

# SWETTE CENTER FOR ENVIRONMENTAL BIOTECHNOLOGY

The Biodesign Swette Center for Environmental Biotechnology seeks PhD students who are driven to improve human and environmental health in a cross-disciplinary, team-based, and international research environment.

Graduate students can pursue research in the Biodesign Swette Center for Environmental Biotechnology through any of the following graduate programs at Arizona State University:

- Civil, Environmental and Sustainable Engineering
- Chemical Engineering
- Biological Design
- Sustainability
- Molecular and Cellular Biology
- Microbiology
- Chemistry & Biochemistry
- Environmental Life Sciences

**CONTACT OUR FACULTY TO EXPLORE YOUR INTEREST AND POSSIBLE ENTRY POINTS.**



## FACULTY



Treavor Boyer



Hinsby Cadillo-Quiroz



Anca Delgado



Andrew Marcus



Rosa Krajmalnik-Brown



Bruce Rittmann



César Torres

## RESEARCH AREAS

Advanced Oxidation and Biodegradation  
 Amazon Peatlands C and N Stocks and Cycling  
 Aquatic Systems  
 Bioenergy Applications  
 Biofilms  
 Biofilm Drinking Water Treatment  
 Biotransformations and Bioremediation of Soils, Water, Sediments  
 Coal Methanogenesis: Energy Production and Water Management  
 Culturable Diversity of Bacteria and Archaea  
 Genomic Adaptations and Physiology of Methanogens  
 Human Gut Microbiome and Energy Extraction  
 Human Gut Microbiome after Bariatric Surgery  
 Human Gut Microbiome and Autism  
 Human Gut Microbiome and Health

Mathematical Modeling of Microbial Systems  
 Membrane Biofilm Reactors  
 Microbial Electrochemistry and Technologies  
 Microbial Fermentations and Reductions for Bioenergy  
 Microbial Metabolic Exploration  
 Microbial Photobioenergy  
 Molecular Microbial Ecology  
 Northern Peatlands Climate and Its Effect on Microbial Activity  
 Nutrient and Resource Recovery  
 Photosynthetic Biofuel Production  
 Sequestration of Contaminants  
 Wastewater Treatment  
 Water Treatment and Conservation  
 Water-Energy-Food Nexus

*What I love about the Swette Center is that we are focused on making lemonade out of lemons – turning overlooked and underappreciated waste streams into energy, clean water, and valuable byproducts. My work in the Swette Center allows me to explore this hidden potential through cutting edge technologies like microbial electrochemical cells and fundamental tools like chemical and molecular tools and mathematical modeling. When combined, these tools are leading to faster and more efficient commercialization of technologies that will facilitate clean water production and energy recovery in the first and third worlds.* **Michelle Young, Ph.D. Candidate in Civil, Environmental and Sustainable Engineering, 2017**  
Rittmann and Torres Labs.

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*Research in the Biodesign Swette Center for Environmental Biotechnology was very much an interdisciplinary experience. One of the most important skills I developed in the Center was the ability to connect with other researchers from many different areas of expertise. This group of scientists and engineers seeks and finds a common scientific language to address pressing research areas. Through my work in the Center, I have become increasingly interested in scientific and research topics spanning the disciplines. The work and collaborations there have helped to shape my research path for my career.*

**Rachel Yoho, PhD in Biological Design 2016**

Visiting Assistant Professor, Department of Biology, Project Dragonfly  
Miami University, Oxford, Ohio

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*Open – that one word I would use to describe the experience I have with BSCEB. I got a bachelor in environmental engineering in Vietnam, and my background helped me to align the center's research topics. Nevertheless, attending presentations of each research team was my first encounter to learn about ongoing projects. The weekly meeting is a popular event there. The exchange opens up opportunities to learn, explore and collaborate. When I was working with photobioreactor team, I had freedom to pursue using embedded systems and automation such as Arduino for algal research. Besides, an open work place, physically and culturally, is hip, fun and exciting.*

**Binh Nguyen, PhD in Environmental Engineering 2016**

Consultant

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*Some of the things that make a successful PhD graduate are a deep understanding of your topic, an ability to critically evaluate results and pull out meaningful trends, and the ability to see gaps in knowledge and design experiments to fill those gaps. On the one hand, learning these skills is greatly facilitated by being around other experts to discuss concepts, results, and ideas. It is, therefore, very important to join a good research group to foster your own success, and the Swette Center is one of (if not "the") premier research centers for environmental biotechnology. On the other hand, a successful PhD needs to be able to work independently. It requires space to try things (often fail) and develop your own methods and experimental plan. Bruce provided me a lot of autonomy throughout my PhD, which, if I'm honest, was an early source of frustration. This is, however, what earning a PhD is about, and has left me in a much better position for starting my current postdoc position.*

**Levi Straka, PhD in Environmental Engineering 2017**

Postdoctoral Research Associate, Department of Civil and Environmental Engineering  
University of Washington

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*I am a proud and happy Ph.D. alumni of the Biodesign Swette Center for Environmental Biotechnology (BSCEB). BSCEB is a world-class research facility lead by some of the world's most talented and innovative researchers in environmental biotechnology. Indeed, based on citations and accolades alone one can clearly see that BSCEB researchers are working on and solving some the world's most pressing challenges. However, BSCEB represents more than cutting-edge research, it is also place where I learned to ask the questions that helped lead to solutions and a place where I developed the relevant skills to understand a problem from an interdisciplinary perspective. I also learned the importance of teamwork and how to develop the skills to leverage shared interests in a way that maximizes much of the broad and deep talent at BSCEB.*

**Nasser Hamdan, PhD in Geotechnical Engineering 2014**

Director of Industrial Collaboration and Assistant Research Professor  
Center for Bio-mediated & Bio-inspired Geotechnics, School of Sustainable Engineering and the Built Environment  
Arizona State University

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*Before joining the center, I was not aware that I could become a leader, could help people in their research, and could be a very good team player. I was also the official mentor for several visiting scientists that came to our center from a variety of countries (e.g., Japan, France, Turkey). I highly recommend the BSCEB as it is a very diverse research group, friendly, and easygoing. I have developed expertise in environmental biotechnology, microbial molecular ecology, and membrane biofilm reactors. I have published several peer-reviewed articles, have active collaborations with people at Arizona State University, with Mexico's education institutions, and the University of Notre Dame at South Bend, Indiana.*

**Aura Ontiveros-Valencia, PhD in Sustainability 2014**

Postdoctoral Research Associate, Environmental Engineering  
University of Notre Dame, Indiana

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*My research focuses on managing microbial communities to provide services on sustainable closed-loop processes. To be more specific, I am working on bacteria mediated removal, recovery, and reuse. This particularly requires interdisciplinary partnership, which is enabled in the Swette Center owing to its famous culture of cross-disciplinary and team-based research. In addition, our seed project on palladium has made several milestone achievements including three literature publications, one international PCT patent application, and formation of one company. These would have not been possible without the support from the internal Swette fund.*

**Chen Zhou, Assistant Research Scientist**

Rittmann Lab and Center PhD alumnus in Environmental Engineering.