Brendan T. Higgins
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Auburn University Auburn, AL 36849
(334) 844-3532

EDUCATION

Ph.D., Biological Systems Engineering, University of California, Davis, CA, Dec 2014
Dissertation: "Co-culturing green algae with bacteria for enhanced growth and production of biofuel precursors"
Advisor: Jean S. VanderGheynst

Master of Science, Transportation Technology & Policy, University of California, Davis, CA June 2011
Thesis: "Life cycle environmental and cost impacts of using an algal turf scrubber to treat dairy wastewater"
Advisor: Alissa M. Kendall

Bachelor of Science, Civil Engineering, Northwestern University, Evanston, IL March 2009
Graduated *Magna Cum Laude*

EXPERIENCE

Associate Professor, Biosystems Engineering, Auburn University, Auburn, AL, 08/2022-present
Assistant Professor, Biosystems Engineering, Auburn University, Auburn, AL, 09/2016-8/2022
Postdoctoral Research, **Biological and Agricultural Engineering,** UC Davis 12/2014-08/2016
Lecturer, **Biological and Agricultural Engineering,** UC Davis, Fall 2015
Graduate Student Intern, California Air Resources Board, Sacramento, CA, Summer 2009
Project Engineer Co-op, Bulley & Andrews, LLC, Chicago, IL, 06/2006-09/2008

RESEARCH INTERESTS

My research group investigates processes that utilize both algae and bacteria for conversion of waste and wastewater to products of value. We also investigate use of hydroponics plant production as a means of upcycling wastewaters. We seek to understand underlying mechanisms that contribute to system performance with a particular focus on molecular organism interaction. Research methods include cell culture, metabolomics, metagenomics, chromatography, mass spectrometry, and biological and chemical assays. We also use life cycle assessment and process engineering as tools to understand broader implications of our experimental research.

TEACHING

ENGR 1110, Introduction to Biosystems Engineering, Auburn University, Fall and Spring semesters from 2017-present. Transformed course into active learning experience for students.

BSEN 5280/6280, Life Cycle Assessment in Biological Systems, Auburn University, Fall 2018. Created this new course which covers life cycle assessment and bioprocess engineering.

EBS 127, Mass Transfer and Kinetics in Biological Systems, UC Davis, Fall 2015 as instructor of record for the course. Developed course notes and in-class problems, wrote homework assignments and exams, supervised TA's teaching of lab course.

NSF GK-12 RESOURCE Fellow, UC Davis, 4/2011-6/2013
Taught hands-on science, math, and engineering to 6th grade classes in Sacramento with an emphasis on renewable energy systems. Taught 10 hours per week in classroom including assistance with after school MESA program (http://mesa.ucop.edu/) for enhanced STEM education among low-income and underserved students. Developed curriculum that covered 6th grade science standards including energy, heat, electricity, and renewable energy; each year culminated with a set of lessons on algal biofuels and included construction of photobioreactors by students. **Notable achievement:** Supervised 6th grade team that won first place $550,000 grant money for school renovations in Sacramento City School District's "Project Green" competition.

Mentoring and Advising

Graduate Students (as primary advisor):
1. Margaret Otto (PhD), 8/2024-present
2. Grace Hohn (MS), 1/2024-present
3. Mehedi Hasan (PhD), 1/2024-present
4. Navid Farahmandzad (PhD), 1/2023-present
5. Edward Drabold (PhD), 8/2022-present
6. Wellington Arthur (PhD), 1/2022-present
7. Shima Rezaei (PhD), 1/2022-present
8. Alireza Fallahi (MS), 1/2022-12/2024 (degree conferred)
9. Elizabeth Childree (MS), 8/2022-8/2023 (degree conferred)
10. Zach Morgan (MS), 8/2021-8/2023 (degree conferred)
11. Jessa Cherones (MS), 1/2021-8/2022 (degree conferred)
12. Dillon Sprague (MS), 8/2020-12/2021 (degree conferred)
13. Morgan Thomas (MS), 8/2020-08/2021 (degree conferred)
14. Peyton Goodling (MS), 8/2020-08/2021 (degree conferred)
15. Rohit Kalvakaalva (MS), 1/2019-12/2020 (degree conferred)
16. Elizabeth Bankston (MS), 8/2017-8/2019 (degree conferred)
17. Qichen Wang (PhD), 1/2018-5/2022 (degree conferred)
18. Haixin Peng (PhD), 1/2017-8/2020 (degree conferred)

Undergraduate Students (as research advisor):
1. Emma Tolbert (11/2024-present)
2. Kelly Sullivan (8/2024-present)
3. Mary Beth Hall (4/2024-present)
4. Grace Booher, REU (5/2024-7/2024)
5. Teresa Galvan, REU (5/2024-7/2024)
6. Rance Hood (2/2024-present)
7. Caroline Morris (1/2024-present)
8. Sarah Henslee (1/2024-present)
9. Trinity Seale (12/2023-11/2024)
10. Emma Gujski (12/2023-present)
11. Fran Mann (10/2023-present)
12. Brooklyn Stooksberry (9/2023-present)
13. Cole Bedics (9/2023-present)

14. Maddie Spoor (5/2023-present)
15. Grace Palenapa (5/2023-present)
16. Rachel Schorer (4/2023-present)
17. Al Dean Francisco (3/2023-present)
18. Julia Kullander (5/2022-5/2023)
19. Matthew Rud (5/2022-8/2023)
20. Arleth Ortiz, REU (5/2022-7/2022)
21. Justus Smith (08/2021-present)
22. Elizabeth Melby (5/2020-5/2022)
23. Morgan Thomas (4/2020-7-2020)
24. Peyton Goodling (5/2019-7/2020)
25. Miriam Hyman, REU (3/2019-1/2021)
26. Nathan Wall (11/2018-12/2019)
27. Emily Waller, REU (5/2018-7/2018)
28. Justin Box (4/2018-5/2020)
29. Bryan Holmes (1/2018-5/2019)
30. Kristin Chaump (6/2017-5/2020)
31. Matthew Preisser (1/2017-5/2018)
32. Kaiyan Li (9/2016-8/2017)
33. Sandon Du* (9/2015-8/2016)
34. Matthew Paddock* (1/2015-8/2016)
35. Diana Johnson* (2014)
36. Simon Staley* (2013-2015)
37. Alexander Thornton-Dunwoody* (2013)
38. Kara Johnson* (2012)
39. Brian Gong*, REU (2012)

*Mentored undergraduate researchers prior to joining Auburn University.

A Commitment to Inclusivity
My research program has supported students that are traditionally underrepresented in engineering research including two African-American, three of Hispanic origin, one partially deaf, and 22 female students. I work hard to foster a work environment that is inclusive and welcoming to all.

SERVICE
Associate Editor: American Society of Biological and Agricultural Engineering (ASABE) Journals
Reviewer (select journals): ACS Environmental Science & Technology, ACS Sustainable Chemistry & Engineering, Algal Research, Biotechnology & Bioengineering, Chemosphere, Environmental Engineering Science, Process Biochemistry, Process Engineering, Science of the Total Environment, Waste Management, Water Research

PEER-REVIEWED RESEARCH PUBLICATIONS
1. Guo, N., S. Wang, T. Whitfield, W. Batchelor, Y. Wang, D. Blersch, **B.T. Higgins**, Y. Feng, M. Liles, L. Estela de-Bashan, Y. Ma, Y. Wang. 2024. High-Efficiency CRISPR-Cas9 Genome Editing Unveils Biofilm Insights and Enhances Antimicrobial Activity in Bacillus velezensis FZB42. Biotechnology and Bioengineering. In Press.

2. Shanmugam, S.R.[1], R. Schorer[3], W. Arthur[2], E. Drabold[2], M. Rudar, **B.T. Higgins.** Upcycling Nutrients from Poultry Slaughterhouse Wastewater Through Cultivation of the Nutritional Yeast, *Yarrowia lipolytica*. Journal of Environmental Chemical Engineering. In Press.
3. Maldonado, D., B.R. Dickson, G.Au, M. Li, A. Rodriguez, M. Bortner, E.E. Victor, **B.T. Higgins**, M.S. Peresin. Exploring the Effects of Cellulose Sources on Silver Reduction and the Antimicrobial Activity of Nanocellulose-Based Hydrogels. Carbohydrate Polymers. 347. 122771.
4. Arthur, W.[2], Z. Morgan[2], M. Reina, E. Drabold[2], D.E. Wells, D.V. Bourassa, Q. Wang, **B.T. Higgins**[1]. 2024. Pilot-Scale Evaluation of Poultryponics: Insights into Nitrogen Utilization and Food Pathogen Dynamics. ACS ES&T Water. 4(9): 3964-3975.
5. Francisco, A.D., Q. Wang., **B.T. Higgins**. 2024. Microalgae Biomass Production Using Anaerobically Digested Solid Waste from Aquaponics. Auburn University Journal of Undergraduate Scholarship: 2024 issue.
6. **Higgins, B.T.[1]**, M. Thomas[2], P. Goodling[2], A.E. Wilson. Development of a new primer tool for quantification and identification of geosmin-producing cyanobacteria in drinking water reservoirs. Limnologica. 107. 126183.
7. Inskeep, A.E., **B.T. Higgins**, D.E. Wells. 2024. Modeling ammonium to prepare for a nitrogen mass balance for an algal-bacterial system. Auburn University Journal of Undergraduate Scholarship: 2024 issue.
8. Wang, Q.[2], A. Fallahi[2], A.E. Wilson, **B.T. Higgins**. 2024. Engineered algal systems for the treatment of anaerobic digestate: a meta-analysis. Journal of Environmental Management. 356. 120669
9. Wang, Q., **B.T. Higgins**. 2023. Long term outdoor algal production on undiluted anaerobic digestate in the southeastern US. Journal of the ASABE. 67(1): 181-192..
10. Kalvakaalva, R.[2], M. Smith, S.A. Prior, G.B. Runion, E. Ayipio, C. Blanchard, D. Wells, D. Blersch, S. Adhikari, R. Prasad, T. Hanson, N. Wall[3], **B.T. Higgins[1]**. 2023. Life cycle assessment of a decoupled biofloc aquaponics facility across seasons. Journal of Cleaner Production. 429. 139356.
11. Kalvakaalva, R.[2], M. Smith, S.A. Prior, G.B. Runion, E. Ayipio, C. Blanchard, D. Wells, D. Blersch, S. Adhikari, R. Prasad, T. Hanson, N. Wall[3], **B.T. Higgins[1]**. 2023. Mass-Balance Process Model of a Decoupled Aquaponic System. Journal of the ASABE 66(4): 955-967.
12. Z. Sun, Y. Wei, X. Song, **B.T. Higgins**, Z. Huang, W. Hao, M. Li. 2023. Using a microbial fuel cell to balance the carbon-nitrogen mismatch in submerged fixed-bed reactors for the resilient treatment of mariculture wastewater. Journal of Water Process Engineering. 53. 103629..
13. Wang, Q., E. Childree[2], J. Box[3], M. López-Vela, D. Sprague[2], J. Cherones[2], **B.T. Higgins[1]**. 2023. Microalgae can promote nitrification in poultry processing wastewater in the presence and absence of antimicrobial agents. ACS ES&T Engineering 3(4): 568-579.
14. T. Rahman, H. Jahromi, P. Roy, S. Adhikari, F. Feyzbar-Khalkhali-Nejad, T.S. Oh, Q. Wang[2], **B.T. Higgins**. 2023. Influence of red mud catalyst and reaction atmosphere on hydrothermal liquefaction of algae. Energies. 16(1): 491.
15. Kalvakaalva, R.[2], S.A. Prior, M. Smith, G.B. Runion, E. Aiyipio, C. Blanchard, N. Wall, D. Wells, T.R. Hanson, **B.T. Higgins[1]**. 2022. Direct greenhouse gas emissions from a pilot-scale aquaponics system. Journal of the ASABE. 65(6): 1211-1223.
16. Smith, J.[3], Q. Wang[2], **B.T. Higgins**. Determining the ability of polyphosphate accumulating organisms to use organic compounds in algal photosynthate. Auburn University Journal of Undergraduate Scholarship: 2022 issue.
17. Melby, E.[3], **B.T. Higgins**. Neutral Lipid Accumulation in Algae by Oxidative Stress Due to Poultry Wastewater Antimicrobials. Auburn University Journal of Undergraduate Scholarship: 2021 issue.

18. **Higgins, B.T.**[1], K. Chaump[3], Q. Wang[2], R. Prasad, P. Dey. 2021. Moisture content and aeration control mineral nutrient solubility in poultry litter. Journal of Environmental Management. 300. 113787.
19. Wang, Q.[2], J. Cherones[2], **B.T. Higgins**[1]. 2021. Acclimation of an algal consortium to sequester nutrients from anaerobic digestate. Bioresource technology. 342. 125921.
20. M. Hyman[3], Q. Wang[2], A.E. Wilson, S. Adhikari, and **B.T. Higgins**[1]. 2021. Production of *Daphnia* zooplankton on wastewater-grown algae for sustainable conversion of waste nutrients to fish feed. Journal of Cleaner Production. 310. 127501.
21. A. Fallahi[2], F. Rezvani[1], H. Asgharnejad, E. Khorshidi, N. Hajinajaf, **B.T. Higgins**[1]. 2021. Interactions of Microalgae-Bacteria Consortia for Nutrient Removal from Wastewater: a Review. Chemosphere. 129878.
22. Wang, P., Y. Sakhno, S. Adhikari, H. Peng, D. Jaisi, T. Soneye, **B.T. Higgins**, Q. Wang. 2021. Effect of ammonia removal and biochar detoxification on anaerobic digestion of aqueous phase from municipal sludge hydrothermal liquefaction. Bioresource Technology. 326. 124730.
23. Peng, H.[2], L.E. de-Bashan, **B.T. Higgins**[1]. 2020. Comparison of algae growth and symbiotic mechanisms in the presence of plant growth promoting bacteria and non-plant growth promoting bacteria. Algal Research. Algal Research. 53. 102156.
24. Wang, Q.[2], M. Hyman[3], **B.T. Higgins**[1]. 2020. Factors impacting the effectiveness of biological pretreatment for the alleviation of algal growth inhibition on anaerobic digestate. Algal Research. 53. 102129.
25. Peng, H.[2], L.E. de-Bashan, **B.T. Higgins**[1]. 2020. *Azospirillum brasilense* reduces oxidative stress in the green microalgae *Chlorella sorokiniana* under different stressors. Journal of Biotechnology. 325. 179-185.
26. Box, J.[3], **B.T. Higgins.** 2020. Development of Algal-Bacterial Wastewater Treatment Systems that are Effective in the Presence of Antimicrobial Processing Aids Used in the Poultry Processing Industry. Auburn University Journal of Undergraduate Scholarship: 2020 issue.
27. Box, J.[3], J. Otto, W. Kent, **B.T. Higgins**[1]. 2020. Investigation of covers and chemical treatment for the suppression of cyanobacteria in water treatment systems. Water and Environment Journal. 12643.
28. Bankston, E.[2], Q. Wang[2], **B.T. Higgins**[1]. 2020. Algae support populations of heterotrophic, nitrifying, and phosphate-accumulating bacteria in the treatment of poultry litter anaerobic digestate. Chemical Engineering Journal. 398: 125550.
29. Wang, P., H. Peng[2], S. Adhikari, **B.T. Higgins**, P. Roy, W. Dao Wei, X. Shi. 2020. Enhancement of biogas production from wastewater sludge via anaerobic digestion assisted with biochar amendment. Bioresource Technology. 209: 123368.
30. Peng, H.[2], L.E. de-Bashan, Y. Bashan, **B.T. Higgins**[1]. 2020. Indole-3-acetic acid from *Azosprillum brasilense* promotes growth in green algae at the expense of energy storage products. Algal Research. 47: 101845.
31. Bankston, E.[2], **B.T. Higgins**. 2019. Anaerobic microbial communities can influence algal growth and nutrient removal from anaerobic digestate. Bioresource Technology. 297: 122445.
32. Holmes, B.[3], M. Paddock[3], J.S. VanderGheynst, **B.T. Higgins**[1]. 2019. Algal photosynthetic aeration increases the capacity of bacteria to degrade organics in wastewater. Biotechnology & Bioengineering. 117: 62-72.
33. Holmes, B.[3], M., **B.T. Higgins**. 2019. Modeling of Photosynthetic Aeration for Energy Efficient Wastewater Treatment. Auburn University Journal of Undergraduate Scholarship: 2019 issue.
34. Wang, Q.[2], R. Prasad, **B.T. Higgins**[1]. 2019. Aerobic bacterial pretreatment to overcome algal growth inhibition on high-strength anaerobic digestates. Water Research. 162(1): 420-426.

35. Islam, M.S., R. Dissanayaka, **B.T. Higgins**, S. Adhikari, G. Mills. 2019. Photoreduction of CCl_3F in Aqueous Solutions Containing Sulfonated Poly(ether etherketone) and Formate Buffers. Research on Chemical Intermediates. 45: 4015-4028.
36. Chaump, K.[3], M. Preisser[3], S.R. Shanmugam, R. Prasad, S. Adhikari, **B.T. Higgins[1]**. 2018. Leaching and anaerobic digestion of poultry litter for biogas production and nutrient transformation. Waste Management: 84: 413-422.
37. Wang, Q.[2], H. Peng[2], **B.T. Higgins[1]**. 2018. Cultivation of Green Microalgae in Bubble Column Photobioreactors and Assay for Neutral Lipids. JoVE: doi: 10.3791/59106
38. Preisser[3], M., **B.T. Higgins**. 2018. Anaerobic Digestion Case Study: Identifying Viable Feedstock Sources for Small Scale Biogas Production at Auburn University. Proceedings of the National Conference on Undergraduate Research (NCUR). April 5-7, Edmond Oklohoma.
39. Preisser[3], M., **B.T. Higgins**. 2018. Anaerobic Digestion of Food Waste and Poultry Litter for Biogas Production. Auburn University Journal of Undergraduate Scholarship: 2018 issue.
40. **Higgins, B.T.[1]**, Q. Wang[2], S. Du[3], M. Hennebelle, A. Taha, O. Fiehn, J.S. VanderGheynst. 2018. Impact of thiamine metabolites and spent medium from *Chlorella sorokiniana* on metabolism in the green algae *Auxenochlorella protothecoides*. Algal Research: 33: 197-208.
41. **Higgins, B**., I. Gennity, P. Fitzgerald, S. Ceballos, O. Fiehn, J. VanderGheynst. 2017. Algal-bacterial synergy in treatment of winery wastewater. Nature Clean Water: 1(6)
42. Yu, Y.W., **B. Higgins**, C. Yu, A. Reddy, S. Ceballos, L. Joh, B. Simmons, S. Singer, J. VanderGheynst. 2016. Ionic liquids impact the bioenergy feedstock degrading microbiome and transcription of enzymes relevant to polysaccharide hydrolysis. mSystems: 1(6):e00120-16.
43. **Higgins, B**. I. Gennity, S. Samra, T. Kind, O. Fiehn, J. VanderGheynst. 2016. Cofactor symbiosis for enhanced algal growth, biofuel production, and wastewater treatment. Algal Research: 17: 308-315.
44. Simmons, C., **B. Higgins**, S. Staley, L.D. Joh, B.A. Simmons, S.W Singer, J.J. Stapleton, J.S. VanderGheynst. 2016. The role of organic matter amendment level on soil heating, organic acid accumulation, and development of bacterial communities in solarized soil. Applied Soil Ecology: 106: 37-46.
45. Fernandez, L., **B. Higgins**, H. Scher, J. VanderGheynst. 2015. Spray application and release of microalgae from water-in-oil emulsions. Current Biotechnology: 5(2): 154-162.
46. **Higgins, B.**, D. Nobles, Y. Ma, W. Wikoff, T. Kind, O. Fiehn, J. Brand, J. VanderGheynst. 2015. Informatics for improved algal taxonomic classification and research: a case study of UTEX 2341. Algal Research: 12: 545-549.
47. **Higgins, B.**, J.M. Labavitch, J. VanderGheynst. 2015. Co-culturing *Chlorella minutissima* with *Escherichia coli* can increase neutral lipid production and improve biodiesel quality. Biotechnology and Bioengineering: 112(9): 1801-1809.
48. Tsugawa, H., T. Cajka, T. Kind, Y. Ma, **B. Higgins**, K. Ikeda, M. Kanazawa, J. VanderGheynst, O. Fiehn, M. Arita. 2015. MS-DIAL: Data independent MS/MS deconvolution for comprehensive metabolome analysis. Nature Methods: 12(6): 523-526.
49. **Higgins, B**., A. Thornton-Dunwoody, J.M. Labavitch, J. VanderGheynst. 2014. Microplate assay for quantitation of neutral lipids in extracts from microalgae. Analytical Biochemistry: 465: 81-89.
50. **Higgins, B.** and J. VanderGheynst. 2014. Effects of *Escherichia coli* on mixotrophic growth of *Chlorella minutissima* and production of biofuel precursors. PLoSOne: 9: e96807.
51. **Higgins, B.** and A. Kendall. 2012. Life cycle environmental and cost impacts of using an algal turf scrubber to treat dairy wastewater. J. of Industrial Ecology: 16: 436-447.

[1]Corresponding author
[2]Graduate student directed by B. Higgins
[3]Undergraduate student directed by B. Higgins

PEER-REVIEWED TEACHING PUBLICATIONS

1. **Higgins, B.T.**, L. Parson, F.R. Saunders, S. Adhikari. 2024. Assessing change in research perceptions following participation in REU site focused on converting biological wastes into products of value. Proceedings of the American Society of Engineering Education Annual Conference. June 23-26. Portland, OR
2. Richards, N., D. Harrold, **B. Higgins**, T. Smith. 2014. What is heat? TeachEngineering.org: Online
3. Smith, T., **B. Higgins**, N. Richards, D. Harrold. 2014. Keep it hot! TeachEngineering.org: Online

CONFERENCE PAPERS AND PRESENTATIONS

I have published 4 conference papers (listed below) and have co-authored 58 conference presentations (not listed)

1. Wang, Q., **B.T. Higgins.** 2024. Advantages of introducing solar power to anaerobic digestion of sludge from aquaculture. Presented at the Annual International Meeting of American Society of Agricultural and Biological Engineers. July 31-Aug 3, Anaheim, CA.
2. Wang, Q.[2], **B.T. Higgins.** 2020. Biomass production and nitrification in an algal-bacterial wastewater treatment system. Presented at the Annual International Meeting of American Society of Agricultural and Biological Engineers. July 12-15, Virtual forum.
3. Wang, Q.[2], Haodong Ji, Dongye Zhao, **B.T. Higgins**. 2019. Use of photocatalytic nanomaterials for volatile fatty acid removal from anaerobic digestate leads to improved algal growth. Presented at the Annual International Meeting of American Society of Agricultural and Biological Engineers. July 7-10, Boston, MA.
4. Wang, Q.[2], Haodong Ji, Dongye Zhao, **B.T. Higgins**. 2018. Improved microalgae biomass production and wastewater treatment: Pre-treating municipal anaerobic digestate for algae cultivation. Presented at the Annual International Meeting of American Society of Agricultural and Biological Engineers. July 29-Aug 1, Detroit, MI.
5. **Higgins, B.T.**, M.B. Paddock[3], S. Staley[3], S.J. Ceballos, J.S. VanderGheynst. 2017. Modeling of photosynthetic aeration for energy-efficient wastewater treatment and reduced greenhouse gas emissions. Presented at the Annual International Meeting of American Society of Agricultural and Biological Engineers. July 16-19, Spokane, WA.

GRANTS AND CONTRACTS (selected out of over $13.6 million in extramural funding)

2023-2027. Eco-Friendly Biolubricant Production from Waste Cooking Oil Using Integrated Catalytic Processes. $649,762.

PI: Hossein Jahromi
Co-PI: Sushil Adhikari, Robert Jackson, **Brendan Higgins**

2023-2025. Comparing natural and artificial lighting strategies for commercial broiler systems and their effects on bird performance, bird welfare, and the environment. $297,747.

PI: Jon Linhoss
Co-PI: **Brendan Higgins**, Jeremiah Davis, Jessie Campbell

2023-2027. Reimagining controlled environment agriculture in a low carbon world. National Institute of Food and Agriculture (SAS). $9,950,000.
PI: **Brendan Higgins**
Co-PI: Sushil Adhikari, David Blersch, and 16 others

2022-2024. Odor and pathogen management in solids from poultry processing and rendering plants. Alabama Department of Environmental Management. $77,190.
PI: **Brendan Higgins**
Co-PI: Sushil Adhikari, Dianna Bourassa

2022-2025. Collaborative Research: Investigation of decoupled algal-biofloc aquaponics technology for deployment in food deserts. National Science Foundation. $575,728.
PI: **Brendan Higgins**
Co-PI: David Cline, Sheena Stewart, Luz de-Bashan, Paola Magallon

2021-2026. Developing sustainable aquaponic production systems. USDA ARS. $10,000,000.
PI: Daniel Wells
Co-PIs: David Blersch, David Cline, Allen Davis, **Brendan Higgins**, Melba Salazar, et al.

2021-2024. REU Site: Research experience through collaborative teams in bioprocessing for conversion of waste into products of value. National Science Foundation. $391,099.
PI: **Brendan Higgins**
Co-PI: Sushil Adhikari

2021-2025. Assessing nutrient cycling and food safety of poultry processing wastewater for irrigation in controlled-environment agriculture. National Institute of Food and Agriculture. $499,576.
PI: **Brendan Higgins**
Co-PIs: Dianna Bourassa, Rishi Prasad, Daniel Wells

2020-2024. Development of a bacterial-algal-zooplankton process for conversion of agricultural waste into aquaculture feed. National Institute of Food and Agriculture. $434,657.
PI: **Brendan Higgins**
Co-PIs: Alan Wilson, Rishi Prasad, Marc Deshusses

2020-2022. Spatial and temporal investigation of taste and odor-producing microorganisms in Lake Sougahatchee. Opelika Utilities. $121,840.
PI: **Brendan Higgins**

2020-2021. Development of a predictive model for taste and odor episodes in regional drinking water reservoirs. US Geological Survey, Columbus Water Works, Opelika Utilities, Auburn Water Works. $293,892.
PI: **Brendan Higgins**
Co-PIs: William Kent, Dusty Kimbrough, Dan Hilyer

2020-2022. Enhancing nitrogen removal in saline submerged fixed bed bioreactor coupled microbial fuel cells treating maricultural effluents, OUC-AU Joint Program, $74,842.
PI: Xiefa Song

Co-PIs: **Brendan Higgins**, Zhitao Huang

2018-2020. Life cycle analysis and economics of commercial aquaponic systems. Alabama Agricultural Experiment Station. $140,000.
PI: Terry Hanson
Co-PIs: **Brendan Higgins,** Daniel Wells, David Blersch

2018. Investigation of covers for suppression of cyanobacteria in water treatment settling basins. Xton, Inc. and Columbus Water Works. $10,107.
PI: **Brendan Higgins**

2018-2020. A systems approach to extract phosphorus from poultry litter. AU Internal Grants Program. $80,000.
PI: Rishi Prasad
Co-PI: **Brendan Higgins**

2017-2019. Conversion of poultry litter waste into biofuel and feed through coupled anaerobic digestion and algae cultivation. Alabama Agricultural Experiment Station. $50,000.
PI: **Brendan Higgins**
Co-PI: Luxin Wang

2017-2019. Overcoming algal growth inhibition on anaerobic digester effluent through nanomaterial treatment. AU Internal Grants Program. $40,000.
PI: **Brendan Higgins**
Co-PI: Dongye Zhao

2014-2019. Managing mixotrophic algae cultivation for efficient water treatment and biofuel production. National Science Foundation. $317,505
PI: J. VanderGheynst
Co-PIs: Oliver Fiehn, **Brendan Higgins**, Tobias Kind

AWARDS AND HONORS

- Outstanding Faculty Award: 2025, Biosystems Engineering Department, Auburn University
- New Holland Young Researcher: 2024, American Society of Agricultural and Biological Engineers
- Outstanding Associate Editor Award: 2024, American Society of Agricultural and Biological Engineers
- Outstanding Faculty Award: 2023, Biosystems Engineering Department, Auburn University
- Dean’s Grantsmanship Award: 2022, College of Agriculture, Auburn University
- Outstanding Publication Award: 2021, College of Agriculture, Auburn University
- Dean’s Grantsmanship Award: 2021, College of Agriculture, Auburn University
- Outstanding Publication Award: 2020, College of Agriculture, Auburn University
- Dean’s Grantsmanship Award: 2020, College of Agriculture, Auburn University
- Spirit of Sustainability Award: 2019, As part of the research team on aquaponics, Auburn University
- Mark A. Spencer Creative Mentorship award: 2018, $5,000
- Earnest Hill Fellowship: 2014, $4,132
- NSF GK-12 RESOURCE Fellowship: 2011-2013, $60,000 plus tuition and fees for two years
- Jastro-Shields Research Fellowship: 2011 and 2013, $4,975 (total)
- Chevron Technology Ventures Fellowship: 2011, $7,000

- Fletcher Jones Fellowship: 2010, $9,000

Awards to mentored students (at AU): 14 awards to graduate students under my direct mentorship, 24 awards to undergraduate students under my direct mentorship.