

## TYLER J. BARZEE

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<https://www.tylerbarzee.com/>

### EDUCATION

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- 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

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#### ARTICLES

- Barzee, T.**, Edalati, A., El-Mashad, H., Zhang, R. (in preparation). Economic Analysis of Biofertilizer Production from Anaerobic Digestate.
- Barzee, T.**, Zhang, R., Edalati, A., Rapport, J., El-Mashad, H. (in review). Pilot-Scale Production and Characterization of Biofertilizers from Anaerobically Digested Dairy Manure and Food Waste. *Transactions of the ASABE*.
- Lin, Y., Zhao, Y., Ruan, X., **Barzee, T.**, Zhang, Z., Kong, H., Zhang, X. (in press). The potential of constructed wetland plants for bioethanol production. *BioEnergy Research*.
- Barzee, T. J.**, Edalati, A., El-Mashad, H., Wang, D., Scow, K., & Zhang, R. (2019). Digestate Biofertilizers Support Similar or Higher Tomato Yields and Quality Than Mineral Fertilizer in a Subsurface Drip Fertigation System. *Frontiers in Sustainable Food Systems*.  
<https://doi.org/10.3389/fsufs.2019.00058>
- 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. <https://doi.org/10.1656/058.017.0413>
- 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. [https://doi.org/10.1007/978-1-4939-9484-7\\_19](https://doi.org/10.1007/978-1-4939-9484-7_19)

**Barzee, T. J.**, El-Mashad, H. M., Zhang, R., Pan, Z. (2019). Chapter 12: Carrot. in: *Integrated Processing Technologies for Food and Agricultural By-Products*, (Eds.) Pan, Z., Zhang, R., Zicari, S., Academic Press. <https://doi.org/10.1016/B978-0-12-814138-0.00012-5>

Chen, Y., **Barzee, T. J.**, Zhang, R., Pan, Z. (2019) Chapter 9: Citrus. In: *Integrated Processing Technologies for Food and Agricultural By-Products*, (Eds.) Pan, Z., Zhang, R., Zicari, S., Academic Press. <https://doi.org/10.1016/B978-0-12-814138-0.00009-5>

## 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-Products 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. <https://biomass.ucdavis.edu/wp-content/uploads/ARB-Report-Final-Draft-Transmittal-Feb-26-2016.pdf>

## GRANTS

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### Current Research

**Title:** Carbon Sequestration and Soil Health Improvement in Almond Orchards by Using Dairy Manure Compost

**Award Number:** 19-0686-000-SO-0 (PI: Ruihong Zhang)

**Funding Agency:** California Department of Food and Agriculture

**Amount Awarded:** \$249,998

**Period:** 08/2019 – 03/2022

**Role:** Graduate Student Researcher, Proposal Coauthor

**Title:** Demonstration of an Advanced Manure Management System for Reducing Greenhouse Gas Emissions and Producing Valuable Products

**Award Number:** In negotiation (PI: Ruihong Zhang)

**Funding Agency:** California Department of Food and Agriculture

**Amount Awarded:** \$999,994

**Period:** 11/2019 – 07/2021

**Role:** Graduate Student Researcher, Proposal Coauthor

### Previous Research

**Title:** Sustainable Bio-Fertilizer from Anaerobically Digested Animal Manure

**Award Number:** SU836120 (PI: Ruihong Zhang)

**Funding Agency:** US Environmental Protection Agency

*Amount Awarded:* \$14,965  
*Period:* 08/2015 – 07/2016  
*Role:* Graduate Student Researcher, Proposal Coauthor

**Total Grant Funding = \$1,264,957**

## TEACHING EXPERIENCE

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**Mass Transfer and Kinetics in Biological Systems (EBS 127)** Fall 2019  
Biological and Agricultural Engineering Department, UC Davis  
Associate Instructor

- Led the core senior-level course consisting of lecture and lab sections to a class of 40.
- Organized course materials and created an online video homework series as a student resource.
- Created exams and graded course materials.
- Collaborated with the Teaching Assistant for effective implementation of lab exercises.
- Implemented a course-specific ABET assessment.

**Engineering Design and Professional Responsibilities (EBS 170)** 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.
- Created and implemented course-specific ABET assessment materials.

**Modeling of Dynamic Processes in Biological Systems (EBS 130)** Winter 2019, 2018, and 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.

## 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 Award and Fellowship Funding = \$118,682**

## SELECTED PRESENTATIONS

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### ORAL PRESENTATIONS

#### 2019

- Barzee, T.**, Edalati, A., El-Mashad, H., Jenkins, B., Rapport, J., Zhang, R. 2019. Economic Analysis of Producing Solid and Liquid Biofertilizers from Anaerobic Digestates. Oral, American Society of Agricultural and Biological Engineers (ASABE) Annual International Meeting (AIM), Boston, MA.
- Chio, A., **Barzee, T.**, Cao, L., Zhang, R. 2019. Heterotrophic Growth of Algae for Animal Feed Application. Oral, ASABE AIM, Boston, MA.
- Cao, L., **Barzee, T.**, El-Mashad, H., Chen, Y., Pan, Z., Zhang, R. 2019. Production of Fungal Biomass from Almond Hulls for Animal Feed Application. Oral, ASABE AIM, Boston, MA.
- Liang, K. J., El-Mashad, H., **Barzee, T.**, Chen, C., Pan, Z., Zhang, R. 2019. Drying of Microalgae with Infrared Radiation. Oral, ASABE AIM, Boston, MA.
- Edalati, A., Chen, Y., El-Mashad, H., **Barzee, T.**, Lin, X., Zicari, S., Zhang, R. 2019. The Impact of Mechanical Solid-Liquid Separators on the Mitigation of Methane Emissions from Dairy Manure Lagoons in California. Oral, ASABE AIM, Boston, MA.
- Edalati, A., Chen, Y., El-Mashad, H., **Barzee, T.**, Lin, X., Zicari, S., Zhang, R. 2019. The Impact of a Unique, Advanced Multistage Solid-Liquid Separator System on the Mitigation of Methane Emissions from a Dairy Manure Lagoon in California. Oral, ASABE AIM, Boston, MA.
- Chen, Y., Edalati, A., **Barzee, T.**, El-Mashad, H. M., Zhang, R. 2019. Economic Analysis of Solid Separation Technologies on California Dairy Farms. Oral, ASABE AIM, Boston, MA.
- Chen, Y., Edalati, A., **Barzee, T.**, El-Mashad, H. M., Zhang, R. 2019. Particle Size Distribution and Effect of Solid Removal on Biomethane Potential Reduction of Flushed Dairy Manure. Oral, ASABE AIM, Boston, MA.

#### 2018

- 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, ASABE 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.

#### 2017

- 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, 25<sup>th</sup> Annual Conference of the International Symposium on Sustainable Systems and Technology, Chicago, IL.

#### **2015-2016**

**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**

Edalati, A., Chen, Y., El-Mashad, H., **Barzee, T.**, Lin, X., Zicari, S., Kaffka, S., Campbell, M., Zhang, R. 2019. The Impact of a Weeping Wall on the Mitigation of Methane Emissions from a Dairy Manure Lagoon in CA. Poster, ASABE AIM. Boston, MA.

**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) 12<sup>th</sup> 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 12<sup>th</sup> 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.**

#### **GRADUATE RESEARCH EXPERIENCE**

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##### **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

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### Manuscript reviewer: Journal (manuscripts reviewed)

- Journal of Environmental Management (16)
- Bioresource Technology (1)
- Resources, Conservation & Recycling (1)

### 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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ASABE CA/NV Student Rally Planning Committee Summer 2018 - Present

### *Subcommittee Service:*

- Student Executive, *Chair*
- Logistics and Space, *Chair*
- Governing Documents, *Member*
- Budget, *Member*
- Programming, *Member*

One Health Symposium Planning Committee Winter 2018 - Present

Biological Systems Engineering Space and Facilities Committee Fall 2017 - Present

Biological Systems Engineering Graduate Studies Committee Fall 2016 – Spring 2019

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

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UC Davis One Health Institute 2017 – Present

Student Symposium Coordinator, Panel Moderator, Break Out Session Student Facilitator

- Invited to lead and moderate two panels, “Political Interfaces and One Health” and “Environmental Sustainability of Health Professions” at the 2019 and 2018 Annual One Health Symposiums, respectively.
- Organized eight expert panelists from California, New York, and Ireland to participate in panel presentations and Q&A with >150 audience members.

- Designed and led a breakout session focused on Coastal Borders and the effects of harmful algal blooms on environmental and human/animal health.

**University of California Carbon Neutrality Initiative** 2016 – 2019  
Engagement Fellow

- 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 - 2019  
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** Summer 2017  
“Plant Factory”  
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**

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Pflueger-Peters, N. 2019. Student Spotlight: Tyler Barzee. <https://bae.ucdavis.edu/news/student-spotlight-tyler-barzee>

Sino-US Food and Agriculture Innovation Center. 2019. Tyler Barzee, a Ph.D. Candidate in Biological Systems Engineering, UC Davis, Visits SUFAIC. <https://www.sufaic.com/single-post/2019/07/31/Tyler-Barzee-a-PhD-Candidate-in-Biological-Systems-Engineering-UC-Davis-Visits-SUFAIC>

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/>