TIFFANY G. WILSON

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EDUCATION

Duke University Durham, NC
Ph.D. in Civil & Environmental Engineering July 2017

Advisor: Dr. John D. Albertson; Co-Advisor: Dr. Amilcare M. Porporato

Dissertation title: Effects of vegetation and infiltration feedbacks on hydrologic partitioning and droughts

Certificate in Wireless Sensor Networks, requiring courses in Environmental Sensing, Artificial Intelligence, and Intelligent Sensors, along with participation in the annual WISeNet workshop.

Certificate in College Teaching Program, requiring practical teaching experience and peer evaluation, two courses relating to topics in college teaching, and development of an online teaching portfolio.

Research interests: Semiarid hydrology and ecohydrology, evolution of soil moisture, effects of changing seasonality of precipitation and temperature on vegetation and the water cycle, watershed hydrology.

Relevant Courses: Land Atmosphere Interactions, Ecohydrology, Hydrology Modeling for Water Quality and Quantity Assessment, Groundwater Hydrology, Intermediate and Advanced Fluid Mechanics, Pollutant Transport Systems, The Climate System, Scientific Computing, Numerical Analysis

Princeton University Princeton, NJ
B.S.E. in Civil & Environmental Engineering June 2007

Magna cum laude

Certificate in Geological Engineering

Undergraduate Thesis: Effects of Climate Change on the New York City Water Supply

Relevant courses: Hydrology, Environmental Engineering Laboratory, Rivers and the Regional Environment, Earth Surface Processes, Water Quality, Environmental and Civil Engineering Systems Planning and Design, Structural Geology

TEACHING EXPERIENCE

Hydrology and Water Resources Fall 2012
Graduate Teaching Assistant Duke University

Description: Undergraduate course (16 students) in the Pratt School of Engineering on topics including the water cycle, flood routing, groundwater, frequency analysis, ground water, water supply, and hydrologic design.

Prepared homework assignments and laboratory materials. Graded homework assignments and lab reports.

Held weekly recitation sessions to present additional relevant material to students and answer course- work questions.

Held weekly office hours to improve student comprehension on labs and homework.

Gave guest lectures on storm frequency analysis, flood routing, and groundwater well hydraulics.

Fluid Mechanics Fall 2011
Graduate Teaching Assistant Duke University

Description: Undergraduate course (30 students) in the Pratt School of Engineering on fluid statics and dynamics.

Graded homework assignments and lab reports.

Led bi-weekly hands-on lab sessions including review of equipment and relevant concepts. Lab topics included surface tension, viscosity, Bernoulli's theorem, hydraulic jumps, and laminar/turbulent flow.

Held weekly office hours to answer student questions on labs and homework.

SAT Solutions Medford, NJ
Teacher and Tutor August 2005 – October 2006

Taught two weekly 90-minute classes preparing high school students for the mathematics sections of the SAT exam.

Created lesson plans, homework solution guides, and review of course materials. Held individual math tutoring sessions.

INDUSTRY EXPERIENCE

US Department of Agriculture, Hydrology and Remote Sensing Laboratory Beltsville, MD
Research Physical Scientist November 2017 – Present

Analyzed over five years of continuous soil moisture, energy flux, and micrometeorological data to gain insights on and inform decision making in the irrigation of industrial vineyards.

Designed two types of soil moisture sensor arrays for the variable rate drip irrigation (VRDI) GRAPEX vineyard site, followed by installing the sensors and performing monitoring and initial analysis of the data.

Contributed to the overall monitoring of the new VRDI site by generating brief reports of soil moisture and evapotranspiration data to team members at a minimum frequency of once per week, which were critical in monitoring the impact of irrigation scheduling decisions on vine stress.

Malcolm Pirnie, Inc. Plantation, FL
Engineering Intern; Engineer Summer 2006; July 2007 – July 2009

Conducted engineering tasks in the municipal water practice including water treatment component design, water conservation planning, inspection- and discovery-based site visits, GIS mapping, and development of project deliverables.

Successfully helped a client reduce a contaminant in their source water by coordinating a rapid turnaround design-build project involving the client, subcontractors, and managers.

Other project experience: water treatment plant chemical system design, development of water conservation plans, water supply planning, gravity sanitary sewer design, and regulatory compliance.

AWARDS

Duke University Department of Civil and Environmental Engineering
Jeffrey Taub Award 2015

Duke University Graduate and Professional Student Council
Student Impact Award 2015

Wireless Intelligent Sensor Networks (WISeNet) Integrative Graduate Education and Research Training Fellowship ($30,000/year) 2012 – 2015

James B. Duke Fellowship ($20,000) 2009 – 2013

Pratt-Gardner Fellowship ($9,000) 2009 – 2010

Peter W. Stroh '51 Environmental Senior Thesis Prize ($500) 2007

W. Taylor Thom Jr. Prize in Geological Engineering ($100) 2007

Malcolm Pirnie/UNCF Corporate Scholar (Paid Summer Internship) 2006

WORKSHOPS, CONFERENCES, AND POSTER PRESENTATIONS

2018 BARC Poster Day April 25, 2018
National Agriculture Library, US Department of Agriculture Beltsville, MD

Poster: Wilson, T. G., Kustas, W. P., McKee, L. G., Alfieri, J. G., Prueger, J. H. Effects of evapotranspiration on wetting front advancement in a California drip-irrigated Pinot Noir vineyard.

Workshop on Wireless Intelligent Sensor Networks (WISeNet) May 9, 2016
Duke University Durham, NC

Poster: **T.G. Wilson**. Investigating the effects of drought timing and severity on vegetation and soil conditions in water-limited ecosystems.

Workshop on Wireless Intelligent Sensor Networks (WISeNet) June 9–10, 2014
Duke University Durham, NC

Poster and Presentation: **T.G. Wilson**. Use of state-dependent precipitation distributions in 15- minute Markov chain rainfall generation.

Workshop on Wireless Intelligent Sensor Networks (WISeNet) June 4–5, 2013
Duke University Durham, NC

Poster and Presentation: **T.G. Wilson**. Towards optimal placement and operation of soil moisture sensors based on land surface features and topography.

GradX Talks April 2, 2013
Duke University Durham, NC

Presentation: **T.G. Wilson**. Climate Change, Vegetation, and Water Supply.

Ecohydrology and Sustainability in Seasonally Dry Ecosystems June 13-14, 2011
NSF-CBET and Pratt School of Engineering, Duke University Durham, NC

Poster: **T.G. Wilson**, C. Cortis, R. Corona, N. Montaldo, J.D. Albertson. Design and testing of a low-cost plot-scale rainfall simulator in Sardinia, Italy, for calibration of a distributed hydrologic model

AGU Fall Meeting 2010 December 13–17, 2010
American Geophysical Union San Francisco, CA

Poster: **T.G. Wilson**, C. Cortis, R. Corona, N. Montaldo, J.D. Albertson. Design and testing of a low-cost plot-scale rainfall simulator in Sardinia, Italy, for calibration of a distributed hydrologic model

Presentation: J. D. Albertson, **T.G. Wilson**, N. Montaldo. Interannual rainfall variability, vegetation dynamics, and runoff controls in Mediterranean climates.

PUBLICATIONS

Prueger, J. H., Parry, C., Kustas, W. P., Alsina, M. M., Hipps, L. E., Alfieri, J. G., Nieto, H., Anderson, M. C., Gao, F., **Wilson, T. G.**, Hatfield, J. L., McKee, L. G., McElrone, A. (2018). Crop Water Stress Index of an Irrigated Vineyard in the Central Valley of California. Irrigation Science (in press).

Kustas, W. P., Anderson, M. C., Alfieri, J. G., Knipper, K., Torres-Rua, A., Parry, C. K., Nieto, H., Agam, N., White, A., Gao, F., McKee, L., Prueger, J. H., Hipps, L. E., Los, S., Alsina, M., Sanchez, L., Sams, B., Dokoozlian, N., McKee, M., Jones, S., Yang, Y., **Wilson, T. G.**, Lei, F., McElrone, A., Heitman, J. L., Howard, A. M., Post, K., Melton, F., and Hain, C. (2018). The Grape Remote sensing Atmospheric Profile and Evapotranspiration eXperiment (GRAPEX). Bulletin of the American Meteorological Society, BAMS-D-16-0244.1. https://doi.org/10.1175/BAMS-D-16-0244.1

Kustas, W. P., Alfieri, J. G., Nieto, H., **Wilson, T. G.**, Gao, F., & Anderson, M. C. (2018). Utility of the two-source energy balance (TSEB) model in vine and interrow flux partitioning over the growing season. Irrigation Science. https://doi.org/10.1007/s00271-018-0586-8

Wilson, T. G., Albertson, J. D., and Montaldo, N.: Impact of drought severity and timing on vegetation and water partitioning during recovery (in prep), 2017.

Wilson, T. G., Albertson, J. D., Montaldo, N., and Porporato, A.: Impact of biomass-infiltration feedback on vegetation dynamics and hydrologic partitioning (in prep), 2017.

Wilson, T. G., and Albertson, J. D.: Use of occurrence-conditioned precipitation depths in Markov generation of 15-minute rainfall (unpublished), 2014.

Wilson, T. G., Cortis, C., Montaldo, N., and Albertson, J. D.: Development and testing of a large, transportable rainfall simulator for plot-scale runoff and parameter estimation, Hydrol. Earth Syst. Sci., 18, 4169-4183, doi:10.5194/hess-18-4169-2014, 2014.

Vico, G; Thompson, SE; Manzoni, S; Molini, A; Albertson, JD; Almeida-Cortez, JS; Fay, PA; Feng, X; Guswa, AJ; Liu, H; **Wilson, TG**; Porporato, A, Climatic, ecophysiological, and phenological controls on plant ecohydrological strategies in seasonally dry ecosystems, Ecohydrology, 8(4), pp. 660-681, doi:10.1002/eco.1533, 2015.

R. Corona, **T.G. Wilson**, L.P. D'Adderio, F. Porcu, N. Montaldo, and J.D. Albertson, 2013. On the estimation of surface runoff through a new plot scale rainfall simulator in Sardinia, Italy. Procedia Environmental Sciences, 19, pp. 875-884, doi:10.1016/j.proenv.2013.06.09, 2013.

SERVICE

CEE Students Advocating for Graduate Education (SAGE) August 2015–July 2016
Inaugural Member Department of Civil & Environmental Engineering, Duke University

Group of faculty-nominated students tasked with representing graduate students, bringing concerns to the faculty, and participating in the implementation of improved CEE graduate student development.

GPSC Basketball Committee September 2013–March 2017
Secretary, Subcommittee Chair, Graduate Student Usher Duke University

Acted in multiple roles surrounding the coordination of an annual Campout event and admission of students to basketball games.

Designed and implemented a web-based system to track over 1,500 students during the weekend-long Campout event, resulting in 50 percent shorter wait times for participants and increased efficiency for team leaders.

Initiated a secretary/project manager role and successfully coordinated the activities of 20 subcommittee chairs and over 50 volunteers.

Planned food and entertainment for the Campout event.

During the basketball season, volunteered as an usher to help students enter Cameron Indoor Stadium for men's basketball games.

Dean's Award for Excellence in Mentoring Selection Committee 2015
Graduate School, Duke University

Graduate and Professional Student Council April 2013–April 2015
Director of Student Life, Executive Secretary Duke University

Worked on a 13-person Executive team to lead a 100-person General Assembly in service of Duke graduate and professional students.

Spearheaded membership, communication, and organizational efficiency efforts that resulted in increased meeting attendance and improved maintenance of institutional knowledge.

Managed a budget of over $30,000 to plan and execute weekly events for the 8,000+ student population.

Received the first ever GPSC Student Impact award for outstanding service to GPSC and the Duke community.

CEE Graduate Student Council March 2011–May 2012
Board Member Duke University

Plan academic, professional, and social events for graduate students in Duke University's Department of Civil and Environmental Engineering.

Florida Section AWWA June 2008 – July 2009
Board Member Broward County, FL

As a Region 6 Board Member and Young Professionals Chair, planned events for the water industry professionals of South Florida, including a half-day seminar and bowling tournament.

Christmas in July 2006 – 2009
Board Member Ft. Lauderdale, FL

Helped plan Christmas in July, an annual event for nearly 1,000 children from homeless shelters in Broward County, Florida.

PROFESSIONAL ORGANIZATIONS AND LICENSES

American Geophysical Union	2010 – Present
Sigma Xi, Scientific Research Society	2007 – 2017
Engineer in Training (F.E. Exam), State of Florida	October 2008
Florida Section AWWA, Broward County, Florida	2007 – 2009

ADDITIONAL SKILLS AND INTERESTS

Programming and Markup Languages	Python, Matlab, C/C++, Google Apps Script, LaTeX
Software and Technology Platforms	Mathematica, ArcMap, Google sites, Sakai, Qualtrics, Blackboard
Languages	English (native), Spanish (intermediate conversational)
Interests	Lifetime softball player, avid crafter/DIYer, cycling in (almost) any weather