

UWRL Outstanding Student Spotlight: Ayman Nassar | Utah Water Research Laboratory

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The UWRL likes to take a moment to highlight an outstanding student, faculty member, or alumni. This time our spotlight is on Ayman Nassar, a Ph.D. researcher studying Water Engineering at Utah State University.



UWRL Ph.D. Researcher Ayman Nassar

Ayman works with UWRL faculty member and USU Professor Alfonso Torres, whose research focuses on subjects like remote sensing, irrigation engineering, and agricultural water management. Dr. Torres is also a leader of the UWRL's Aggie Air service center, which uses UAVs to collect quick and low-cost scientific imagery to provide high-resolution data products for research projects inside and outside of the lab. Ayman assists Dr. Torres in many of these projects, taking data from unmanned aerial vehicles to gather and analyze spatial data.

Dr. Torres commented on his work with Ayman, saying "Ayman Nassar is a bright, hardworking, and dedicated student from Palestine, with a curiosity and passion for research that pushes him to explore ideas that enhance his research. His research and work efforts have been recognized by the several awards he has received before and during his stay at USU. He is working with me to close the gap between scientific and practical applications of UAV for estimation of water use at plant scale. His commitment to research, skills in data analysis, and programming are needed to achieve this work. As his mentor, I foresee Ayman moving into larger, more complex problems in agriculture and water use".

Ayman was recently awarded the prestigious 2020 FACT Fellowship, a project funded by the National Science Foundation (NSF) for those focused on improving food and water security. The fellowship requires expert knowledge of science, engineering fundamentals, advanced data analytics, and computational methods.

Ayman's other awards also include:

- February 2020 – NSF Award Scholarship
- February 2020 – 1st Place in USU College of Engineering Technical Writing Competition, Graduate Division
- June 2019 – Utah Water User Association Scholarship: This scholarship is awarded annually to two students who study in Utah and plan to pursue a water resources career.
- February 2019 – American Water Work Association, Information Section, Eva Nieminski Honorary Graduate Science Engineering Scholarship

We recently sat down with Ayman to learn more about him and his research:

What brought you to the UWRL?

I began looking for a Ph.D. opportunity because I wanted to study and expand my knowledge and fulfill my research interests. The Civil and Environmental Engineering Department and the Utah Water Research Laboratory seemed to be an excellent environment for water research. With encouragement from my former advisor, who graduated from USU a few years ago, and my friends, I applied for graduate admission. In 2017, I was accepted and started my PhD studies in hydrology and water resources engineering.



Ayman Nassar, American Geophysical Union (AGU) conference, Washington DC

What inspired you to choose this field of study?

As I grew up in my home country of Palestine, I used to hear the common expression, "Water is life." These few words, along with my understanding of the struggles people experience in meeting their basic water needs, encouraged me to set an academic goal of studying water resources. I recognized the immense importance of this research area before I moved to the United States three years ago and began studying at the UWRL.

Tell us about your research/fieldwork?

My research focuses mainly on emerging tools in remote sensing that are used for water management in natural environments. I am looking into the integration of multiple remote sensing platforms for consistent estimation of water and energy fluxes. Remote sensing is considered an advanced technology that could help managers get data more easily and help them to derive useful information that they can be employed in a many applications.

In my research project, I am looking into the sensitivity analysis of spatial resolution from different remote sensing platforms to estimate ET in complex canopy environments and natural areas. I am also testing multiple daily ET models that can be used to upscale instantaneous ET to daily values, which can be an effective tool to improve the efficiency of water use. I handle all of the model

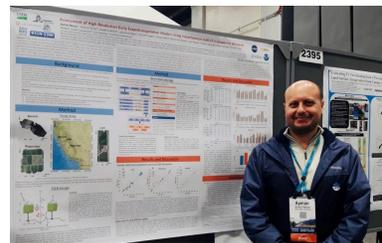
implementation, data collection, and model validation necessary for my research.

What is your favorite part of your research?

There are always challenges and problems that need to be solved to keep things running smoothly. In my research projects, I work heavily with spatial data, which can take a lot of time to analyze. For that reason, I am developing tools in Python that can perform the data analysis in record time, with a GUI (graphic user interface) that can help other users to run the model very easily as well.

What is the most challenging part of your research?

In my research, I use different remote sensing platforms to estimate evapotranspiration (ET) in natural areas and complex canopy environments. One of the challenges is related to the large amount of data I use for analysis, which requires powerful platforms to run the models. To overcome this issue, our research group has started using high-performance computing (HPC), which has significantly reducing the time necessary to run our models.



Ayman Nassar, American Geophysical Union (AGU) conference, California

What is the most helpful advice you've ever been given?

"I'm here to help you, even if I'm busy."

These few words always come to mind. In my first year of studying at the UWRL, Dr. McKee and Dr. Torres asked me to start working on a research project that needed to be published in the next two months. This was challenging for me, as I was busy with the coursework from the first year of my PhD. I was doubtful that the project could be accomplished in that short of time and get published. One day while we were in a weekly progress meeting, I

raised a question related to the research and inquired of Dr. McKee, who was always very busy, if he would have time to discuss it with me further. He replied, "Sure, I will be available. I'm here for you even if I'm busy." As far as I remember, that discussion lasted for more than 4 hours. In the end, the research was completed successfully and published on time.

I also received great advice regarding staying healthy and taking care of myself. As a PhD researcher, I spend many hours in front of the computer working on my research projects. One day my graduate advisor, Dr. Torres, stopped by my office and found me very tired. I was preparing for a conference paper that I wanted to finish as soon as possible. However, Dr. Torres reminded me to stop working when necessary and said, "Ayman, your health is first."

What are your career goals?

I am interested in continuing my research in the field of remote sensing hydrology, in either academia or the public sector. I would like to continue developing advanced tools that could be helpful for decision and policymakers in water resource management. My career goals come from my own belief that the protection of water is extremely fulfilling as it is a vital part of keeping people alive. I am looking for a job that could enrich my knowledge and allow me to stay informed and involved in additional research. Traditional work has always frustrated and bored me, so I'm passionate and motivated about finding a job that keeps me active and pushes me towards creativity and innovation.

Learn more about Ayman's [research](#) or contact him at aymnassar@aggiemail.usu.edu.