Matthew R. Lurtz

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EDUCATION:

Colorado State University, Fort Collins, Colorado
- Doctor of Philosophy in Hydrologic Science and Engineering, Fall 2023
  - o Dissertation: Multiscale connections between a groundwater dependent ecosystem and socio-hydrology: insight gained from numerical modeling, geospatial informatics, and Bayesian statistics

The University of Kansas, Lawrence, Kansas
- Masters of Science with Water Resource Emphasis, December 2016
- Bachelor of Science in Civil Engineering with Environmental Emphasis, December 2013

The University of Newcastle, New South Wales, Australia, 2011
- Completion of Civil Engineering Study Abroad Program

RESEARCH:

As a postdoctoral scientist, I expand on my work as a doctoral student by examining groundwater-dependent ecosystems (GDE) through the lens of scale-enlightened modeling. Groundwater dependent ecosystems play a dominant role in supporting flora and fauna, but little information is available to help quantify GDE health (i.e., evapotranspiration) with varying time, space and climatic scales. The main goal of the study is to uncover temporal and spatial dependence in GDEs using remotely-sensed and numerical modeling methods. Hypothesis testing is used to investigate how small scale GDE processes translates to larger spatial scales which will bolster predictive models used to address national water challenges.

WORK and TRAINING EXPERIENCE:

National Science Foundation, Fort Collins, Colorado
Earth Sciences Postdoctoral Fellow, (*Current*)
- Examine issues related to scale in groundwater dependent ecosystems with Dr. Mike Ronayne (Colorado State University) and Dr. Alfredo Huete (University of Technology Sydney, AU)
- Work with Dr. Balaji Rajagopalan as an affiliate of the Sustainability, Energy and Environment Community at the University of Colorado, Boulder

Colorado State University, Fort Collins, Colorado
Graduate Research Assistant, 2018 – 2022
- Investigate the effects of irrigation return flow on riparian evapotranspiration in the Arkansas River Valley, Colorado

Stantec, Overland Park, Kansas
Water Resource Engineer, October 2022 – August 2023
Water Resource Engineer Intern, May 2017 – August 2017
- Zone A and Zone AE FEMA floodplain modeling using HEC-RAS two-dimensional flow model (Current)

University of Kansas, Lawrence, Kansas
Graduate Research Assistant, May 2015 – December 2016
- Contacted and interviewed numerous county engineers, road supervisors, and engineering firms that work for counties to gain insight on LWSC design, associated costs, and related permitting process
- Analyzed published documents relating to design and construction of low-water stream crossings (LWSC) with numerous site visits to operational LWSCs

U.S. Geological Survey, Lawrence, Kansas
Student Trainee Hydrologist, January 2016 – August 2016
- Performed routine measurements of water stage and discharge under given field conditions
- Performed installation, maintenance, and troubleshooting of sensing, recording, and communication equipment
- Conducted in-office hydrologic analyses on collected data
- Assisted in establishing vertical and horizontal datums at collection sites

University of Kansas, Lawrence, Kansas
Undergraduate Research Assistant, 2012 – 2013
- Assisted a team of graduate students by collecting geospatial and hydrologic data for numerous watersheds in the Midwestern U.S. and subsequently performed multiple linear regression analysis under the supervision of Dr. Bryan Young (2013).
- Assisted doctoral student in lab research using soil types as natural filters to remove or reduce contaminants found in groundwater sources in developing countries (2012).

TEACHING and ADVISING EXPERIENCE:

- **Colorado State University**, Lobitos, Peru
  o Study Abroad Program Leader, January 2022
- **Colorado State University**, Fort Collins, Colorado
  o Graduate Teaching Fellow, August 2020 – May 2021
- **Colorado State University**, Fort Collins, Colorado
  o Served as Research Advisor to a First-Generation Student, December 2020 - May 2021
- **The Institute for Learning and Teaching** (TILT), Colorado State University, Fort Collins, Colorado
  o Completed the "Teaching Online Courses" workshop (July 2020)
  o Completed the "Creating Assignments" workshop (August 2020 – September 2020)
- **Colorado State University**, Fort Collins, Colorado
  o Graduate Teaching Assistant, August 2017 – December 2017

SKILLS:

- R Scripting Language in R-Studio (*Advanced*)
- R Packages: cosmos, mvtnorm, terra, ggplot, xts, jags, winbugs, rgdal, sp, sf, stan
- ArcGIS, HEC-RAS (1-D and 2-D), MODFLOW
- Google Earth Engine
- Internet of Things (IoT) Sensors
- Microsoft Suite
- Automated reports in Rmarkdown, knitr and LateX
- Code version control and management (Git, GitHub)
- Python Scripting Language in Jupyter Notebook (*Intermediate*)

SERVICE ACTIVITIES:

- Co-Convener: Evapotranspiration (ET): Advances in In Situ ET Measurements and Remote Sensing-Based ET Estimation, Mapping, and Evaluation (AGU 2023).
- Member of American Geophysical Union (*Current*)
- Academic Teaching Member of Engineers Without Borders (2022)

- ASCE-EWRI chapter at CSU (2018-2020)
- Fundamentals of Engineering Exam (FE) in Fall 2013
- Volunteer at Fort Collins Rescue Mission

PROJECTS:

- Autonomous monitoring of soil moisture, leaf temperature, and in-canopy temperature/RH at an agricultural research site in Fort Collins, CO. A DIY field-monitoring station was developed for natural and agricultural ecosystems.
  - https://www.youtube.com/watch?v=c7WOwQDDCSA&feature=youtu.be

INVITED LECTURES:

- University of Colorado (Boulder), BOASE Hydrologic Sciences and Water Resources Engineering Seminar Series (April 2023).

PUBLICATIONS (Refereed Journals):

4. Lurtz, M. R., Morrison, R. R., and Nagler, P. (2024). On connecting hydrosocial parameters to vegetation greenness differences in an evolving groundwater dependent ecosystem. *Remote Sensing*.
3. Nagler, P., Barreto-Muñoz, A., Sall, I., Lurtz, M. R., and Didan, K. (2023). Riparian Plant Evapotranspiration and Consumptive Use for Selected Areas of the Little Colorado River Watershed on the Navajo Nation. Special Issue: *Remote Sensing*.
2. Lurtz, M. R., Morrison, R. R., and T. K. Gates. (2021). Connecting irrigation return flow and hydrologic data to riparian greenness using a statistical method. *Colorado Water Special Issue,* Colorado State University.
1. Lurtz, M. R., Morrison, R. R., Gates, T. K., Senay, G. B., Bhaskar, A. S., and Ketchum, D. G. (2020). Relationships between riparian evapotranspiration and groundwater depth along a semi-arid irrigated river valley. *Hydrological Processes*, hyp.13712. https://doi.org/10.1002/hyp.13712.

PUBLICATIONS for KANSAS DEPARTMENT of TRANSPORTATION:

- McEnroe, B. M., Lurtz, M. R., Parsons, R. L., and Neupane, M. (2017). Practical Design Guidelines for Replacement of Deficient Bridges with Low-Water Stream Crossings in the Rural Midwest. *Report No. FHWA-KS-16-19.*
- Young, C. B., McEnroe, B. M., Gamarra, R., Yuan, L., and Lurtz, M. R. (2014). Estimating the Discharge for Ordinary High Water Levels in Kansas. *Report No. K-TRAN: KU-13-1.*

CONFERENCE PUBLICATIONS:

- Siller, T. J., Johnson, A., Fischer, S., and Lurtz, M. R. (2022). Connecting Education Abroad with an in-class EWB International Challenge Project. American Society of Engineering Education. Minneapolis, Minnesota. June 26-29. Included Presentation.

CONFERENCE PRESENTATIONS:

- Lurtz, M.R., and Morrison, R.R. (2022). A Reach Scale Comparative Analysis of Water Use for Plant Functional Types found in a Groundwater Dependent Ecosystem in Southeastern Colorado. American Geophysical Union Fall Meeting. Chicago, IL. December 12–16.
- Lurtz, M.R., Morrison, R.R., and Gates, T.K. (2021). Connecting irrigation return flow and hydrologic data to riparian greenness using Bayesian linear regression. American Geophysical Union, Hydrology Days (virtual). Fort Collins, Colorado. March 22.
- Lurtz, M.R., Morrison, R.R., and Senay, G.B. (2019). Model-parameter fitting using simulations from independent remotely-sensed evapotranspiration algorithms applied in different hydrologic conditions. American Geophysical Union Fall Meeting. San Francisco, CA. December 9–13.
- Lurtz, M.R., Morrison, R.R., Gates, T.K., Bhaskar, A.S., Senay, G.B., and Ketchum, D. (2019). Riparian vegetation characteristics and evapotranspiration in relation to groundwater exchange and water table fluctuations along an irrigated river valley. American Geophysical Union, Hydrology Days. Fort Collins, CO. March 27–29.
- Lurtz, M.R., Morrison, R.R., Bhaskar, A.S., Gates, T.K., Senay, G.B., and Ketchum, D. (2018). Riparian Vegetation Indices and Evapotranspiration in Relation to Groundwater Exchange and Water Table Fluctuations along an Irrigated River Valley. American Geophysical Union Fall Meeting. Washington D.C. December 10–14.
- Lurtz, M.R., Morrison, R.R., Bhaskar, A.S., and Gates, T.K. (2018). Riparian area evapotranspiration with implications on water resource management. American Geophysical Union, Hydrology Days. Fort Collins, Colorado. March 19–21.
- Lurtz, M.R. and McEnroe, B. (2017). Low-Water Stream Crossings: Siting, Permitting and Design. 99th Annual Kansas Transportation Engineering Conference. Kansas State University, Manhattan, Kansas. April 11-12.

SCHOLARSHIPS and AWARDS:

- Graduate Student Council Travel Grant (2022)
- Walter Scott, Jr. College of Engineering Graduate Teaching Fellow (2020-2021)
- Tipton and Kalmback/Stantec Graduate Fellowship (Fall 2020)
- Whitney Borland Scholarship (Fall 2020)
- GIS Colorado Part-time Student Scholarship (Summer 2019)
- Shrake Culler Scholarship (Fall 2019)
- Whitney Borland Scholarship (Fall 2019)
- Darryl B. Simons Graduate Fellowship (Fall 2018)
- Whitney Borland Scholarship (Fall 2018)
- Ernest Pogge Water Resources Engineering Scholarship (2013)

EXTRAMURAL FUNDING:

Evaluating spatiotemporal dependence in groundwater-dependent ecosystem processes, National Science Foundation, Earth Sciences Post-doctoral Fellowships ($180,000), September 2023 – August 2025