CBE WINTER QUARTERLY NEWSLETTER

DREXEL UNIVERSITY
Chemical and Biological Engineering
College of Engineering

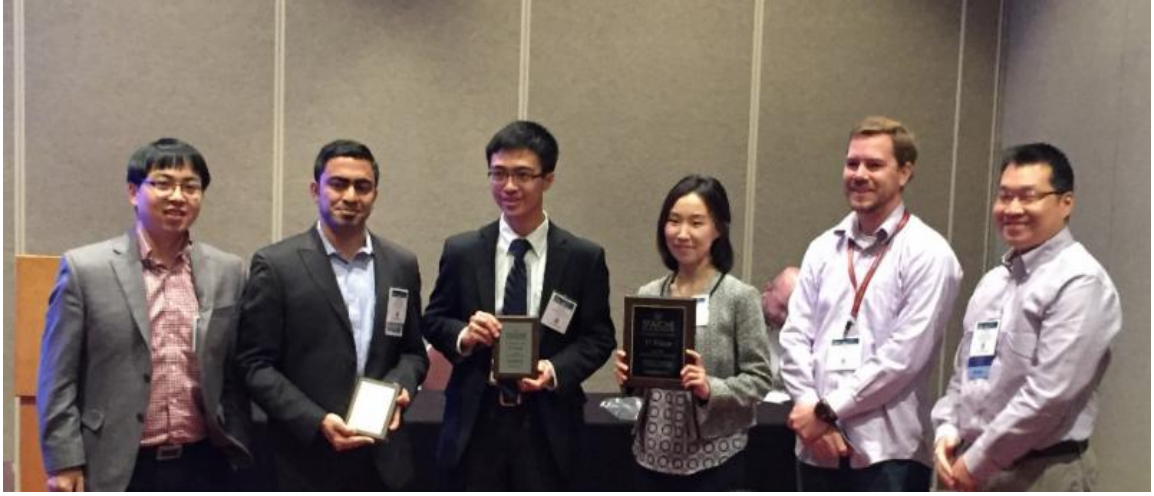
Professor Tang Awarded NSF CAREER Grant

Maureen Tang, Ph.D., an Assistant Professor in the Chemical and Biological Engineering Department, has received the National Science Foundation CAREER Award for her research on failure mechanisms in advanced lithium-ion batteries. The five-year grant totaling $500,002 is entitled, "Predicting battery lifetime from direct measurements of inter-electrode communication". With this grant, Prof. Tang will work towards improving the lifetime of advanced batteries for vehicle transport and renewable electricity grid storage applications.

At present, the main cause of battery failure is undesirable chemical side reactions that are very complicated and difficult to understand. Because these reactions are so difficult to measure directly, battery scientists are less able to design materials and devices that can withstand side reactions for longer times. As a result, to date, engineers mainly have to rely on empirical failure tests that increase the time and cost of developing new technology. This CAREER award applies new methods to directly measure side reaction rates that impact battery lifetime and performance. Information about reaction rates will then be used to build system models that predict battery lifetime. The results will allow researchers to design materials that last longer and to predict device failure much more rapidly than traditional methods.

Learn More About Dr. Tang

CBE PhD Student, Subham Dastidar, Wins AIChE Award



Above: Subham (2nd from left) accepting award with fellow awardees and awards committee members.

Subham Dastidar, a PhD student in the research group of Prof. Aaron Fafarman, won an award from the Electronic and Photnonic Materials division at the American Institute of Chemical Engineers National Meeting in Minneapolis, MN. Subham's talk, entitled "Extraordinarily Slow Electron-Hole Recombination in Perovskite Phase Cesium Lead Iodide", was among eight abstracts selected for the competition and placed third overall. The award comes with a cash prize and the invitation to contribute an original paper to the Journal of Vacuum Science and Technology. The work described has recently been published in the journal ACS Energy Letters.

Congratulations to the 2018 CBE Department Award Recipients

The Chemical and Biological Engineering Department is pleased to announce the recipients of the 2017 CBE Awards:

2017 CBE Outstanding Research Award: Prof. Cameron Abrams

2017 CBE Outstanding Teaching Award: Prof. Michael Walters

2017 CBE Outstanding Service Award: Prof. Jason Baxter

2017 CBE Outstanding Adjunct Faculty Award: Victor Batarseh

2017 CBE Outstanding Staff Award: Vince Hatton

2017 CBE Outstanding PhD Student Achievement Award*: Jasmine Gardner and Hossein Riazi
*Based on the quality and quantity of refereed journal papers published

2017 CBE Outstanding PhD Student Service Award: Michael Cimorelli and Martin Walsh

2017 CBE Outstanding Master's Student Achievement Award*: Rahul Pai
*Based on the quality and quantity of refereed journal papers published

2017 CBE Undergraduate Student Achievement Award: Kyle Barrett and Benjamin Andrien

2017 CBE Undergraduate Student Service Award: Grace Womack and Erica Nordquist

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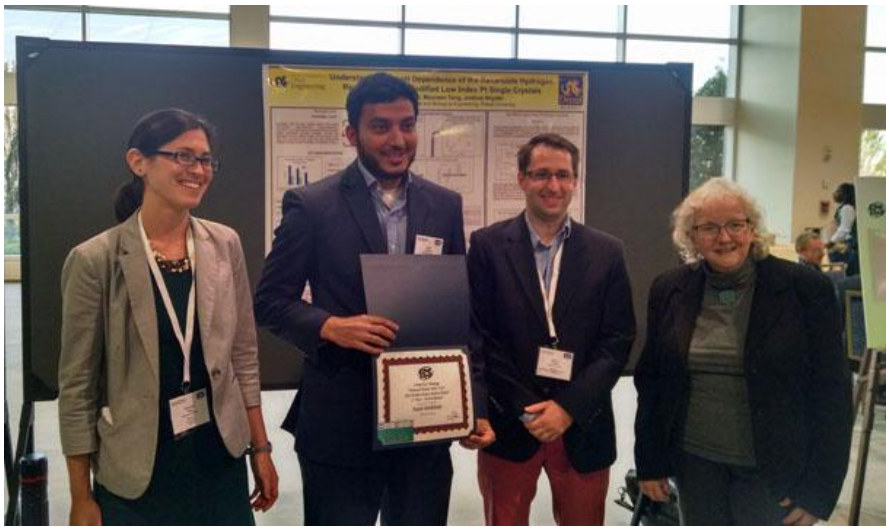
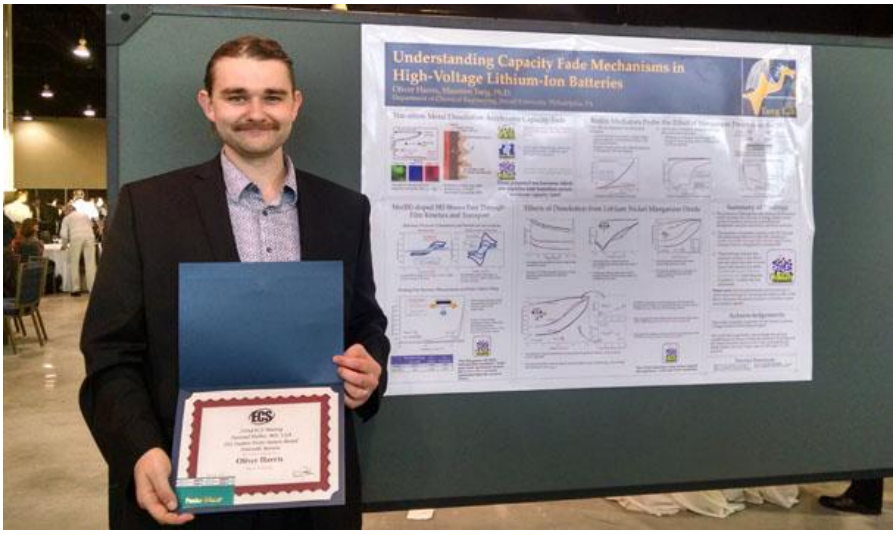
PhD Students, Saad Intikhab and Oliver Harris, Receive Awards at Annual Electrochemical Society Meeting



Above: (from Left): Dr. Tang, Saad Intikhab, Dr. Snyder, Dr. Johna Leddy (President, ECS).
Below: Oliver Harris



The Electrochemical Society held it's 232nd Annual Meeting in National Harbor, MD on Oct 1-5, 2017.Saad Intikhab, advised by Dr. Joshua Snyder, won the poster competition and Oliver Harris, advised by Dr. Maureen Tang, placed as honorable mention.

Drexel CBE has Strong Showing at FMC Event

On November 14, 2017, the Drexel Chemical Engineering Department participated in an AIChE, Delaware Valley Section Poster Symposium hosted by FMC, at nearby FMC tower in University City. The focus of the night was sustainability with a variety of posters from local chemical engineering students focused on batteries, seaweed, composites, films, plant based materials and nanofibers, to name a few. Multiple universities participated, but Drexel had the strongest showing; more than half of the posters were presented by Drexel students or faculty.

Read Full Story Here

CBE Hosts Fifth Annual Event

On Saturday, October 7, 2017, the Department of Chemical and Biological Engineering hosted its fifth Alumni Annual Event. CBE has been taking the initiative to reunite alumni with the department, while creating a community among students, faculty, and alumni.

During the reception, Dr. Cameron Abrams provided an overview and update of the department, citing all of this year's efforts to generate more alumni initiatives,

including the mentoring program, the annual event, and the spring panel discussion. Following his presentation, Dr. Abrams presented Ed Andjeski '87 with the Alumni of the Year award, noting his outstanding engagement efforts and commitment to the department.

Interim Dean, Giuseppe R. Palmese, delivered the keynote lecture on bio-based materials as building blocks for new classes of polymers with unique performance characteristics inspired by nature. The presentation spanned twenty years of research and commercialization activities.

The next alumni and student event, to be held on Saturday, April 28, 2018, will be a panel discussion, "Leadership in Chemical Engineering". For more information, contact Jenn Bing, 215-895-1855, jlb453@drexel.edu.

Professor Abrams Awarded NIH Grant

Abrams and his collaborators recently developed a method termed Transition-Path Theory/Markovian Milestoning (TPT/MM) for the prediction of generalized transition rates in all-atom simulations. Its utility was demonstrated in the context of small gas molecule entry and exit in proteins [Yu et al., J Amer Chem Soc 2015;147:3041]. The overarching objective of this project is to develop the TPT/MM approach to handle the binding and unbinding of polyatomic ligands from proteins which involve (a) binding site desolvation and (b) large-scale conformational changes of the protein. Additionally, they aim to test new approaches to making TPT/MM even more efficient.

The project involves two postdoctoral researchers and two PhD students, one of each from both collaborating institutions (Drexel and NYU). Activities will involve code development and large-scale molecular simulations to implement the required biased sampling of (1) binding-site hydration and (2) protein and ligand conformational changes. Test-bed systems of interest include ATP and substrate binding to epidermal growth factor receptor kinase (EGFRK), and substrate and inibitor binding to HIV-1 protease. The ultimate goal is a robust, validated method for estimating ligand on- and off-rates based on 3D all-atom structures available in public databases.

CBE Professors Give Invited Lectures

- Professor Cameron Abrams Gives Plenary Talk at Simons Foundation Conference on Bridging Scales in Microbiology: From Atoms to Organelles
- Professor Steve Wrenn Gives Invited Talk at le Stadium in Tours, France
- Professor Masoud Soroush Gives Plenary Talk on Model-Predictive Safety Systems at the 2017 AIChE Annual Meeting

- Professor Ken Lau Gives Invited Talk at the Polymers for Energy Storage and Conversion Session at the 2017 AIChE Annual Meeting

Drexel University
Department of Chemical and Biological Engineering
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