

JADEN TATUM, Ph.D.

Assistant Professor, Extension Specialist
Dept. Family & Consumer Science
Human Nutrition & Food / Dietetics
University of Wyoming

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EDUCATION

PhD in Food, Agricultural, and Biological Engineering **2019-2024**

The Ohio State University, Columbus, OH

Graduate Interdisciplinary Specialization: Data-Driven Sustainable Energy Systems

Dissertation: Development and Evaluation of a Novel Integrated Grain

Drying and Storage System (iGDSS) for Use in Developing Countries

Bachelor of Science in Biological and Agricultural Engineering **2015-2019**

Summa Cum Laude. Minors: Sustainability, Natural Resource Management

University of Arkansas, Fayetteville, AR

Thesis: Simulating Delayed Flood and Alternate Wetting and Drying

Rice Production in Arkansas Using APEX.

RESEARCH & WORK EXPERIENCE

Postdoctoral Research Associate – USDA-ARS Water Management and Systems Research

Agency-Funded Postdoctoral Research Associate, 2024 – 2025

- Validation and global sensitivity analysis using evapotranspiration and water balance open-source model `pyfao56`
- Leading stakeholder engagement for multi-institutional team developing WISE Pro irrigation scheduling tool

Application of Shallow Geothermal System for Season Extension in Ohio Greenhouses

Project Manager – Extension Research, 2021- 2024

- Authored external and internal grants, awarded \$35,500 to support research
- Coordinated with three farms to design and install shallow geothermal heat exchangers
- Deployed systems and monitored thermal performance to validate design equations
- Authored fact sheets; Hosted on-farm demonstration; Prepared presentations for scholarly and farmer-focused conferences; Recognized as a top OSU Community Engaged Scholar

Integrated Grain Drying and Storage System for Developing Countries

Graduate Research Fellow – Dissertation Research, 2019 – 2024

- Authored internal seed and student grants, awarded \$18,000 to support supplies and travel
- Carried out dissertation fieldwork in Tanzania, including market research and interviews and focus group discussions with smallholder farmers (OSU IRB Exempt, 2023E0663)
- Designed and evaluated two grain dryer prototypes; Evaluated key grain quality parameters across storage trials; Modeled grain drying; Economic assessments of system adoption
- Authored journal articles; Prepared scholarly presentations, won 3 presentation awards

Student Federal Service Virtual Internship with US Agency for International Development.

Intern - Bureau for Resilience, Environment, and Food Security. 2022 - 2023. Part-time.

- Worked with the Scaling Team to assess gap from research to disseminated technologies

- Contributed to reports to identify business case information needed for further commercial uptake of innovations and existing open access technology databases

TEACHING & MENTORING EXPERIENCE

TEACHING EXPERIENCE

Ohio State University, Departments of Food, Agricultural, and Biological Engineering & Civil, Environmental, and Geodetic Engineering

CIVILEN4011/4012 Global Capstone, 4 credits, 22 students

Graduate teaching assistant, Primary project advisor to two teams

CIVILEN5797.21S Sustainable and Resilient Communities, 4 credits, 19 students

Course assistant, Pre-departure Spring 2023, In-country Summer 2023

AGSYSMT4300 Engineering Applications in Agriculture, 4 credits, Undergraduate level

Guest lecturer, Autumn 2023. Topic: Grain Drying and Storage for Developing Countries

FABE5540 Biomass Conversion to Bioenergy, 3 credits, Graduate level

Guest lecturer Spring 2022, Spring 2023. Topic: Bioenergy Policies and Global Perspective

FABE 2100 Energy in Biological Systems, 1 credit, Undergraduate level

Guest lecturer Autumn 2022. Topic: Applications of Psychometric Chart for Grain Drying

MENTORING EXPERIENCE

NSF EmPOWERment Research in Sustainable Energy Summer Program, Mentor to Undergraduate Research Student, 2023, 2 students

Big 10 Summer Research Opportunities Program, Mentor to Undergraduate Research Student, 2022, 1 student

Undergraduate Research Mentor, Spring 2022-Spring 2023, 1 student

National Science Foundation EmPOWERment Program Bootcamp Mentor, August 2021, August 2022, 10 students

GRANTS & PROPOSAL DEVELOPMENT

1. J. Tatum. **Graduate Student Grant** (\$15,000), US Department of Agriculture Sustainable Agriculture Research and Education North Central Region (NCR SARE). *Utilizing Shallow Geothermal Resources for Low-Cost Season Extension of Controlled Environmental Agriculture: Performance Evaluation and Design Tool*. 2023-2024.
2. M. Hagenberger. **Research, Teaching, and Extension Grant** (\$500), The Ohio State University Office of International Affairs. *Building Capacity for Global Engagement for OSU Students through Agricultural-Focused Research*. 2023.
(Contribution: wrote proposal. Could not be listed as PI due to student status)

3. J. Tatum. **Career Development Grant** (\$350), Council of Graduate Students, The Ohio State University. *Student Internship Professional Development Travel to Washington, D.C.* 2023.
4. J. Tatum. **International Research and Scholarship Grant** (\$2,500), The Ohio State University Office of International Affairs. *A Culturally Informed Human-Centered Design Initiative for Addressing Food Insecurity with Rural Farmers in Tanzania.* 2023.
5. J. Tatum. **Ohio State Energy Partners** (\$10,500), The Ohio State University and Ohio State Energy Partners. *Design Tool for Implementing Shallow Geothermal-Assisted Season Extension for Greenhouses on Campus and in Community.* 2023-2024.
6. A. Shah. T. McDermott. **Paul C. and Edna H. Warner Grants for Sustainable Agriculture** (\$5,000), The Ohio State University College of Food, Agricultural, and Environmental Sciences Paul C. and Edna H. Warner Endowment Fund. *Design Tool for Shallow Geothermal-Assisted Season Extension for Ohio Farmers.* 2023-2024.
(Contribution: wrote proposal, solicited letters of support from partners, and prepared all accompanying materials. Could not be listed as PI due to student status)
7. J. Tatum. **Sustainability Institute Student Seed Grant** (\$5,000), The Ohio State University Sustainability Institute. *Investigation of Renewably Powered Small-Scale Agricultural Electrification for Sustainable Development at Local and Global Scales.* 2023-2024.
8. J. Tatum, M. Hagenberger, P. Sours. **KEEN Engineering Mindset Professional Development Award** (\$5,500), The Ohio State University Department of Engineering Education. *Development and Integration of Engineering Entrepreneurial Mindset into Global Capstone Curriculum.* 2022-2023.
(Contribution: Developed curriculum updates and co-wrote follow-up documentation)
9. A. Shah. **Paul C. and Edna H. Warner Grants for Sustainable Agriculture** (\$5,000), The Ohio State University College of Food, Agricultural, and Environmental Sciences Paul C. and Edna H. Warner Endowment Fund. *Application of Shallow Geothermal System for Season Extension in Ohio Greenhouses.* 2021-2022.
(Contribution: wrote proposal, solicited letters of support from partners, and prepared all accompanying materials. Could not be listed as PI due to student status)
10. J. Tatum. **Sustainability Institute Student Seed Grant** (\$5,000), The Ohio State University Sustainability Institute. *Integrated Grain Drying and Storage System for Use in Developing Countries.* 2020-2021.
11. J. Tatum. **CFAES Internal Grants Program Graduate Award** (\$5,000), The Ohio State University College of Food, Agricultural, and Environmental Sciences Research & Graduate Education Internal Grants Program. *Integrated Grain Drying and Storage System for Use In Developing Countries.* 2020-2022.

AWARDS & PROFESSIONAL ACTIVITIES

FELLOWSHIPS

The Ohio State University, Columbus, Ohio

- University Fellowship, Inclusive Excellence Fellowship [Graduate School]
- CFAES Environmental Graduate Fellowship [College]
- National Science Foundation Research Traineeship Fellow, Ohio State University NRT for Sustainable Energy Futures

AWARDS

Pharos of Alexandria Global Learning Award, July 2024, The American Society of Agricultural and Biological Engineers

Reverend P. T. Taiganides – Professor R. E. Stewart Memorial Award FABE Graduate Student of the Year, Spring 2024, the Ohio State University Department of Food, Agricultural and Biological Engineering

Advanced Research Forum – 1st Prize Oral Presentation, FAES Category, March 2024, The Ohio State University Edward F. Hayes Advanced Research Forum.

Graduate Student Poster Competition – 3rd Place, November 2023, Engaged Scholar Symposium, the Ohio State University Office of Outreach and Engagement.

Presentation Excellence Award, July 2023, the American Society of Agricultural and Biological Engineers.

FABE Graduate Research Award, PhD Category, Spring 2023, the Ohio State University Department of Food, Agricultural and Biological Engineering

The Henry J. Barre Award for Graduate Study in Agricultural Engineering, Spring 2023, the Ohio State University Department of Food, Agricultural and Biological Engineering

PROFESSIONAL COMMITTEES AND SERVICE

Panel Organizer and Moderator, Subcommittee Member, Global Engagement, 2023-Present. American Society of Agricultural and Biological Engineers (ASABE) Young Professionals Committee

Observing Member, 2024 – Present. American Society of Agricultural and Biological Engineers (ASABE), Plant Systems Group.

Panel Organizer and Moderator, Technical Support Committee Member & Session Moderator, 2023. American Society of Agricultural and Biological Engineers (ASABE) Alliance for Modernizing African Agrifood Systems (AMAA) Imagining African Agrifood Systems Looking Forward Conference, Summit, & Technology Show

Member, 2022-Present. Organic Farmer Researcher Network, Ohio Ecological Food and Farming Association.

Council Member, Conference Organizer, Committee Member 2020-2022. Women in Engineering Graduate Council, OSU.

Faculty Meeting Representative, 2022-2024, **Committee Member**, 2022-2023, Student Member 2019-2024. Food, Agricultural, and Biological Engineering Graduate Student Organization, OSU.

Proposal Reviewer, 2021. College of Food, Agriculture, and Environmental Sciences Internal Grants Program, OSU.

PUBLICATIONS & PRESENTATIONS

JOURNAL ARTICLES

1. **J. Tatum**, A. Shah. (2024). *Performance of Small-Scale Hermetic Storage Systems Under Periodic Access*. Agriculture, 14(10), p. 1839.
2. **J. Tatum**, A. Shah. *Determination of Relative Composition of Samples Collected with Open Head Spiral Grain Sampling Probe*. Journal of Stored Products Research (major revisions submitted).

PEER REVIEWED CONFERENCE PROCEEDINGS

1. **J. Tatum**, T. McDermott, A. Shah. (2024). *Shallow Geothermal Earth-to-Air Heat Exchange: Cooling and Heating for Sustainable Season Extension*. Proceedings of the Urban Food Systems Symposium. <https://newprairiepress.org/ufss/2024/proceedings/5>
2. **J. Tatum**, A. Shah. (2024) *Design and Evaluation of an Integrated Grain Drying and Storage System for Smallholder Farmers*. In Gitau, M.W., S. Hiablie, K. Ileleji, & A.K. Srivastava, (Eds.), *Imagining African Agrifood Systems: Looking Forward*. (pp. 11-14). St. Joseph, MI: American Society of Agricultural and Biological Engineers. DOI: 10.13031/AMAA.2023

NON- REFEREED PUBLICATIONS

1. **Tatum, J.** 2024. Development and Evaluation of an Integrated Grain Drying and Storage System for Developing Countries. Ohio State University Knowledge Bank, 38th Hayes Advanced Research Forum.
2. **Tatum, J.** Oberly, G. 2023. Shallow Geothermal Earth to Air Heat Exchanger (EAHX) Retrofit Heating and Cooling System Install Info Sheet. FairShare CSA Coalition Farm Tour Handout.
3. **Tatum, J.,** Sours, P. 2023. In-Class Activity: Creating Value for Stakeholders Matrix within Cross-Cultural Engineering Capstone Projects. *Engineering Unleashed Entrepreneurial Mindset for Engineering Coursework Card*. <https://engineeringunleashed.com/card/3482>
4. **Tatum, J.** 2019. Simulating Delayed Flood and Alternate Wetting and Drying Rice Production in Arkansas Using APEX. University of Arkansas. *Biological and Agricultural Engineering Undergraduate Honors Theses*. 60.

BOOK CHAPTERS

1. A. Manandhar, S.H. Mousavi-Avval, **J. Tatum**, E. Shrestha, P. Nazemi, A. Shah. 2021. Chapter 18 - Solid biofuels. In: Biomass, Biofuels, Biochemicals - Green-Economy: Systems analysis for sustainability. Pg 343-370. Edited by: G. Murthy, E. Gnansounou, S. K. Khanal, A. Pandey. Elsevier Inc.

EXTENSION PRESENTATIONS

1. Workshop: Shallow Geothermal Earth-to-Air Heat Exchange: Cooling and Heating for Sustainable Season Extension. **J. Tatum**. June 12, 2024. Urban Food Systems Symposium.
2. Workshop: Lessons from Design and Installation of an Earth-to-Air Heat Exchanger for High Tunnel Heating and Cooling. **J. Tatum**. February 17, 2024. Ohio Ecological Food and Farming Association Conference.
3. Field Day: Shallow Geothermal Farm Tour at Oaks & Sprouts. October 15, 2023. **J. Tatum**. G. Oberly. Facilitated by FairShare CSA Coalition.

SCHOLARLY PRESENTATIONS – ORAL & POSTER

1. **J. Tatum**, A. Shah. *Method Development and Determination of Relative Composition of Samples Collected with Open Head Spiral Grain Sampling Probe*. July 2024. ASABE Annual International Meeting [Oral]
2. **J. Tatum**, A. Shah. *Stakeholder-Informed Energy, Environment, and Cost Assessment for Postharvest Technology for Subsistence Maize Farmers in Arusha & Kilimanjaro Regions Tanzania*. July 2024. ASABE Annual International Meeting [Oral]
3. **J. Tatum**, A. Shah, T. McDermott. *Shallow Geothermal Heating and Cooling for High Tunnels – A Design & Decision Support Tool for Farmers*. July 2024. ASABE Annual International Meeting [Oral]
4. **J. Tatum**, A. Shah. *Techno-Economic Analysis of a Novel Integrated Grain Drying and Storage System (iGDSS) in Tanzania*. April 2024. Environmental Professionals Network & Ohio State EmPOWERment Research Symposium.
5. **J. Tatum**. *Development and Evaluation of an Integrated Grain Drying and Storage System for Developing Countries*. March 1, 2024. The Ohio State University Edward F. Hayes Advanced Research Forum. [Oral]
6. **J. Tatum**, A. Shah. *Design and Evaluation of an Integrated Grain Drying and Storage System for Smallholder Farmers*. November 15, 2023. ASABE AMAA Imagining African Agrifood Systems: Looking Forward. [Virtual]
7. D. Hodson, A. Shah, **J. Tatum**. *Applications and Energy Sources of Pico-Grid Systems for Agricultural Mechanization for Smallholder Farmers*. November 2, 2023. Columbus, OH. The Ohio State University Office of Undergraduate Research & Creative Inquiry Autumn Undergraduate Research Festival. [Poster]
8. **J. Tatum**, A. Shah, G. Oberly, T. Oberly, T. McDermott. *Shallow Geothermal Heat Exchangers: Sustainable Low-Cost Season Extension for Community Farmers*. November 1, 2023. Columbus, OH. The Ohio State University Office of Outreach & Engagement Engaged Scholar Symposium. [Poster]
9. **J. Tatum**, A. Shah, J. Bielicki, T. McDermott. *Shallow Geothermal Heat Exchangers: Sustainable Low-Cost Season Extension for Community Farmers*. October 30, 2023. Tempe, AZ. NSF NRT Annual Meeting. [Poster]
10. **J. Tatum**, A. Shah. *Case Study in Applying Techno-Economic Assessment Methods for Appropriate Technologies for Developing Countries*. 2023. ASABE Annual International Meeting. [Oral]

11. **J. Tatum**, A. Shah. *Design of Earth-to-Air Heat Exchange System for Season Extension in Commercial Greenhouse in Ohio*. 2023. ASABE Annual International Meeting [Oral]
12. **J. Tatum**, A. Shah. *Modeling to Minimize Energy Requirements for In-bin Drying of Different Grain Types in a Small-Scale Dryer for Developing Countries*. 2023. ASABE Annual International Meeting. [Poster]
13. D. Hodson, A. Shah, **J. Tatum**. *Designing a Renewable Energy Powered System to Meet Energy Needs of Smallholder Farmers*. 2023. Ohio State University Undergraduate Summer Research Symposium. [Poster]
14. **J. Tatum**. *Evaluation of integrated Grain Drying and Storage System (iGDSS) for Developing Countries*. 2023. Ohio State University Department of Food, Agricultural, and Biological Engineering Research Competition, PhD Category. [Oral]
15. **J. Tatum**, A. Shah. *Design and Pilot Testing of a Shallow Geothermal Heat Exchanger for Low-Cost Season Extension*. 2023. Ohio State University College of Food, Agriculture, and Environmental Science Research Forum. [Poster]
16. **J. Tatum**, A. Shah, G. Oberly, T. Oberly. *Retrofit Design of Shallow Geothermal Earth-to-Air Heat Exchanger for Low-Cost Season Extension*. 2023. JOULE Seminar of the NSF Data-Driven Sustainable Energy NRT. [Oral]
17. **J. Tatum**, A. Shah. *Design and Pilot Testing of a Shallow Geothermal Heat Exchanger for Low-Cost Season Extension*. 2023. Ohio State University School of Environment and Natural Resources Environmental Professionals Network Earth Day Event. [Poster]
18. **J. Tatum**, A. Shah. *Evaluating Novel Hermetic Grain Storage System for Smallholder Farmers in Developing Countries*. 2022. Ohio State University College of Food, Agriculture, and Environmental Science Research Forum. [Poster]
19. M. Balsman, A. Shah, **J. Tatum**. *Improved Land Utilization for Smallholder Farms in Developing Countries*. 2022. Ohio State University Undergraduate Summer Research Symposium. [Poster]
20. **J. Tatum**, A. Shah. *Barriers to Adoption of Improved Grain Storage Technologies for Smallholder Farmers in Developing Countries*. 2021. Annual International Meeting of American Society of Agricultural and Biological Engineers. [Poster, virtual]
21. **J. Tatum**, A. Shah. *Evaluating Small-Scale Grain Dryer for Developing Countries*. 2021. Ohio State University College of Food, Agriculture, and Environmental Science Research Forum. [Poster]
22. **J. Tatum**. *Crop Residue Management in Chinese Agricultural Systems*. 2019. Ohio State University Environmental Issues in East Asia Course Poster Session. [Poster]