Brock J.W. Kamrath

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EDUCATION

PhD, Biological and Agricultural Engineering Fall 2018 – Fall 2021
North Carolina State University, Raleigh, NC
Minor: Civil Engineering
Dissertation Title: *Improving performance and examining expansion of constructed wetlands for tertiary treatment of nitrogen from domestic and municipal wastewater*

MS, Biological and Agricultural Engineering Fall 2016 – Summer 2018
North Carolina State University, Raleigh, NC
Thesis Title: *Evaluation of performance and long-term viability of wetland restoration, construction, and creation projects in Eastern NC*

BSE, Civil Engineering (Emphasis: Environmental Engineering) Fall 2011 – Spring 2015
The University of Iowa, Iowa City, IA
Honors: Distinction (GPA: 3.89/4.00)

PROFESSIONAL EXPERIENCE

Postdoctoral Research Fellow October 2021 – Present
ORISE EPA Office of Research and Development Full Time: 40 hr/wk
Center for Environmental Measurement and Modeling
Research Triangle Park, NC
Mentor: Dr. Yongping Yuan

- Completed systematic review of the effectiveness of specific agricultural conservation practices aimed at improving water quality
- Collaborated with the National Center for Water Quality Research (NCWQR) to assess uncertainty in nutrient load estimates as they relate to monitoring strategies for water quality assessments
- Investigated the relationship between nutrient losses and hydrology in agricultural watersheds
- Analyzed internal updates to Fertilizer Emission Scenario Tool for CMAQ (FEST-C) for future use in assessing the impact of agricultural practices on water quality

Graduate Research Assistant August 2016 – September 2021
Department of Biological and Agricultural Engineering Part Time: 20 - 30 hrs/wk
North Carolina State University, Raleigh, NC

- Managed, monitored, and maintained four field research sites; collected flow data, water quality samples, water table data, and surface elevation change data
- Planned, modified, and executed a laboratory study to determine ammonium release from detritus
- Conducted statistical analysis on data collected from field and laboratory research
- Collaborated with fellow graduate students, local landowners, local public works department personnel, and USGS personnel to complete research objectives
- Maintained laboratory equipment and supplies as acting laboratory manager
- Supervised and mentored undergraduate research assistants and senior design groups

Engineer 1 (EIT #19194) May 2015 – July 2016
Andrews Engineering Inc., Springfield, IL Full time: 40 to 60 hr/wk

- Performed on-site construction quality assurance for landfill construction and remediation projects
- Assisted professional engineers with landfill designs and prepared bid documents for new projects

Undergraduate Research Assistant May 2014 – May 2015
Department of Civil and Environmental Engineering, University of Iowa, Iowa City, IA Part time: 20 hrs/wk

- Aided graduate students in completion of research projects investigating emerging contaminants
- Analyzed samples collected from laboratory equipment using a GC/MS to evaluate background polychlorinated biphenyl (PCB) contamination

TECHNICAL SKILLS

Environmental Data Science:	Hydrology and water quality data processing, analysis, and visualization using packages (i.e., tidyverse, EGRET, LOADEST, ggplot2, etc.) in R/RStudio
General Modeling Knowledge:	Model evaluation, Model calibration, Uncertainty analysis, Regression analysis, Sensitivity analysis, Tracer/RTD Analysis, Machine Learning (Random Forest)
Data Management:	R/RStudio, Excel, GitHub
Data Collection:	Manual Discharge Measurements (Mid-Section Method), ISCO 6712 automatic samplers and modules, HOBO U20 & U26 sensors, YSI Professional Plus
Sample Analysis:	HACH DR3900

PEER-REVIEWED PUBLICATIONS

Kamrath, B. & Yuan, Y. (2023 – In Press) "Effectiveness of Nutrient Management for Reducing Phosphorus Losses from Agricultural Areas." *Journal of the ASABE*. https://doi.org/10.13031/ja.15572

Kamrath, B., & Yuan, Y. (2023). Streamflow duration curve to explain nutrient export in Midwestern USA watersheds: Implication for water quality achievements. *Journal of Environmental Management*, *336*, 117598. https://doi.org/10.1016/j.jenvman.2023.117598

Kamrath, B., Yuan, Y., Manning, N., & Johnson, L. (2023). Influence of sampling frequency and estimation method on phosphorus load uncertainty in the Western Lake Erie Basin, Ohio, USA. *Journal of Hydrology*, *617*, 128906. https://doi.org/10.1016/j.jhydrol.2022.128906

Kamrath, B. J.W., Burchell, M. R., Kurki-Fox, J. J., & Bass, K. L. (2020). Impact of control structures on hydrologic restoration within the Great Dismal Swamp. Ecological Engineering, 158, 106024. https://doi.org/10.1016/j.ecoleng.2020.106024

Kamrath, B. J.W., Burchell, M. R., Cormier, N., Krauss, K. W., & Johnson, D. J. (2019). The Potential Resiliency of a Created Tidal Marsh to Sea Level Rise. Transactions of the ASABE, 62(6), 1567–1577. https://doi.org/10.13031/trans.13438

Kurki-Fox, J. J., Burchell, M. R., & **Kamrath, B. J.W.** (2019). The Potential Long-Term Impacts of Climate Change on the Hydrologic Regimes of North Carolina's Coastal Plain Non-Riverine Wetlands. Transactions of the ASABE, 62(6), 1591–1606. https://doi.org/10.13031/trans.13437

SELECT PRESENTATIONS

Kamrath, B., Yuan, Y. (2023, July). Effectiveness of Nutrient Management for Reducing Phosphorus Losses from Agricultural Areas. ASABE Annual International Meeting (AIM), Omaha, NE.

Kamrath, B., Yuan, Y. (2022, July). Influence of sampling frequency and estimation method on phosphorus load uncertainty in the Western Lake Erie Basin, Ohio, USA. ASABE AIM, Houston, TX.

Kamrath, B., Burchell, M. R. (2021, March). Potential nitrogen release from minor WWTPs in NC without nitrate monitoring. Water Resources Research Institute of the UNC System (WRRI) Virtual Annual Conference Student Lightning Talk.

Kamrath, B., Burchell, M. R. (2020, July). Improving nitrogen treatment through rejuvenation of an aging tertiary constructed wetland. American Society of Agricultural and Biological Engineers (ASABE) Virtual Annual International Meeting.

Kamrath, B., Burchell, M.R., Kurki-Fox, J. J. (2020, May). Preliminary assessment of nitrogen treatment in a tertiary constructed wetland following detritus removal. WRRI Annual Conference Virtual Wetlands Research Session.

Kamrath, B., Burchell, M. R. (2019, July). Efficacy of a linear in-stream wetland to treat agricultural drainage water in the Little River Watershed. ASABE AIM, Boston, MA.

Kamrath, B., Burchell, M. R., Kurki-Fox, J. J. (2019, June). Impact of Control Structures on the Restoration of Wetland Hydrology within the Great Dismal Swamp. 19th American Ecological Engineering Society (AEES) Meeting, Asheville, NC

Kamrath, B., Burchell, M. R., Krauss, K. W., Johnson, D. J, & Kurki-Fox, J. J. (2018, May) Evaluation of a Recently Created Tidal Marsh's Resiliency to Relative Sea-Level Rise. Society of Wetland Scientists (SWS) 2018 Annual Meeting, Denver, CO

Kamrath, B. J.W. & Burchell, M. R. (2018, March). Efficacy of linear wetlands to treat agricultural drainage in the Little River watershed. 20th Water Resources Research Institute of the UNC System (WRRI) Annual Conference, Raleigh, NC

Kamrath, B. (2017, September). Restoration and Creation of Wetlands in North Carolina. NC State's 3rd Annual Three Minute Thesis Competition.

TEACHING AND OUTREACH EXPERIENCE

Guest Lecturer February 2021
Course: BAE 565 Environmental and Agricultural Data Analytics and Modeling
Topics: Introduction to GitHub, Using GitHub with RStudio

Graduate Teaching Assistant
Courses: BAE 305 – Biological Engineering Circuits Fall 2019
BAE 203 – Introduction to Environmental & Ecological Engineering Spring 2017

Session Co-Moderator 2019 & 2022
American Society of Agricultural and Biological Engineers (ASABE) Annual International Meeting

Subcommittee Chair 2022-2023
ASABE NRES-253: Riparian Zones, Floodplains, and Wetlands

Graduate Peer Mentor Fall 2020 – Spring 2021
NC State Graduate Peer Mentoring Collaborative

NCSU BAE Undergraduate Senior Design Mentor 2017-18 & 2019–20
Advisor: Dr. Michael R. Burchell