heteroatom bond formation reactions, as well as a series of oxidative and reductive transformations. In this context, a series of uncommon mononuclear Pd(III) complexes have been synthesized and their oxidative reactivity was investigated. In addition, organometallic Ni(III) complexes relevant to cross-coupling reactions have been isolated and their catalytic reactivity was studied in detail. More recently, unique Pd(I) and Ni(I) complexes have been developed, and their reactivity was probed for the first time. Finally, the intermediacy of such paramagnetic Ni and Pd species in several catalytic organometallic reactions will also be discussed.

Bio. Prof. Liviu Mirica is the William H. and Janet G. Lycan Professor in the Department of Chemistry at the University of Illinois at Urbana-Champaign, USA. He received his B.S. degree in Chemistry from Caltech in 1999, and his Ph.D. in Chemistry from Stanford University in 2005. After an NIH postdoctoral fellowship at UC Berkeley, in 2008 he started his independent career at Washington University in St. Louis, and 2019 he moved to the University of Illinois. Prof. Mirica has made important contributions to chemistry, such as the design of flexible multidentate ligands that can stabilize transition metal ions such as Ni and Pd in uncommon oxidation states. He has also shown that these species are key intermediates in cross-coupling reactions and biomimetic oxidative transformations. Other contributions the development of novel therapeutic and diagnostic agents for Alzheimer's disease, including Cu-64 PET imaging agents for the neurotoxic beta-amyloid peptide oligomers.

Real-time Electrocatalytic Control of C-H and C-C Bond Transformation and Fuel Formation

Prof. Marcel Schreier

Richard H. Soit Assistant Professor

Department of Chemical and Biological Engineering

University of Wisconsin-Madison

Abstract. Producing fuels and chemicals using electricity has drawn considerable interest in recent decades. To date, research in electrocatalysis – the key tool which allows us to link electricity to chemical reactions – remains strongly focused on the transformation of small inorganic molecules such as CO2, H2O, N2, and oxygenated biomass derivatives. Yet, comprehensive industrial electrification will likely require electrocatalytic methods that can promote the reactions that make up the core of the chemicals and fuels industry: n-alkane transformations.

In this talk, I will demonstrate that electricity-driven alkane transformations not only are feasible but that they also unlock new avenues of reactivity, offering solutions to long-standing challenges in catalytic alkane chemistry. Specifically, I will show how our group combined a fundamental understanding of interfacial electrocatalytic processes1 with in-situ electrochemical mass spectrometry to gain independent, real-time control over the elementary steps of alkane transformations at room temperature. By modulating the potential applied to an electrocatalyst surface, we were able to independently control the adsorption of n-alkanes, initiate the transformation of adsorbates while they are bound to the surface, and selectively desorb desired products while keeping others anchored. These methods provide a powerful lever of control over catalytic surface chemistry, enabling us to demonstrate remarkable reactivity, including: (1) the room-temperature electrochemical fragmentation of ethane and butane into shorter chain fragments, and (2) the room-temperature dehydrogenation of n alkanes to alkenes. Beyond these transformations, I will show how leveraging independent control over elementary steps allowed us to deconstruct the continuous oxidation of n-alkanes in fuel cells into its fundamental steps, thereby identifying bottlenecks and providing new design principles for improved catalysts.

In the final part of my talk, I will discuss how, at a fundamental level, applied voltages control the rate of electrocatalytic reactions. Electron transfer reactions are typically thought to pass through a vibrationally activated transition state, making them temperature dependent. However, we discovered that some electrocatalytic reaction classes, for example CO2 reduction, show little to no temperature dependence, regardless of the catalyst or electrolyte. Building on previous reports by Halpern and Conway, I will discuss how our mechanistic interpretation of this phenomenon points to the translational, rather than vibrational, reorganization of electrolyte components to form an interfacial electron transfer transition state. I will also discuss how this insight highlights the importance of considering more than enthalpic activation barriers in designing electrocatalytic systems.

By extending electrocatalysis to alkane transformations and uncovering new mechanistic insights into reaction rate control, we aim to enable more precise atomic-level manipulation in electrocatalytic processes, paving the way for a more selective, efficient, and electrified chemical

industry of the future.

Bio. Prof. Schreier received his B.S. degree in Chemistry and Chemical Engineering from EPFL and his M.S. degree in Chemical and Bioengineering from ETH Zurich. During his studies, Schreier worked on Li-Ion Batteries at BASF and investigated Fischer-Tropsch refining mechanisms at the University of Alberta. His master's research was performed in the laboratory of Sossina Haile at Caltech, where he designed materials for fuel cell electrodes. He subsequently joined the laboratory of Michael Grätzel at EPFL, where he developed electrocatalysts and devices for the sunlight-driven conversion of CO_2 to fuels. Following his passion for fundamental electrochemistry, he moved to MIT, where he worked with Yogesh Surendranath as an SNSF Postdoctoral Fellow. He subsequently joined the Department of Chemical and Biological Engineering at the University of Wisconsin-Madison as the Richard H. Soit Assistant Professor. He is also an affiliate faculty member of the Department of Chemistry. Together with his research group, Prof. Schreier works to understand how the structure of the electrochemical interface and the surface chemistry of catalytic materials influence the fundamental mechanisms which drive chemical transformations using electrical energy. While at the University of Wisconsin, he has received a Beckman Young Investigator Award, a Packard Fellowship for Science and Engineering, an NSF CAREER Award, and a Sloan Fellowship. He has been named a Scialog fellow, a Kavli Fellow (National Academy of Science) and has participated in several Frontiers of Engineering meetings of the National Academy of Engineering. Apart from electrochemistry, Prof. Schreier is passionate about modern art, energy systems, technologies of all kinds and policy.

Methods and Tools to Meet the Synthetic Needs of Process Chemistry

Dr. Shashank Shekhar

2025 Herman Pines Awardee

Senior Research Fellow

Abbvie

Abstract. Developing chemical processes for large-scale synthesis requires balancing multiple parameters such as robust and reproducible chemical methods, minimization of impurity formation, minimizing environmental impact of manufacturing, cost-efficiency, in-depth understanding of reaction mechanism, etc. Applications of catalytic reactions in synthesis help achieve this balance. The extent of understanding and control of manufacturing process depends upon the stage of the clinical trial. This presentation will use two examples to demonstrate some of the chemical methods and tools used to meet the synthetic needs in process chemistry. First, in-depth mechanistic and modeling studies conducted to control a persistent impurity formed in a Buchwald-Hartwig amination reaction conducted on multi-kilo scale will be discussed. Next, identification of a simple ligand for Ni-catalyzed Suzuki-Miyuara coupling (SMC) with Lewis basic heterocycle will be described. Mechanistic studies to reveal the unique ability of this catalyst will be a topic of discussion. While the Ni-complexes of this ligand were highly successful in coupling several Lewis basic substrates with aryl boronate esters, limited scope was observed with sterically hindered partners. Building on this study, a second-generation ligand (DiploPhos) was developed that outperforms state-of-the-art ligands for Ni to achieve sterically hindered SMC with Lewis basic coupling partners. Catalyst speciation studies revealed the hemilabile nature of DiploPhos, which not only improves reactivity relative to stronger chelating ligands but also leads to the formation of less-active DiploPhos-bridged aggregates. Lewis basic functionality (present on substrates or additives) was found to promote the disaggregation of these species and led to increased SMC yields. This observation is contrary to most other systems in which Lewis basic substrates inhibit Ni-catalyzed SMC reactions.

Bio. Dr. Shashank Shekhar is a Senior Research Fellow at AbbVie and is the head of the Center of Catalysis. His group develops chemical and biochemical catalytic processes to meet the needs of Discovery and Process Chemistry. He has developed the synthesis of biarylphosphorinane ligands and has demonstrated their application in Pd-catalyzed cross-coupling reactions on milligram to multi-kilogram scale. He has developed copper- and nickel-catalyzed cross-coupling methods for industrial applications. He has also developed Ir-catalyzed C-H borylation and Rh-catalyzed cyclopropanation methods of relevance to the pharmaceutical industry. Shashank has helped develop capabilities to conduct high-throughput experimentation, high-pressure, photo-, and electro-chemical reactions at AbbVie. He is helping integrate AI/ML tools for reaction optimization and reaction condition prediction. Shashank is a well-recognized process chemist, technology lead and mentor. He has established multiple research collaborations with Universities, has authored >75 manuscripts, patents, book chapters and presentations, has served as the Topic Editor for ACS Catalysis and as Guest Editor for the Journal of Organic Chemistry and Organic

Presentation Abstract: Shekhar

Process Research & Development. He is an External Advisory Board member of the Department of Chemistry at the University of Minnesota. Throughout his career, he has demonstrated exceptional creativity in identifying and developing catalytic methods and building technologies to solve chemical synthesis problems of relevance to the pharmaceutical industry.

Catalysis on Crowded Surfaces

Prof. Adithya Bhan

Distinguished McKnight University Professor

Department of Chemical Engineering and Materials Science

University of Minnesota, Twin Cities

Abstract. Catalytic reactions seldom occur on pristine, clean surfaces. Instead, catalytic surfaces are “nearly” saturated at practical conditions, crowded with surface adsorbates derived from reactants, products, promoters, and solvents. We describe case studies involving oxidative and reductive catalytic transformations illustrating the role these crowded surfaces play in influencing mechanisms, rates, and pathways of catalytic reactions. First, we use the general conceptual framework for analyzing rates and reversibility of catalytic reaction sequences to examine the reaction intermediates involved and the evolution in structure and function of commercial $Cu/ZnO/Al_2O_3$ catalysts for CO_2 hydrogenation. These kinetic analyses illustrate that catalysis occurs on H*- and HCOOH**-saturated surfaces; these crowded surfaces replete with strongly bound surface species aid in the adsorption and activation of weakly bound gas-phase species and provide unique mechanistic routes inaccessible to bare catalyst surfaces. The resulting mechanistic description rationalizes observed reaction orders of CO_2, H_2O, CO, and H_2 and the distinct H_2/D_2 kinetic isotope effects for methanol synthesis and reverse water gas shift and allows us to identify relevant surface species involved in branching CO_2 hydrogenation pathways. Second, we rationalize the role of promoters in silver-catalyzed propylene epoxidation, wherein high selectivity for epoxidation is only observed in the presence of four promoters viz., potassium (~0.02 g K $(g_{cat})^{-1}$) as well as gaseous co-feeds—2-10 vol% carbon dioxide, 5-20 ppmv allyl chloride, and 100-1000 ppmv nitric oxide. Allyl chloride (~2 Pa or ~20 ppm C_3H_5Cl) is shown to deposit ~0.15 mol Cl (mol $Ag_{surf})^{-1}$ Cl adatoms, monitored in-situ via Cl mole balances, and result in an increase in the epoxidation-to-combustion ratio ~20× without significantly altering rate-determining O_2 activation. Co-promoting nitric oxide, carbon dioxide, and potassium are required in addition to Cl promotion for selective epoxidation. We illustrate that threshold concentrations of these co-promoters result in crowded catalytic surfaces that are selective for both propylene (~60% selectivity) and ethylene epoxidation (~90% selectivity) which share common oxidants and common active sites.

Bio. Aditya Bhan serves as a Distinguished McKnight University Professor on the Chemical Engineering and Materials Science faculty at University of Minnesota Twin Cities. His research group focuses on mechanistic characterization of catalysts and has been recognized with the Emmett Award in Fundamental Catalysis by the North American Catalysis Society and the Ipatieff Prize from the American Chemical Society.

Poster Presentations

Poster #	Name	Institution	Position	Poster Title
1	Ayotunde Alabi	Purdue	Grad Student	Investigating the Role of Brønsted Acid Sites and Co-adsorbates on the Diffusion of C6–C12 Methylbenzenes in H-MFI Zeolite
2	Michael Appoh	Notre Dame	Grad Student	Computational Evidence for the Comparable Catalytic Potential of Ni-Polyoxometalates and Ni-Zeolites in Ethylene Oligomerization
3	Dylan Bardgett	Northwestern	Grad Student	Nitrogen plasma activation for enhancing electrochemical ammonia synthesis at intermediate temperatures
4	Olivia Bennett	Northwestern	Grad Student	Influence of Oxide Supports and Copper Phase on Microdischarges and CO2 Conversion in Nonthermal Plasma
5	Ashutosh Bhadouria	Purdue	Grad Student	Electrochemically Activating Alkanes: A Mechanistic and Kinetic Analysis of Room Temperature C—H Bond Activation via On-line Spectrometry
6	Elizabeth Brungardt	UW-Madison	Grad Student	Competitive oxidation kinetics in the selective catalytic reduction of N2O and NOx over Fe-Zeolites
7	Jesse Canavan	Minnesota	Grad Student	Isopotential Electron Titration: Electrostatics and Thermodynamics of Adsorbates on Metal Catalysts
8	Bryan Cruz Delgado	Purdue	Grad Student	Interrogating the kinetic and mechanistic origins of N2O formation during NH3-assisted selective catalytic reduction of NOx on Cu-CHA
9	Matt Edgar	UW-Madison	Grad Student	Reaction Pathways in the (De)hydrogenation of N-Heterocyclic Liquid Hydrogen Carriers Over Supported Pd Catalysts
10	Bridget Friel	GTI Energy	Early Career Professional	Novel Electric Reformer for Catalytic Conversion of Biogas or Waste CO2
11	Connor Gallin	Argonne National Lab	Postdoc	Unexpected trans selectivity in nickel complex catalyzed carboxylation of alkynes
12	Michael Gresh-Sill	Minnesota	Grad Student	Interactions among Cs and gaseous co-promoters in silver-based ethylene epoxidation catalysts
13	Evan Grothen	UW-Madison	Grad Student	Promoting electrochemical hydrogen production using like-charged co-ions
14	Jacklyn Hall	Argonne National Lab	Postdoc	Dynamic Active Site Response on Ferroelectric Catalyst Supports
15	Denver Haycock	Notre Dame	Grad Student	Catalysis Considerations in Nonthermal-Plasma-Driven Ethane Dehydrogenation
16	Anwin John	UW-Madison	Grad Student	Elucidating bunching and its impact on oxygen reduction reaction activity on Pt facets
17	Seonyeong Kim	UW-Madison	Grad Student	Selective Oxidation of 3-Hydroxypropionic Acid to Malonic Acid over Pd/C: Mechanistic and Kinetic Study
18	Moonjoo Kim	UW-Madison	Postdoc	High-Throughput Screening of Compositionally Complex Solid Solutions for Hydrogen Evolution Reaction
19	Leyu Liu	Purdue	Postdoc	Impact of Potential-Dependent Surface Phase Evolution on Oxygen Evolution Reaction Activity and Mechanism over $IrO_2(110)$
20	Yilin Lu	Purdue	Grad Student	DFT and AI-Driven Studies of Surface Catalysis and Lattice-Mismatched Interfaces
21	Enner Mendoza	UW-Madison	Grad Student	Room-Temperature Electrocatalytic Dehydrogenation and Partial Fragmentation of n-Alkanes

Poster Presentations

22	Seonmyeong Noh	UW-Madison	Grad Student	Multiple Roles for Proton Donors in Heterogeneous Electrochemical CO2-to-CO Conversion
23	Lauren Oleksy	Northwestern	Grad Student	Photocatalytic activity, lattice strain, and defect formation on p-type InGaN nanowires during nonoxidative methane coupling
24	Durvesh Parab	UW-Madison	Grad Student	First Principles Study of Low Temperature Electrocatalytic Propane Activation on Platinum
25				Withdrawn
26	Sebasian Rivera Perez	UW-Madison	Grad Student	Catalytic Triad Inspired Nanozymes for Ester Hydrolysis in Organic Solvent Mixtures
27	Diamarys Salome Rivera	Purdue	Grad Student	Assessing the influence of acid site location in MFI zeolites on propene oligomerization rates and selectivity
28	Ryoh-Suke Sekiya	Purdue	Grad Student	Mechanistic O2 activation pathways on Au/SiO2 and propene epoxidation on TS-1 zeotypes present as physical mixtures
29	Piyush Sharma	Purdue	Grad Student	Data-Driven Discovery of Elementary Reaction Mechanisms Using Large Language Models and Evolutionary Search
30	Toyin Shittu	UW-Madison	Grad Student	Sustainable Catalytic Production of Hexane-1,2,5,6-tetrol from Biomass Derived Levoglucosanol
31	Andrew Simonson	Purdue	Grad Student	Effects of High Coverage on Isobutane Hydrogenolysis within Dense H* Adlayers on Ir(111) Surfaces
32	Deepak Sonawat	UW-Madison	Grad Student	Intraporous Liquid Water Stabilizes PdCu/Zeolite Catalysts for Wacker Oxidation of Ethylene
33	Shawn Stephens	UW-Madison	Grad Student	Understanding the acid catalyzed dehydration of Cellulose and Levoglucosan through kinetic modeling
34	Ruixue Xiong	Minnesota	Grad Student	Programmable CO Oxidation on Digital Lateral Catalytic Condensers
35	Anish Yadav	Purdue	Grad Student	Diastereoselective Heterogeneous Hydrogenation of Bicyclic Arenes Directed by Amines and Alcohols
36	Alexander Zielinski	UW-Madison	Grad Student	Linking Electrocatalytic Turnover to Elementary Step Rates in Hydrocarbon Fuel Oxidation

Acknowledgments

The Catalysis Club of Chicago would like to thank the following people and organizations for their generous contributions to the success of the 2026 Spring Symposium, including:

- NACS: We acknowledge the North American Catalysis Society for foundational support of the Catalysis Club of Chicago.
- GTI Energy: We are extremely grateful to GTI Energy for their generous support of the CCC Spring Symposium through donation of their event space, and administrative and catering support.
- Abstract review: Dr. Jacob Miller (LanzaJet), Prof. Elizabeth Bickel Rogers (UIUC), Prof. Siddarth Krishna (UW-Madison), Dr. Chris Keturakis (Honeywell UOP)
- Poster and oral flash talk judges: Elizabeth Bickel Rogers (UIUC), Rajamani Gounder (Purdue), Aditya Bhan (Minnesota), Justin Notestein (Northwestern), Joe Grant (Honeywell UOP), Raka Dastidar (Honeywell UOP), Shashank Shekhar (Abbvie), Stephanie Kwon (Colorado School of Mines), Zhenhua Zeng (Purdue), Robert Kennedy (Aeternal Upcycling), Michael Bradford (GTI Energy), Patrick Littlewood (GTI Energy), Eric Sacia (AbbVie), Sam Moore (AbbVie)
- Honeywell UOP: we thank Honeywell UOP for support of CCC, including via sponsorship of the Herman Pines Award.
- Malvern Panalytical/Micromeritics, Inc, a Tier 1 sponsor. See their company and product information on the following pages.
- Anton Paar, a Tier 1 sponsor. See their company and product information on the following pages.
- Thermo Fisher, a Tier 2 sponsor. See their company and product information on the following pages.

CCC Institutional Representative Committee:

- Anson Rowe (Northwestern) – junior session co-chair
- Sara Ahsan (UW-Madison) – junior session co-chair
- Ryoh-Suke Sekiya (Purdue) – junior session co-chair
- Ciara Tyler (Minnesota)

Acknowledgments

Tier 1 Sponsor

Catalyst Research Solutions with Anton Paar

Anton Paar supports catalyst development and optimization through a comprehensive suite of characterization techniques. Our solutions enable:

- **Gas Adsorption Studies, both Physi and Chemi**: Precise measurement of BET surface area, pore size distribution, and metal dispersion to optimize catalyst and support materials.
- **Particle Size and Morphology Characterization**: Accurate measurement of particle size distribution and shape, supporting the development of consistent, high-performance catalyst powders and pellets.
- **Phase Identification and Structural Monitoring**: High-resolution powder X-ray diffraction solutions to monitor phase transitions, crystallite growth, microstrain, and active-site formation throughout catalyst synthesis, activation, and operation. We also offer SAXS for nanoparticle size and maping of the catalyst
- **Raman and FTIR**: Provides insight to reaction mechanism, functional groups, adsorbed species, and catalyst interactions
- **Microwave synthesis and sample prep:** enables rapid, uniform heating, leading to shorter preparation times and improved control over particle size, morphology, and phase formation. This can enhance catalyst reproducibility and performance
- **In Situ Reaction Studies**: Real-time structural analysis of catalysts under industrially relevant temperatures, gas environments, and reaction conditions to understand stability, activation pathways, and performance.

By integrating surface, structural, and in situ analysis, Anton Paar provides the critical insights researchers need to accelerate catalyst innovation for the energy, chemical, and environmental industries.

Contact: Andy Labrousse – Andy.Labrousse@anton-paar.com

Contact: Chris Castro – Christopher.Castro@anton-paar.com

Anton Paar USA – Central Regional Office
600 Hickory Hill Drive
Vernon Hills, IL 60061
Tel: +1 (847) 429-3229
info.us@anton-paar.com

Acknowledgments

Tier 1 Sponsor

a powerful combination

Malvern Panalytical and Micromeritics delivers industry-leading materials characterization solutions that accelerate catalyst innovation and performance. From surface area and porosity to elemental, structural, and particle analysis, our combined portfolio empowers deeper insight across the entire catalyst development lifecycle.

Together, we offer a powerful suite of market-leading analytical technologies. With more than 92,000 instruments in daily operation worldwide, we support pioneering companies, universities, and government laboratories with extensive expertise in structural, elemental, and particle analysis—including particle size and shape, surface area, and porosity.

Backed by 2,500 employees across global R&D, manufacturing, sales, and service, we act as true partners in discovery, advancing materials characterization for innovators around the world.

Contact: Maria Lightfoot, Field Marketing Manager Americas
maria.lightfoot@malvernpanalytical.com

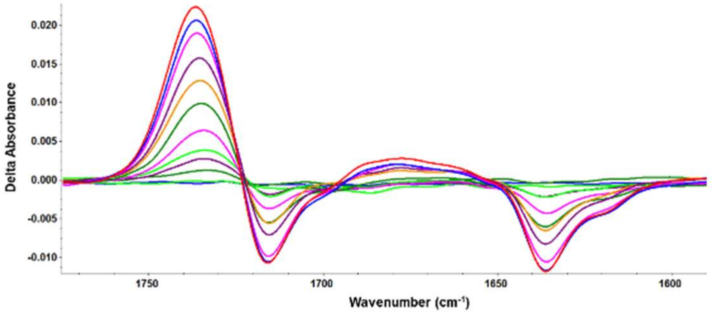
Malvern Panalytical Inc
2400 Computer Drive
Westborough, MA 01581
United States of America
Tel: + 1-800-766-7000
https://www.malvernpanalytical.com/

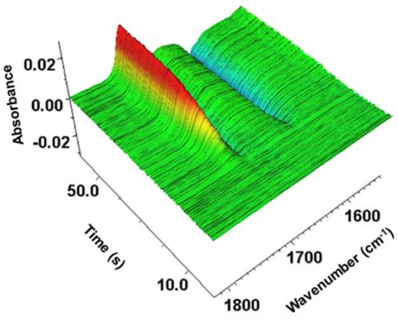
Acknowledgments

Tier 2 Sponsor

Elucidate catalyst composition and monitor reactions with Nicolet FT-IR & Raman spectrometers on macro and micro scales

- **Material Identification**: FT-IR and Raman spectroscopy are complimentary, non-destructive techniques that can identify organic and inorganic species to help determine material composition and crystallinity
- **In Situ Reaction Monitoring**: Specialized reaction chambers allow for heating & cooling, and analysis of dynamic gaseous environments to monitor adsorption, desorption, and reaction of chemical species in real-time on micro & macro scales





FT-IR and Raman spectroscopy are complementary analytical techniques that are valuable in catalyst research because they reveal what species are present, their structure and bonding, and how they change during reactions. Together, they provide insight into structure–activity relationships, which is central to designing next-generation catalysts

Contact: Matt Bartucci – FTIR & Raman Instrument Sales Representative
matt.bartucci@thermofisher.com – ph: 410-925-0734

Contact: Ryan Smith – Senior Spectroscopist & Applications Scientist
ryan.smith1@thermofisher.com – ph: 847-721-9333

Thermo Fisher Scientific
5225 Verona Road
Madison, WI
Tel: + 1-800-766-7000
www.thermoscientific.com

Facility Maps

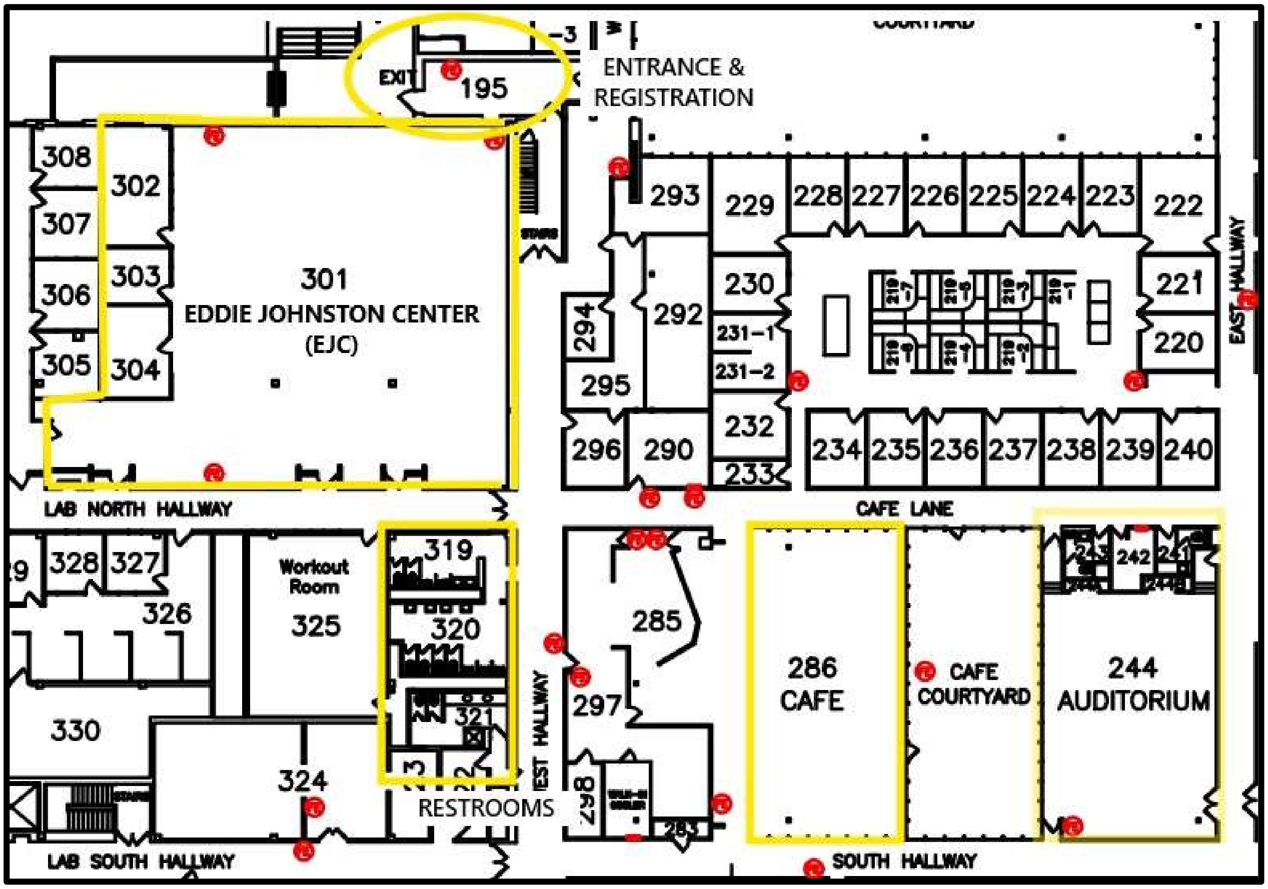
Parking and Entrance

GTI facility address is 1700 S Mt Prospect Rd, Des Plaines, IL 60018, but the parking entrance is located around the corner off of Wille rd (see map above).

For Google Maps, an address of 60 Wille Rd, Des Plaines, IL 60018 appears to lead you to the parking entrance.

Parking is shown above and the building entrance is marked with a gold star.

Facility Maps



The main lecture hall is the Eddie Johnston Center (EJC) room 301 pictured in the top left above.

The poster sessions will be held in the auditorium room 244 pictured in the bottom right above.

Lunch will be provided in the Café room 286.