

Kimberly Bourne

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Education

Duke University
Doctor of Philosophy in Environmental Engineering
Advisor: Dr. Mark Borsuk
Current GPA: 3.72

Durham, NC
expected 05/2021

Clemson University
Bachelor of Science in Environmental Engineering
GPA: 3.67

Clemson, SC
05/2016

Research Interests

The main goal of my research is to bridge the gap between biogeochemical models of surface water ecosystems and policies implemented to protect those systems. I am interested in the natural processes, human behaviors and decisions that affect the biogeochemistry of these systems. The main question I want to ask is: *How can we find an optimal balance between the protection of our country's waterways and maintaining relatively low regulatory burden on industry and communities?*

Current Projects

Patterns of mercury and organic co-contaminants in marine and freshwater fish

Using a new R package, GJAM, developed by Duke professor, Dr. Jim Clark, to determine the characteristics of watersheds, streams, estuaries, and lakes that affect mercury co-contamination with organic contaminants that often cause toxicological concern. This project is in collaboration with Dr. Celia Chen of Dartmouth College.

Assessing the contribution of small streams to use and non-use water quality values using modeling, stakeholder participation, and decision theory

Developing a measure for biodiversity as an ecosystem service in the Piscataqua watershed to be valued by citizens of the area. The next step in this project will be to create a Bayesian network model to link stream chemistry parameters to the selected biodiversity measure.

Evidence for selectivity in the invasive generalist predator *Pterois volitans/miles*

Performing the statistical analysis on data collected by collaborator Amelia Ritger on prey preferences of lionfish in the Caribbean. The goal is to determine what factors influence the prey species consumed by lionfish as well as whether they have a true preference for specific prey.

Effect of climate change on bioaccumulation of mercury in the northeast United States

The goal of this project is to ascertain the effects of changes in salinity, temperature, and carbon loading on bioaccumulation at the base of the food web. Performed the statistical analysis on data collected in mesocosm experiments conducted by Dr. Celia Chen's lab.

Completed Projects

- 05/2016-08/2016 Worked under Dr. Cindy Lee and Dr. Lindsey Shuller-Nickles as a post-baccalaureate researcher. Modeled the interactions of chiral pesticides with chiral mineral surfaces. The goal of the project was to collect initial data for a proposal aiming to determine the fate and effectiveness of pesticides once they are released into the environment.
- 02/2015-06/2016 Worked under Dr. David Ladner as an undergraduate researcher studying the effectiveness of various polymeric oil dispersants in salt water conditions. Created a display about oil spills, dispersants, and their effects on the environment that is currently installed in the Dauphin Island Sea Lab Estuarium.

Skills

Statistical analysis, chemical process modeling, system dynamics modeling, and analysis of remote sensing data.

Software: Matlab, R, Stella Architect, and Adobe Illustrator and Premiere Pro

Presentations

5. Borsuk, M.; **Bourne, K.**; Curtis, A.; Chen, C.Y. "Patterns of Mercury and Organic Co-contaminants in Marine and Freshwater Fish" Presentation at the 13th International Conference on Mercury as a Global Pollutant, Providence, RI (July 2017).
4. Curtis, A.; Chen, C.Y.; Demidenko, E.; Borsuk, M.E.; **Bourne, K.** "The Effects of Multiple Environmental Factors on the Bioaccumulation of Mercury in an Estuarine Amphipod." Poster presentation at the NIEHS Environmental Health Science FEST, Durham, NC (December 2016).
3. Ladner, D.A.; Tu, Y.; Steele, M.; Carpenter, K.; **Bourne, K.**; Brown, M.; Geitner, N.; Wang, B.; Ke, P.C.; Ding, F.; Salehi, M.; Whelton, A.; Powers, S. "Disseminating Oil Spill Knowledge through an Exhibit at the Estuarium." Platform presentation at the Oil Spill and Ecosystem Science Conference, Tampa, FL (February 2016).
2. Carpenter, K.; **Bourne, K.**; Wang, B.; Ding, F.; Ladner, D.A. "Hyperbranched Polymers as Oil Dispersants: Influence of Salinity, pH, and Concentration on Dispersion Effectiveness." Poster presentation at the Oil Spill and Ecosystem Science Conference, Tampa, FL (February 2016).
1. Ladner, D.A.; Carpenter, K.; **Bourne, K.**; Tu, Y.; Wang, B.; Geitner, N.K.; Ke, P.C.; Ding, F.; Powers, S.; Salehi, M.; Whelton, A.J. "Toward biocompatible oil spill dispersants through dendritic polymers." Platform presentation at the Association of Environmental Engineering and Science Professors (AEESP) biannual conference, New Haven, CT (June 2015).

Honors

05/2015 **Hambright Leadership Award**
Funding amount: \$5000 towards leadership development activities for the individual.

Professional Activities

08/2017-current **Co-teacher at North Carolina School of Science and Mathematics**
Helping to develop and teach a course on environmental modeling that focuses on system dynamics.

08/2014-12/2014 **Engineers Without Borders, Clemson University Chapter**
Worked on creating a user's manual and repair guide for a simple water treatment system.

08/2014-05/2016 **Student Sustainability Initiative at Clemson University**
Evaluated which student projects aimed at increasing the sustainability of Clemson's campus would receive funds from the initiative.

08/2014-05/2016 **Environmental Engineering Club at Clemson University**
Co-founder and one term as president. During this time, the organization partnered with AWWA to form a joint career panel and other professional development activities.

01/2014-05/2016 **Member of Clemson College of Engineering and Science Student Advisory Board**
Representative in Sustainability Funds Committee and served one term as Secretary and Treasurer of the organization. Helped in leading initiatives to increase the influence of the organization within the engineering college and its involvement with the student body through professional development and social events.

09/2013-05/2016 **AWWA (American Water Works Association) Member**
Attended talks by professionals in the water and wastewater treatment industry and participated in the annual cleanup of Lake Hartwell Secret Beach.

04/2013-08/2014 **Phi Sigma Pi**
Served one term as inter-chapter liaison and member of regionals committee.

08/2012-05/2016 **Clemson Water Ski Team**
Served one term as public relation officer for Clemson's team. Created a new logo for branding and use by the team and updated various social media platform accounts on a regular basis. Also served a term as South Atlantic Conference secretary and led an initiative to better organize the members of board and information within the organization.

Work Experience

05/2014-07/2014

Environmental Health and Safety Intern at Moog Components Group, Murphy, NC

Built spreadsheets to help streamline the environmental reporting process, performed hazardous waste collection, audited the hazardous waste disposal program to identify areas where disposal costs could be reduced, and aided in the management of the on-site industrial water treatment facility.

05/2012-08/2012

05/2013-08/2013

Volunteer team leader at Hinton Rural Life Center, Hayesville, NC

Managed teams of volunteers on projects repairing homes and constructing handicap ramps for disadvantaged families, as well as led programming for volunteers in the evening.