**CATALYSIS CLUB OF PHILADELPHIA**

*Promoting Catalytic Science and Technologies*



# The Catalysis Club of Philadelphia

**(In Person) Thursday, Jan 16th, 2025**

Doubletree by Hilton Hotel Wilmington – Wilmington, Delaware

4727 Concord Pike, Wilmington, DE 19803

## *Designing microporous catalysts to overcome material and reaction limitations*

**Speaker: Prof. Michele Sarazen**

*Princeton University*

## Meeting Agenda:

*Social Hour* ..... 5:30 PM
*Dinner* ..... 6:30 PM
*Meeting* ..... 7:30 PM

## Meeting Registration:

*Members:* $45.00
*Non-Members:* $55.00
*Stud. & Retired Members:* $35.00

Please register online for this In-person meeting by ***Monday, January 13th*** at CCP website.

## Meal Selection (Included):

Please make one selection for your dinner (included in registration) when you sign-up for the meeting from the following options:

1. Boneless beef short rib with peppercorn demi glace. Dessert: Brownie with anglaise sauce.
2. Apple cider glazed chicken with toasted pecans. Dessert: Brownie with anglaise sauce.
3. Roasted half harissa cauliflower with chimichurri sauce (vegan). Dessert: Brownie with anglaise sauce.

Starter: Butternut squash bisque, toasted pumpkin seeds, dried cranberry

Side: Fingerling potatoes with broccoli

## Membership Registration:

Membership dues for CCP 2023-24 meeting season will be $25 ($5 for the local chapter and $20 for the national club). Dues for students, post-docs and retirees will be $10 ($5 for the local club and $5 for the national club). Please sign-up membership (Link) for more benefits on meeting registrations and net-working events!

Please contact our Treasurer Steve Hardwick (sjh.wilm.de@gmail.com) or Chair Zhuonan (Nick) Song (zsong@wlgore.com) or Program Chair Brandon Bukowski (bbukows1@jhu.edu) if you need any assistance.

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**Thursday, January 16th, 2025**

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**Prof. Michele Sarazen**

Department of Chemical and Biological Engineering, Princeton University

**Abstract**:

With the ubiquity of catalysts in industrial processes for chemical, fuel, polymer, and pharmaceutical production, catalyst design that limits deactivation and improves efficacy (in terms of mass transfer artifacts and/or selective conversions) can decrease process energy demands. Our work focuses on porous crystalline materials such as zeolites and metal-organic frameworks (MOFs), where it is important to define active sites, to probe influences of transport, and to incorporate deactivation and materials stability. In the case of zeolites, incorporation of mesopores into bulk microporous frameworks is one route to alter mass transfer, particularly of bulky molecules. Here, we probe the condensed-phase hydrocarbon conversions (aromatics and waste polyolefins) on various microporous and hierarchical zeolites to deduce diffusional effects on rates, selectivities, and stability using kinetic analyses and observed changes in reaction and deactivation rates. In the case of MOFs, the less hydrothermally stable counterpart to zeolites, we delineate structural and reaction stability during liquid-phase reactions, specifically over the Cr and Fe variants of MIL-101 for styrene oxidation by hydrogen peroxide. Overall, we demonstrate that deactivation phenomena limit catalyst efficiencies in both zeolitic and MOF reaction systems but can be alleviated through synthetic and reaction modifications, which has broad implications for these and other industrial catalytic systems.

**Speaker Bio**:

Michele L. Sarazen is an Assistant Professor in the Department of Chemical and Biological Engineering at Princeton University. Her research group couples synthetic, kinetic, and theoretical investigations of porous crystalline materials as catalysts and adsorbents for sustainable fuel and chemical production with an emphasis on reaction and deactivation mechanisms. She earned her BS in Chemical Engineering, *summa cum laude*, at the Pennsylvania State University and her PhD in Chemical Engineering from the University of California, Berkeley. Before arriving at Princeton, she was a postdoctoral fellow at the Georgia Institute of Technology. Her recognitions include the NSF CAREER Award, Robert Augustine Award of the Organic

Reactions Catalysis Society, AIChE 35 under 35, ICC Young Talent Laureate, Howard B. Wentz, Jr. Junior Faculty Award, National Academy of Engineering Frontiers of Engineering, and The Catalysis Review "Mover and Shaker." She has served as a Division Director and D&I Task Force member for AIChE in Catalysis and Reaction Engineering, Director of the Catalysis Society of Metropolitan New York, Associate Editor for Applied Catalysis B, Early Career Board member for Journal of Catalysis and Applied Catalysis A, and ACS CATL Division Program Chair.

## Many Thanks to Our CCP Sponsors for 2024-2025 Season!