# TYLER J. BARZEE

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## EDUCATION

**PhD in Biological Systems Engineering** Expected December 2019
University of California Davis
Dissertation title: "A Systems-Based Investigation of the Processing and Utilization of Anaerobic Digestate in the Cultivation and Harvesting of Specialty Crops and Microalgae"
Advisor: Ruihong Zhang

**MS in Biological Systems Engineering** December 2016
University of California Davis

**BS in Biosystems Engineering, magna cum laude** May 2014
Clemson University

## PUBLICATIONS, PATENTS, AND REPORTS

### ARTICLES

**Barzee, T.**, Zhang, R., Edalati, A., Rapport, J. El-Mashad, H. (in preparation). Pilot-Scale Production and Characterization of Biofertilizers from Anaerobically Digested Dairy Manure and Food Waste.

**Barzee, T.**, Edalati, A. El-Mashad, H., Zhang, R. (in preparation). Economic Analysis of Biofertilizer Production from Anaerobic Digestate.

**Barzee, T.**, Edalati, A., El-Mashad, H., Wang, D., Scow, K., Zhang, R. (in review). Digestate biofertilizers support similar or higher tomato yields and quality than mineral fertilizer in a subsurface drip fertigation system. *Frontiers in Sustainable Food Systems*.

Lin, Y., Zhao, Y., Ruan, X., **Barzee, T.**, Zhang, Z., Kong, H., Zhang, X. (in review). The potential of constructed wetland plants for bioethanol production. *BioEnergy Research*.

Johnson. A. B., **Barzee, T.**, Holbert, K. D., Poarch, S. L., Storm, J. J. (2018). Effect of Cuterebra fontinella (Mouse Bot Fly) on the Movement of Peromyscus leucopus (White-footed Mouse). *Southeastern Naturalist* 17(4), 597-604.

**Barzee, T.**, Zhang, R., Edalati, A., Rapport, J., El-Mashad, H. 2015. Sustainable Bio-Fertilizer Production from Anaerobically Digested Organic Wastes. American Society of Agricultural and Biological Engineers (ASABE) Annual International Conference, New Orleans, LA. (Paper #152190937).

**Barzee, T.**, Holbert, K., Johnson, J., Kross, C., Storm, J. 2012. Influence of Microhabitat on the Abundance of White-Footed Mice (*Peromyscus leucopus*) in Urban Greenways. *USC Upstate Undergraduate Research Journal*, 5, 89-90.

Dolewski, R., Modarres, A., Holbert, K., **Barzee, T.**, Ferris, R., Baker, J., Williams, A., Storm, M., Storm, J.J. 2012. Small Mammal Community Structure in Urban Greenways. *USC Upstate Undergraduate Research Journal*, 5, 92-94.

### BOOK CHAPTERS

Rude. K. M., **Barzee, T. J.**, Franz, A. K. (2019). Chapter 19: Producing oleaginous microorganisms using wastewater – methods and guidelines for lab and industrial scale production. in*: Microbial Lipid Production – Methods and protocol*, (Ed.) Balan, V., Humana Press.

**Barzee, T.** and El-Mashad, H. (in press). Chapter 12: Carrot. in: *Integrated Processing Technologies for Food and Agricultural By-Products*, (Eds.) Pan, Z., Zhang, R., Zicari, S., Academic Press.

Chen, Y., **Barzee, T.**, Zhang, R., Pan, Z. (in press) Chapter 9: Citrus. in: *Integrated Processing Technologies for Food and Agricultural By-Products*, (Eds.) Pan, Z., Zhang, R., Zicari, S., Academic Press.

**PATENTS AND REPORTS**

Zhang, R., **Barzee, T.** 2018. Clarifying Water and Wastewater with Fungal Treatment/Bioflocculation. Patent Pending. https://patents.google.com/patent/WO2018014037.

Zhang, R., Scow, K., El-Mashad, H., Edalati, A., **Barzee, T.**, Wang, D., Rapport, J. 2017. Producing Valuable Co-Prodcts and Improving Nutrient Management for Dairy Manure Digester Systems: Final Report to the California Department of Food and Agriculture.

Kaffka, S., **Barzee, T.**, El-Mashad, H., Williams, R., Zicari, S., Zhang, R. 2016. Evaluation of Dairy Manure Management Practices for Greenhouse Gas Emissions Mitigation in California: Final Technical Report to the State of California Air Resources Board.

## AWARDS AND HONORS

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| UC Davis Campus Sustainability Award | 2019 |
| William and Nongkarn Chancellor Graduate Fellowship | 2018 |
| Carbon Neutrality Initiative Engagement Fellowship | 2018, 2017, 2016 |
| Biological Systems Engineering Graduate Student Travel Award | 2019, 2018, 2017 |
| Summer Graduate Student Researcher Award | 2018, 2017 |
| Jastro Shields Fellowship | 2018, 2017, 2015 |
| Bill Chancellor Centennial Travel Award | 2016 |
| H. A. Lewin Family Fellowship | 2016 |
| UCD and Humanities Graduate Research Award | 2016 |
| First and Second Place Graduate Poster ASABE CA/NV Meeting | 2016 |
| EPA P3 (People, Prosperity, Planet) Research Grant Award | 2016 |
| Graduate Scholars Fellowship | 2014 |
| | **Total Funding Secured = $118,682** |

## SELECTED PRESENTATIONS

**ORAL PRESENTATIONS**

**Barzee, T.**, Yothers, C., Chio, A., Edalati, A., El-Mashad, H., Franz, A., Zhang, R. 2018. Microalgae Cultivation, Harvest, and Water Recycling Using Processed Anaerobic Digestate as Feedstock. Oral, American Society of Agricultural and Biological Engineers (ASABE) Annual International Meeting (AIM), Detroit, MI.

Chen, Y., Edalati, A., **Barzee, T.**, Lin, X., El-Mashad, H. M., Zhang, R. 2018. Particle Size Distribution and Effect of Solid Removal on Biomethane Potential Reduction of Flushed Dairy Manure. Oral, ASABE AIM, Detroit, MI. **Sixth Place in NRES Student Competition.**

Edalati, A., Chen, Y., El-Mashad, H., Lin, X., **Barzee, T.**, Zicari, S., Zhang, R. 2018. Effect of Solid Manure Separation on Mitigation of Methane Emissions from Dairy Lagoons. Oral, ASABE AIM, Detroit, MI.

**Barzee, T.**, Pereira, R. 2018. Carbon Neutrality at the Intersection of the University and Animal Agriculture. Oral, UC Davis Veterinary Medicine One Health Seminar Series, Davis, CA.

**Barzee, T.**, Zhang, R., El-Mashad, H. 2017. Fungal-Assisted Harvesting of Algae and Bacteria. Oral, ASABE Annual International Meeting, Spokane, WA.

**Barzee, T.**, Edalati, A., El-Mashad, H., Rapport, J., Scow, K., Zhang, R. 2017. Liquid Biofertilizer Production from Anaerobic Digestate for Growing Tomatoes. Oral, ASABE AIM, Spokane, WA.

Edalati, A., **Barzee, T.**, El-Mashad, H., Rapport, J., Scow, K., Zhang, R. 2017. Solid Pelletized Biofertilizer Production from Anaerobic Digestate for Growing Corn. Oral, ASABE AIM, Spokane, WA.

Ambrose, H., **Barzee, T.**, Maroney, E., Raymond, A. 2017. Life Cycle Sustainability Assessment for Advanced Transit Buses. Oral, 25th Annual Conference of the International Symposium on Sustainable Systems and Technology, Chicago, IL.

**Barzee, T.**, Zhang, R., Fan, Z., El-Mashad, H. 2016. Ammonia Fungi Pelletization of Microalgae for Treatment of High Strength Wastewater. Oral, ASABE Annual International Conference, Orlando, FL.

Zicari, S., Williams, R., El-Mashad, H., **Barzee, T.**, Zhang, R., Kaffka, S. 2016. Evaluation of Dairy Manure Management Practices for Greenhouse Gas Emissions Mitigation in California. Oral, ASABE Annual International Conference, Orlando, FL.

**Barzee, T.**, Zhang, R., Edalati, A., El-Mashad, H., Rapport, J., Adams, C. 2015. Sustainable Biofertilizer Production from Anaerobically Digested Organic Wastes. Oral, ASABE Annual International Conference, New Orleans, LA.

**POSTER PRESENTATIONS**

**Barzee, T.**, Yothers, C., Edalati, A., Rapport, J., El-Mashad, H., Franz, A., Zhang, R. 2017. Microalgae Cultivation on Processed Anaerobic Digestates. Poster, California Bioresources Alliance (CBA) 12th Annual Symposium on Building California's Sustainable Bioresource Economy, Sacramento, CA.

**Barzee, T.**, Edalati, A., El-Mashad, H., Zhang, R. 2017. Sustainable Bio-Fertilizer from Anaerobically Digested Organic Wastes. Poster, CBA 12th Annual Symposium on Building California's Sustainable Bioresource Economy, Sacramento, CA.

**Barzee, T.**, Edalati, A., El-Mashad, H., Zhang, R. 2017. Microalgae Cultivation on Processed Anaerobic Digestates. Poster, ASABE Annual International Conference, Spokane, WA.

**Barzee, T.**, Edalati, H., Bala, A., Garrett, T., Zhang, R. 2016 Sustainable Bio-Fertilizer from Anaerobically Digested Animal Manure. Poster, US Engineering and Science Expo, EPA People Prosperity and Planet (P3), Washington DC.

Zicari, S., **Barzee, T.**, El-Mashad, H., Zhang, R., Williams, R., Kaffka, S. 2016. Preliminary evaluation of dairy manure management practices for greenhouse gas emissions mitigation in California. Poster, ASABE CA/NV Meeting, Tulare, CA. **First place in graduate student competition.**

**Barzee, T.**, Edalati, H., El-Mashad, H., Adams, C., Rapport, J., Molinos, B., Torbert, E., Scow, K., Zhang, R. 2016. High Value Fertilizer Products from Anaerobic Digestate. Poster, ASABE CA/NV Meeting, Tulare, CA. **Second place in graduate student competition.**

## TEACHING EXPERIENCE

**Engineering Design and Professional Responsibilities** Fall 2018, Fall 2016
Biological and Agricultural Engineering Department, UC Davis
Teaching Assistant (2018), Reader (2016)

- Created and led lectures in professor's absence to a class of 20.
- Organized and led machine shop training/fabrication activities and led multi-week reverse engineering lab activities.
- Graded reports and presentations and provided feedback for improvement.

**Modeling of Dynamic Processes in Biological Systems** Winter 2018, Winter 2017
Biological and Agricultural Engineering Department, UC Davis
Teaching Assistant

- Developed lecture and MATLAB activities and led weekly discussion sections for 20-30 students.
- Graded weekly homework assignments, prepared detailed grading rubrics, and held weekly office hour/tutoring sessions.

## GRADUATE RESEARCH EXPERIENCE

**University of California Davis** Fall 2014 - Present
Graduate Student Researcher, Dr. Ruihong Zhang

- Implemented a pilot-scale microalgae production system and investigated the use of ultrafiltered anaerobic digestate and extensive water recycling for microalgae production for biofuel or biochemical applications.
- Discovered and investigated the processing parameters of a novel fungi-algae-bacteria bioflocculation and immobilization technique for clarification of water and wastewater streams.
- Produced sustainable biofertilizer products from 14,000 gallons of anaerobic digestate using a pilot-scale multi-stage solid-liquid separation, ultrafiltration, and drying system. Analyzed the system performance and tested the fertilizer's effectiveness in greenhouse and field experiments with tomato, corn, and lettuce crops.
- Researched and reviewed the economics and effectiveness of seven methane mitigation strategies for dairy manure management in CA.

## SERVICE TO PROFESSION

**Manuscript reviewer:** Journal (manuscripts reviewed)

- Resources, Conservation & Recycling (1)
- Journal of Environmental Management (10)

**ASABE California/Nevada Section**
Membership Officer 2019 - Present

- Responsible for overseeing membership changes to the section
- Led an officer team to successfully propose and secure $30,000 in funding from ASABE for the development of an annual CA/NV ASABE Student Rally

Public Relations Officer 2018 - 2019

- Responsible for assisting the Chair and Executive Committee with bi-monthly newsletter publication, maintaining the website and mailing list, and working with industry sponsors to maintain support.

## DEPARTMENT/UNIVERSITY SERVICE

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| One Health Symposium Planning Committee | Winter 2018 - Present |
| Biological Systems Engineering Graduate Studies Committee | Fall 2016 - Present |
| Biological Systems Engineering Space and Facilities Committee | Fall 2017 - Present |
| CA Higher Education Sustainability Conference Student Convergence Committee | January – April, 2017 |
| University of California System Wide Zero Waste Task Force | January – April 2017 |

## LEADERSHIP EXPERIENCE

**University of California Carbon Neutrality Initiative** 2016 - Present

Engagement Fellow

- Invited to lead and moderate the panel "Environmental Sustainability of Health Professions" at the 5th annual One Health Symposium (November 2018).
- Organized events to inform and engage graduate and professional school students about the UC Carbon Neutrality Initiative. Collaborated with student clubs across campus from the Graduate School of Management, the School of Veterinary Medicine, the UCD Health Center, the Law School, and the Graduate Student Association to organize and participate in seminars, tabling activities, and renewable energy facility tours.
- Began the development of a Climate Science and Policy Graduate Academic Certificate program

**Biological and Agricultural Engineering Grad Student Association (BAE-GSA)** 2016 - Present

Alumni Relations Chair (2018-2019), Vice President (2017-2018), President (2016-2017)

- Elected to lead and serve as first president of the BAE-GSA, organize intra- and inter-departmental social and professional development events and meetings.
- Serve as a liaison between graduate students and the faculty graduate studies committee and organizing a departmental alumni/career panel.

**International Exchange Engineering Design Workshop – Plant Factory** Summer 2017

Facilitator/Organizer

- Served as a member of a four-person facilitator team to develop a three-day engineering design and education workshop for exchange between UCD graduate students and visiting scholars from Tokyo University of Agriculture and Technology (TUAT).
- The workshop focused on developing practical skills on the engineering design process, educational course development, and shop fabrication skills. The students exchanged cultures and designed and fabricated a prototype plant factory greenhouse and developed a lesson plan to teach elementary-aged children about the design process.

## MEDIA COVERAGE

UC Davis BFTV Cluster. Tyler Barzee Awarded First BAE Dept. William & Nongkarn Chancellor Graduate Fellow Award. https://news.bftv.ucdavis.edu/biological-and-agricultural-engineering/tyler-barzee-awarded-first-bae-dept-william-nongkarn

Lairmore, M. 2018. One Health Symposium Recap. *UC Davis One Health Institute Blog.* https://www.ucdavis.edu/one-health/symposium-recap

University of California Office of the President. 2018. Tyler Barzee CNI Fellow Class of 2018. https://ucop.edu/carbon-neutrality-initiative/cni-fellows/2018-cni-fellows/barzee.html

Johnson, B. 2017. Biofertilizer made from treated manure, food waste. *Daily Democrat*. https://www.dailydemocrat.com/2017/07/21/biofertilizer-made-from-treated-manure-food-waste/

Coley., M., White, A. 2016. Biodigesters turn food into electricity, but can they also create fertilizer? *Food Blog. UC Division of Agriculture and Natural Resources. https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=22058*

UC Davis Biological and Agricultural Engineering. 2017. Student spotlight: Tyler Barzee, BAE PhD student with numerous fellowships. https://bae.engineering.ucdavis.edu/blog/student-spotlight-tyler-barzee-bae-phd-student-numerous-fellowships/

UC Davis Biological and Agricultural Engineering. 2016. BAE teams win poster competition at CA/NV ASABE meeting. https://bae.engineering.ucdavis.edu/blog/bae-teams-win-poster-competition-at-canv-asabe-meeting/