

CALEB A. BUAHIN*Curriculum Vitae*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

Advisor: E. James Nelson**B.S. Civil and Environmental Engineering** Dec. 2010

Brigham Young University, Provo, Utah

Professional Experience

Hydroinformatics Engineer May 2019 – Present

Xylem Inc, South Bend, Indiana

Research Associate May 2019 – Present

Utah State University, Logan, Utah

Postdoctoral Research Fellow Sept 2017 – May 2019

Utah State University, Logan, Utah

Advisors: Bethany T. Neilson and Jeffery S. Horsburgh**Co-Instructor - GIS for Civil Engineers** Jan 2017 – Apr 2017

Utah State University, Logan, Utah

Teaching Assistant - GIS for Civil Engineers Jan 2015 – Apr 2017

Utah State University, Logan, Utah

Graduate Research Assistant Aug 2013 – Sept 2017

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

Brigham Young University, Provo, Utah

Research Interests

My research interests revolve around 1) developing and applying scale relevant hydrodynamic models to improve understanding of coupled surface and sub-surface flow, solute, and heat transport dynamics in heavily mediated hydrologic systems and their ecological implications; 2)

deploying data driven models and machine learning algorithms specifically to augment traditional hydrologic models and to optimize the management of water systems; and 3) developing standardized model integration and environmental information systems to support more holistic evaluations of water systems.

Awards

<i>Fellow of the OpenMI Association</i>	2019– 2020
The OpenMI Association	
<i>Outstanding Reviewer</i>	2018
Environmental Modeling and Software	
<i>Best Student Paper and Presentation</i>	2016
International Environmental Modeling and Software Society Biennial Congress	
<i>Martin Luther King Fellowship</i>	2016
Utah State University, Office of Research and Studies	
<i>Outstanding Graduate Scholar Award</i>	2016
Utah State University, College of Engineering	
<i>Visiting Scholar</i>	2015
National Flood Interoperability Experiment Summer Institute, National Water Center, University of Alabama, Tuscaloosa, Alabama	
<i>Doctoral Research Fellowship</i>	2013 – 2017
iUTAH and the Utah Water Research Laboratory, Utah State University, Logan, Utah	
<i>Graduate Student Finalist</i>	2010
Paul J. Riley Student Conference and Paper Competition, American Water Resources Association, Utah Section	
<i>Undergraduate Student Winner</i>	2009
Paul J. Riley Student Conference and Paper Competition, American Water Resources Association, Utah Section	

Publications and Presentations

Journal Papers in Print or Press

Mihalevich, B. A., Neilson, B. T., **Buahin, C. A.**, Yackulic, C. B., and Schmidt, J. C. (2020). “Water Temperature Controls for Regulated Canyon-Bound Rivers.” *Water Resources Research*, 56(12), e2020WR027566. <https://doi.org/10.1029/2020WR027566>

Buahin, C.A., Horsburgh, J.S., Neilson, B.T., 2019. Parallel multi-objective calibration of a component-based river temperature model. *Environmental Modelling & Software* 116:57–71. <https://doi.org/10.1016/j.envsoft.2019.02.012>

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. <https://doi.org/10.1016/j.envsoft.2018.07.015>

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- 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)*.
<https://doi.org/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.
<https://doi.org/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. Crawl, R.R. Dupont, J.R. Ehleringer, J. Endter-Wada, C. Flint, J. Grant, S. Hinnners, 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*.
<https://doi.org/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.
<https://doi.org/10.1111/lre.12079>

Working Manuscripts

- Leach, J.A., B.T. Neilson, **C.A. Buahin**, R. D. Moore, H. Laudon (2021). Lake outflow and hillslope lateral inflows dictate thermal regimes for forested streams draining small lakes. *Advances in Water Resources*. In review.
- Buahin, C.A.** (2021). Using CNN LSTM for flow simulation in stormwater and wastewater collection system networks. *Advances in Water Resources*. In preparation.
- Buahin, C.A.**, B.T. Neilson, M.B. Cardenas, S. Ferencz (2021). An investigation of surface water-groundwater solute and heat exchanges under variable flow conditions using reduced physics component-based models. *Water Resources Research*. In preparation.

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 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.

[https://doi.org/10.1061/41173\(414\)499](https://doi.org/10.1061/41173(414)499)

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.

Conference Posters and Presentation

Wu, J., **C. A. Buahin,** B.E. McDonnell, A. Mullapudi, R. Kertesz (2021). PySWMM-v1.0 Release: Advancing the Python interface to stormwater management for now and into the future. 54th International Conference on Water Management Modeling.

Buahin, C.A., K.M. Macro, and B. McDonnell (2020). Combined Sewer Overflow Mitigation Using Ensemble Classifiers in Predictive Real-Time Decision Support Systems. WEFTEC 2020. New Orleans, LA.

Mihalevich, B.A., B.T. Neilson, J.C. Schmidt, D. Rosenberg, D. Tarboton, **C.A. Buahin** (2018). A dynamic river temperature model for the Colorado River within Grand Canyon. 2018 Fall Meeting, AGU, Washington, D.C.

<https://agu.confex.com/agu/fm18/prelim.cgi/Paper/452497>

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., 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). HydroCouple: Advancing Component-Based Modeling Frameworks for Integrated Water Assessment. 25th NSF EPSCoR National Conference Missoula, Montana.

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. <https://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>.

Invited Presentations

Buahin, C. A., B.T. Neilson, J.S. Horsburgh (2018). Heat and Solute Transport Modeling Using the Component-Based Modeling Paradigm. Utah State University Civil Engineering Water & Environmental Seminar.

Buahin, C. A. and J. Horsburgh (2017). The HydroCouple Component-Based Modeling Framework. The OpenMI Association Technical Committee Meeting.

Software

HydroCouple: An HPC enabled component-based framework for integrated water resources modeling. <https://github.com/hydrocouple>

Teaching Experience

Courses

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

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
Hydrology and Earth System Sciences