TYLER J. BARZEE

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EDUCATION

PhD in Biological Systems Engineering March 2020
University of California Davis
Dissertation title: "Processing and Utilization of Anaerobic Digestate as Biofertilizer for Production of 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.J., El-Mashad, H., Zhang, R. (in preparation). Modeling of the Equilibrium and Kinetic Immobilization Behavior of Fungal-Assisted Harvesting of Algae.

Barzee, T.J., Yothers, C., Edalati, A., Rude, K., El-Mashad, H., Franz, A., Zhang, R. (in preparation). Microalgae Cultivation, Harvest, and Water Recycling Using Processed Anaerobic Digestate as Feedstock.

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

Barzee, T. J., Edalati, A., Rapport, J. El-Mashad, H., Zhang, R. (in second 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. J.**, Zhang, Z., Kong, H., Zhang, X. (2019). The potential of constructed wetland plants for bioethanol production. *BioEnergy Research*. https://doi.org/10.1007/s12155-019-10065-y

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

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

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

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., Cao, L., El-Mashad, H., **Barzee, T.**, Pan, Z. 2019. Processes and A System for the Production of Antioxidants and Protein-Rich Food from Nut and Fruit Processing By-products. (ROI Submitted).

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

Zhang, R., El-Mashad, H., **Barzee, T.,** Cao, L. (2020). Production of Antioxidants and Fungal Biomass as Poultry Feed from Almond Hulls. Final Research Report to the Almond Board of California.

Zhang, R., El-Mashad, H., Edalati, A., Chen, Y., **Barzee, T.,** Lin, X.J., Kaffka, S., Campbell, M. (2019). Effect of Solid Separation on Mitigation of Methane Emission in Dairy Manure Lagoons. Final Research Report to the California Department of Food and Agriculture.

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

TEACHING EXPERIENCE

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

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

ORAL PRESENTATIONS

2020

Chio, A., **Barzee, T.**, Zhang, R. 2020. Heterotrophic Production of Microalgae *Chlorella sorokiniana* Using Hydrolyzed Lactose as Substrate. Oral, American Society of Agricultural and Biological Engineers (ASABE) Annual International Meeting (AIM).

Cao, L., **Barzee, T.**, El-Mashad, H., Chen, Y., Pan, Z., Zhang, R. 2020. Production of Antioxidants and Fungal Biomass from Almond Hulls for Food and Feed Applications. Oral, ASABE AIM.

Chen, Y., **Barzee, T.**, El-Mashad, H., Khalsa, S. D., Brown, P., Zhang, R., Edalati, A. 2020. Production and Application of Pelletized Compost Products from Dairy Manure and Woody Biomass on California Almond Orchards. Oral, ASABE AIM.

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, ASABE 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, 25th 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

Cao, L., **Barzee, T.,** El-Mashad, H., Chen, Y., Pan, Z., Zhang, R. 2019. Production of Antioxidants and Fungal Biomass from Almond Hulls for Food and Feed Applications. Poster, The Almond Conference, Sacramento, CA.

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) 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.**

SERVICE TO PROFESSION

Manuscript reviewer: Journal (manuscripts reviewed)

- Journal of Environmental Management (21)
- Agronomy (3)
- Applied Engineering in Agriculture (1)
- Bioresource Technology (1)
- Resources, Conservation & Recycling (1)
- Journal of Soil Science and Plant Nutrition (1)

- Sustainability (1)
- Horticulturae (1)

ASABE California/Nevada Section

Vice Chair 2020 - Present

- Aid the Chair in enacting the goals of the Executive Committee
- Liaison between the Student Rally Executive Committee and the Section

Membership Officer 2019 – 2020

- 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

ASABE CA/NV Student Rally Executive Committee 2019 - Present
Past Chair (2020-2021) Chair (2019-2020)

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

California Biomass Collaborative 2020-Present
Technical Review Administrator

- Administer the technical review process of applications for the California Department of Food and Agriculture Alternative Manure Management and Dairy Digester Programs
- Organize 30 professors from 16 unique institutions around the country for training and quality control of technical reviews.

UC Davis One Health Institute 2017 – Present
Student Symposium Coordinator, Panel Moderator, Break Out Session Student Facilitator

- Winner of world-wide Best Student Event of 2019 from the One Health Commission

- 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

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/