CALEB A. BUAHIN

Curriculum Vitae

Phone: (801) 897-8517
E-mail: caleb.buahin@gmail.com

Education

Ph.D. Civil and Environmental Engineering Dec. 2017
Utah State University, Logan, Utah
Dissertation: Advancing the Cyberinfrastructure for Integrated Water Resources Modeling.
Advisor: Jeffery S. Horsburgh

M.S. Civil and Environmental Engineering Dec. 2010
Brigham Young University, Provo, Utah
Project: Dynamic Multidimensional Visualization of Water Quality Data for River Networks.
Advisor: James E. Nelson

B.S. Civil and Environmental Engineering Dec. 2010
Brigham Young University, Provo, Utah

Professional Experience

Postdoctoral Research Fellow Sept. 2017 – Present
Department of Civil and Environmental Engineering, Utah State University, Logan, Utah

Co-Instructor - Geographic Information Systems for Civil Engineers Jan. 2018 – Present
Department of Civil and Environmental Engineering, Utah State University, Logan, Utah

Teaching Assistant - Geographic Information Systems for Civil Engineers Jan. 2015 – April. 2017
Department of Civil and Environmental Engineering, Utah State University, Logan, Utah

Graduate Research Assistant Aug. 2013 – Sept. 2017
Utah Water Research Laboratory, Department of Civil and Environmental Engineering, Utah State University, Logan, Utah

Project Engineer Jan. 2011 – Aug. 2013
Environmental Resources Management Inc., Exton, Pennsylvania

Software Engineering Intern 2010
Aquaveo LLC, Provo, Utah

Civil Engineering Intern 2010
United Research Corporation, Salt Lake City, Utah

Graduate Research Assistant Jan. 2009 – Dec. 2010
The Environmental Modeling Research Laboratory, Department of Civil and Environmental Engineering, Brigham Young University, Provo, Utah

Research Interests

My research experience and interests are centered generally on the environmental fluid dynamics and hydroinformatics field with an emphasis on: 1) developing and applying hydrologic, hydraulic, and hydrodynamic models for investigating the dynamics that occur at the intersection between engineered water infrastructure, hydrological, and ecological systems

; 2) integrating models and environmental information systems; and 3) developing and applying GIS to address water resources challenges. My current research is focused on developing and testing standardized modeling frameworks that allow modelers to couple earth systems and environmental models in a "plug-and-play" fashion to support more holistic evaluations of human-natural water systems. I have applied these frameworks to couple models to evaluate the hydrology of urban stormwater systems and investigate heat transport in heterogeneous rivers with significant human mediation.

Awards

Outstanding Reviewer 2018
Environmental Modeling and Software

Best Student Paper and Presentation 2016
International Environmental Modeling and Software Society Biennial Congress

Martin Luther King Fellowship 2016
Utah State University, Office of Research and Studies

Best Graduate Scholar Award 2016
Utah State University, College of Engineering

Visiting Scholar 2015
National Flood Interoperability Experiment Summer Institute, National Water Center, University of Alabama, Tuscaloosa, Alabama

Doctoral Research Fellowship 2013 – 2017
iUTAH and the Utah Water Research Laboratory, Utah State University, Logan, Utah

Graduate Student Finalist 2010
Paul J. Riley Student Conference and Paper Competition, American Water Resources Association, Utah Section

Undergraduate Student Winner 2009
Paul J. Riley Student Conference and Paper Competition, American Water Resources Association, Utah Section

Professional Activities

Professional Memberships

American Society of Civil Engineers.
The International Environmental Modelling and Software Society

Reviewer

Environmental Modelling & Software
Journal of the American Water Resources Association
Lakes & Reservoirs: Research and Management

Publications and Presentations

Journal Papers in Print or Press

Buahin, C.A. and J.S. Horsburgh, 2018. Advancing the Open Modeling Interface (OpenMI) for Integrated Water Resources Modeling. *Environmental Modelling & Software* 108:133–153. doi: 10.1016/j.envsoft.2018.07.015

Buahin, C. A., Sangwan, N., Fagan, C., Rae, C., Maidment, D. R., Nelson, J. E., Horsburgh, J. S., Merwade, V. (2017). Probabilistic Flood Inundation Delineation Using a Rating Curve Library Approach, *Journal of the American Water Resources Association (JAWRA)*, doi:10.1111/1752-1688.12500.

Buahin, C. A. and J.S. Horsburgh (2015). Evaluating the Simulation Times and Mass Balance Errors of Component-Based Models: An Application of OpenMI 2.0 to an Urban Stormwater System. *Environmental Modelling & Software* 72:92–109. doi:10.1016/j.envsoft.2015.07.003.

Hale, R.L., A. Armstrong, M.A. Baker, S. Bedingfield, D. Betts, **C. A. Buahin**, M. Buchert, T. Crowl, R.R. Dupont, J.R. Ehleringer, J. Endter-Wada, C. Flint, J. Grant, S. Hinners, J.S. Horsburgh, D. Jackson-Smith, A.S. Jones, C. Licon, S.E. Null, A. Odame, D.E. Pataki, D. Rosenberg, M. Runburg, P. Stoker, and C. Strong (2015). iSAW: Integrating Structure, Actors, and Water to Study Socio-Hydro-Ecological Systems. *Earth's Future*. doi:10.1002/2014EF000295.

Williams, G.P., O. Obregon, E.J. Nelson, W. Miller, M.B. Borup, and **C. A. Buahin** (2014). Sensitivity of Water Quality Indicators in a Large Tropical Reservoir to Selected Climate and Land-Use Changes. *Lakes & Reservoirs: Research & Management* 19:293–305. doi:10.1111/lre.12079.

Journal Papers in Preparation or Review

Buahin, C.A., J.S. Horsburgh, B.T. Neilson (2018). Parallelization of Experimental Simulations in Component-Based Models: A Stream Temperature Model Calibration Application. *Environmental Modelling & Software*. In preparation.

Conference Proceedings Papers

Buahin, C. A. and J. S. Horsburgh **(**2016). From OpenMI to HydroCouple: Advancing OpenMI to Support Experimental Simulations and Standard Geospatial Datasets, In: Proceedings of the 8th International Congress on Environmental Modelling & Software, 11-14 July, Toulouse, France.

Buahin, C. A., E.J. Nelson, O. Obregon, and G.P. Williams (2011). Dynamic Multidimensional Visualization for Water Quality Data in Rivers. World Environmental and Water Resources Congress 2011, American Society of Civil Engineers, 4811–4819. http://ascelibrary.org/doi/abs/10.1061/41173%28414%29499.

Buahin, C. A., R. Hila, T. Rabadi, O. Obregon, R. Chilton, A. Childers, G. Williams, and E.J. Nelson (2010). ArcGIS Tools for Storing and Analyzing Reservoir Vertical Profile Data. AWRA 2010 Spring Specialty Conference. Orlando, FL.

Buahin, C.A. (2010). "Spatial Interpolation Techniques for Dynamic Isopleth Map Generation in Assessing Water Quality in Rivers." J. Paul Riley Student Conference and Paper Competition, AWRA Utah Section.

Theses

Buahin, C. A. (2017). Advancing the Cyberinfrastructure for Integrated Water Resources Modeling, Ph.D. Dissertation, Utah State University, Logan, Utah. https://digitalcommons.usu.edu/etd/6901

Conference Presentations, Posters, and Abstracts

Buahin, C.A., J.S. Horsburgh, and B.T. Neilson (2018) Enabling High-Performance Heterogeneous Computing for Component-Based Integrated Water Modeling Frameworks. 9th International Congress on Environmental Modelling and Software. Fort Collins, Colorado.

Buahin, C.A. and J.S. Horsburgh (2017). Parallel Optimization Simulations Using the HydroCouple Component-Based Modeling Framework. Fourth Workshop on Coupling Technologies for Earth System Models (CW2017). Princeton, NJ. https://www.earthsystemcog.org/projects/cw2017/abstracts#buahin.

Buahin, C.A. and J.S. Horsburgh (2016). From OpenMI to HydroCouple: Advancing OpenMI to Support Experimental Simulations and Standard Geospatial Datasets. Environmental Modelling and Software for Supporting a Sustainable Future. Toulouse, France, pp. 153–160. http://scholarsarchive.byu.edu/iemssconference/2016/Stream-A/11.

Buahin, C. A. and J. Horsburgh (2015). Computational Penalties of Component Based Models: An Urban Stormwater Component-Based Modeling Application Using OpenMI. Spring Runoff Conference. Utah State University. http://digitalcommons.usu.edu/runoff/2015/2015Posters/38.

Teaching Experience

Courses

Geographic Information Systems for Civil Engineers 2015– 2018
Utah State University, Logan, Utah