

Dr. Albert Larson

Department of Civil and Environmental Engineering | University of Rhode Island
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Education & Professional Experience

2019 – 2023 **PhD, Department of Civil and Environmental Engineering**
University of Rhode Island

Dissertation Title

Flux to Flow: A Clearer View of Earth's Water Cycle via Neural Networks and Satellite Data

Program of Study

Water in the Environment, Waterborne Diseases, Programming for Scientists, Neural Networks and Deep Learning, Geospatial Watershed Modeling, GIS Analysis of Environmental Data, Remote Sensing and Natural Resource Mapping

2019 – 2020 **MBA, Department of Business Administration**
University of Rhode Island

Program of Study

Statistical Methods for Management, Organizational Behavior, Legal Environment of Business, Organizational Decision Making and Design, Consulting and Management Practice, Principles of Economics, Operations and Supply Chain Management, Management Data Analysis and Communication, Global Supply Chain Management, Global Warehousing and Distribution Systems, Strategic Management

2016 – 2018 Territory Manager, Wescor Associates, Wrentham, MA
2015 – 2016 Assistant Project Manager, Golden Rule Designs, W. Kingston, RI
2013 – 2014 Sales Engineer, Zoll Medical, Chelmsford, MA
2012 – 2013 Sales Engineer, Dewesoft, Whitehouse, OH
2011 – 2012 Sales Engineer, Dewetron, Wakefield, RI
2010 – 2011 Applications Engineer, Yushin America, Cranston, RI
2009 – 2010 Technical Support Engineer, Grass Technologies, Warwick, RI
2005 – 2009 **BS, Mechanical Engineering**, University of Rhode Island

Recent Funding

Research assistant, International Water Management Institute	2022 ⇒ 2023
Research assistant, Akanda Lab	2021 ⇒ 2023
Fellow, NASA Rhode Island Space Grant Consortium	2022
Research assistant, URI Graduate School of Oceanography	2021 ⇒ 2022
Teaching assistant, URI Civil and Environmental Engineering	2020
Research assistant, URI Mechanical Engineering	2020
Graduate assistant, URI Enrollment Services	2020

Publications

1. **Larson, A.**, 2022. A clearer view of Earth's water cycle via neural networks and satellite data. *Nature Reviews Earth & Environment*. <https://doi.org/10.1038/s43017-022-00303-x>
2. Murray, C., **Larson, A.**, Goodwill, J., Wang, Y., Cardace, D., & Akanda, A. S., 2022. Water Quality Observations from Space: A Review of Critical Issues and Challenges. *Environments*, 9(10), 125. <https://doi.org/10.3390/environments9100125>
3. **Larson, A.**, Hendawi, A., Pradhanang, S., Boving, T., Akanda, A.S., 2023. Discerning Watershed Response to Hydroclimatic Extremes with a Deep Convolutional Residual Regressive Neural Network. *Hydrology*, Under Review.
4. **Larson, A.** and Akanda, A.S., 2023. Deep Convolutional Residual Regressive Neural Networks and Sea Surface Temperatures from Aqua & Argo in the 2000s. *Remote Sensing*, Under Review.
5. **Larson, A.**, Pradhanang, S., Boving, T., Akanda, A.S., 2023. Holistic Water Cycle Analysis via the Confluence of Climate Model, Satellite, Ground Truth, and Machine Learning Signal Processing Technologies: Two North American Transboundary River Watersheds. In preparation.

Research Projects

- (2022 – 2023) I worked with deep convolutional neural networks using the GLDAS & NLDAS surface and subsurface flow parameters as predictors of large basin streamflow for various size river basins in the USA. I acquired image and vector data, performed upsampling, downsampling, geographical

- constraining and filtering the data, and exporting the data post treatment to a variety of formats for analysis (.gif, .nc, .npy, .pt)
- (2022) Investigated soil moisture data assimilation products based on the Soil Moisture Active Passive (SMAP) satellite mission, improving its spatial resolution, and its potential for use as an input to watershed calibration via a regression neural network.
- (2021 – 2022) Employed neural network techniques of varying complexities (multilayer perceptrons, residual networks, adversarial networks, autoencoders) for fusing simulated and satellite-derived global sea surface temperature (sst) fields.
- (2020 – 2022) Created and maintained an open jupyter notebook to serve as a small educational tool for graduate students to remote sensing with python. I created animations and visuals for various funding proposals.
- (2021) Performed literature review of climate extremes, hydrology and associated waterborne disease (cholera) risk for use in a feasibility experiment about leveraging meteorological, climatological, and demographic data to predict cholera risk.
- (2020) Combined high speed digital image correlation & *in situ* blast sensors to obtain profiles of explosions to model the solid mechanics phenomena that occur with underwater blasts, simulating naval warfare events.
- (2020) Used the Soil Water and Assessment Tool (SWAT), Remote Sensing and GIS software to model and calibrate watersheds in RI in order to validate modeling/calibration with and without ground truth streamflow.
- (2020) Created visualizations using Massachusetts DOT traffic count data and satellite air quality data (Sentinel 5P observations of NO₂) to visualize change in traffic and emission due to the coronavirus pandemic.
- (2020) Utilized Google Earth Engine and Landsat satellite imagery to extract information about the extent and year over year impact of wildfire in the Lost River region of New Hampshire in 2017–2018.

Programming Environment

unix, homebrew, python, nginx, html

Volunteer Experiences and Microcredentials

URI Metcalf Institute, flood monitoring science coach, 2022

Save The Bay, volunteer, 2021 – 2022

NVIDIA Certification, “Getting Started with Deep Learning”, completed in 2021

University of Rhode Island Diversity and Inclusion Badge, completed in 2020

Lean Six Sigma Yellow Belt, completed in 2019

ExpertRating Online Computer Networking Course-II, completed in 2013

References

Dr. Ali S. Akanda, Civil and Environmental Engineering

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Dr. Soni Pradhanang, Department of Geosciences

spradhanang@uri.edu

Dr. Thomas Boving, Civil and Environmental Engineering

tboving@uri.edu