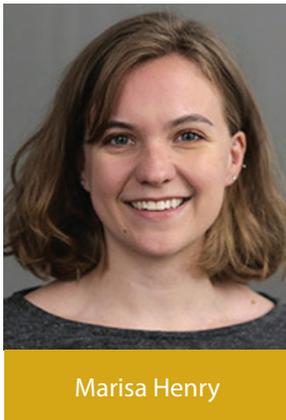




ALUMNI SPOTLIGHTS

These Purdue University alumni published articles in volume 5 (2015) of the *Journal of Purdue Undergraduate Research* during their time spent completing their baccalaureate degrees. Since graduation, they have moved into successful careers in industry and have pursued further educational opportunities.



Marisa Henry

BS in Environmental and Ecological Engineering, Minor in Economics, DiversiKey Certificate, Purdue University (2015); MPhil in Engineering for Sustainable Development, Gates Cambridge scholar, University of Cambridge (2017); and MSE in Applied Mathematics and Statistics, Johns Hopkins University (2018)

What have you been doing since the publication of your article in JPUR, volume 5?

After graduating from Purdue, I continued in academia, earning two master's degrees and conducting research on the design and evaluation of environmental programs and policies. I initially planned to complete a PhD, but recently decided I wanted to work in a more collaborative environment and spend some time developing my technical skills outside of academia. In 2019, I left graduate school and joined Mathematica as a data scientist. Now I work with my colleagues to develop analyses, data visualizations, and reports to aid in the implementation and evaluation of health care programs and policies in the United States.

What are your career goals?

I strive to work on projects that I believe will improve societal well-being. This overarching ambition lends itself to many career paths and goals. Currently, I'm working on developing my general programming skills in Python and improving my understanding of advanced statistical methods for causal inference and predictive analytics. Eventually, I hope to apply my data science skills to address sustainability issues.

How did the research you did as an undergraduate at Purdue impact your current endeavors? What is the value of undergraduate research?

Although the day-to-day work of conducting research differs from my work as a data scientist, both are underpinned by similar skills: an ability to ask interesting questions, implement appropriate scientific methods to address those questions, and effectively communicate technical results (sometimes to a non-technical audience). Undergraduate research is obviously a valuable opportunity for those considering graduate school or a career in research, but it is also an amazing opportunity to develop a rich set of transferrable skills applicable to many career paths outside of research.

How did the faculty mentor relationship impact you during your time at Purdue?

When people ask me about my time at Purdue, I always emphasize the incredible relationships I developed with faculty members, including Dr. Venkatesh Merwade (the faculty mentor for the work I co-authored in JPUR) and Dr. Loring Nies (who I worked with as a peer teaching assistant). As an undergraduate, Dr. Merwade and Dr. Nies were instrumental in the development of my critical thinking skills and intellectual confidence. They have both continued to provide mentorship as I've navigated career decisions, including my decision to leave my PhD program.

How did the experience of publishing an article in JPUR benefit you? What advice would you give to other undergraduates at Purdue who are interested in contributing to the journal?

Publishing in JPUR helped me develop my written communication skills and informed how I later approached writing my first peer reviewed article published in the *Journal of Energy Policy*. If you're planning to publish in JPUR, be prepared to write a lot of drafts! Set manageable deadlines for yourself and leave enough time to gather feedback on your writing, both from faculty mentor(s) and people in your target audience (e.g., people in your field) who are unfamiliar with your specific research project.

A COMMUNITY-BASED WATER HARVESTING SYSTEM

Student Authors

Marisa Henry is a junior studying environmental and ecological engineering, and she has been involved with the water harvesting Global Development Team (GDT) since spring 2014.

Grace Baldwin is a junior in agricultural engineering with an emphasis in environment and natural resources engineering, and she joined the water harvesting GDT in the spring of 2014.

Garrett Quathamer graduated from Purdue with a bachelor of arts in anthropology in December 2014. He is interested in the nexus between engineering and anthropology.



Mentors

Venkatesh Merwade is an associate professor in the Lyles School of Civil Engineering at Purdue University and the water harvesting GDT advisor. Currently, he is working on projects related to flood modeling and mapping, soil moisture data assimilation, cyberinfrastructure development for hydrology, and water resources management in developing countries.

Charlotte Lee is an ecological sciences and engineering interdisciplinary graduate student and became involved with the water harvesting GDT in spring 2015. She is interested in the impact climate change will have on water availability, quality, and use in both developed and developing nations.



Abstract

The World Health Organization (WHO) states it is a human right to have access to sufficient, safe water within one kilometer of the home (WHO, 2015b). However, 1.6 billion people experience economic water shortage and struggle to secure water for personal and domestic use (UN-Water & FAO, 2007). In the village of Endallah, Tanzania, seasonal rainfalls, high rates of evaporation, and inadequate water harvesting infrastructure leave many of the approximately 900 households facing economic water shortage. Around 90% of villagers depend on rainfed subsistence farming, however, annual crop yields are not consistent due to sporadic rainfall. The purpose of this research was to quantify water use, access, and needs in the village of Endallah to inform the design of a sustainable, community-based water harvesting system. In January 2015, a Purdue University Global Development Team traveled to Endallah to survey 25 households on their water collection and use. The results from the 12-question survey were coded, analyzed, and interpreted. The survey showed a significant need to improve water access in Endallah. Based on the survey results, most people in Endallah spend over three hours a day collecting water for domestic use. Water needs in Endallah have not been previously quantified, so the results will be crucial to the development of an accessible, community-based water harvesting system. Ultimately, by decreasing economic water shortage, the people of Endallah will have greater access to water for domestic consumption and can move toward using water to improve livestock health and agricultural productivity.

Henry, M., Baldwin, G., & Quathamer, G. (2015). Designing a community-based water harvesting system: Understanding water use in Endallah, Tanzania. *Journal of Purdue Undergraduate Research*, 5, 38–47. <http://dx.doi.org/10.5703/jpur.05.1.05>

Keywords

water harvesting, Tanzania, water scarcity, food security, community development, participatory design, water use, sand dams, interdisciplinary design, community survey

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What advice would you give to other undergraduates at Purdue who are interested in doing research?

Undergrad is a great time to get involved in research. If you're considering graduate school, undergraduate research will give you an idea of what to expect from graduate research. Even if you're not interested in graduate school, the research process will help you develop your critical thinking, technical, and communication skills beyond what you learn in a classroom setting.

Henry, M., Baldwin, G., & Quathamer, G. (2015). Designing a community-based water harvesting system: Understanding water use in Endallah, Tanzania. *Journal of Purdue Undergraduate Research*, 5, 38–47. <http://dx.doi.org/10.5703/jpur.05.1.05>