

NICOLE KRISTINE WARD

Department of Biological Sciences, Virginia Tech, Blacksburg, Virginia, USA

Email: nkward@vt.edu; Phone: (540) 231-0788**EDUCATION**

- 2016-present **Virginia Tech** *Blacksburg, Virginia*
Ph.D. in Biological Sciences, Major Advisor: Dr. Cayelan Carey
- 2013-2015 **University of Idaho** *Moscow, Idaho*
M.S. in Water Resources Science and Management, Major Advisor: Dr. Erin Brooks
- 2006-2010 **University of Wisconsin** *Madison, Wisconsin*
B.S. in Biology, Certificate in Environmental Studies

COLLABORATIVE RESEARCH EXPERIENCE

- 6/2016 – Present **Ph.D. Research** *Blacksburg, Virginia*
Virginia Polytechnic Institute and State University
 Examining interactions between water quality and human decision making in lake watersheds. Collaborating with 20 researchers in 6 disciplines. Simulating lake water quality with a 1-D lake ecosystem model. Actively engaging with stakeholders to ensure robust actionable science. National Science Foundation (NSF) Dynamics of Coupled Natural-Human Systems award number 1517823.
- 7/2015 – 6/2016 **Associate in Research** *Pullman, Washington*
Washington State University
 Assessed farm management using a fully-distributed hydrologic cropping systems model (CropSyst-MB). Worked with soil scientists, hydrologists, microbiologists, agronomists, remote sensing scientists, and economists to synthesize results. United States Department of Agriculture-National Institute of Food and Agriculture (USDA-NIFA) award number 2011-67003-30341.
- 9/2013 – 8/2015 **M.S. Research** *Moscow, Idaho*
University of Idaho
 Examined practical fertilizer management and policy in the Palouse region. Demonstrated the potential for lateral redistribution of nitrogen to contribute to downslope yields. Applied economic metrics to biophysical outcomes. USDA-NIFA award number 2011-67003-30341.
- 5/2010 – 5/2013 **Aquatic Ecologist** *Saint Paul, Minnesota*
Minnesota Department of Natural Resources
 Developed and implemented field and laboratory research, supervised nine student interns. Worked with hydrologists, geomorphologists, fisheries scientists, outreach specialists, and agency decision makers to improve the management of freshwaters and native mussels in Minnesota.

PUBLICATIONS

- 2018 **Ward, N.K.**, Fitchett, L., Hart, J.A., Shu L., Stachelek, J., Weng, W., Zhang, Y., Dugan, H., Hetherington, A., Boyle, K., Carey, C.C., Cobourn, K., Hanson, P.C., Kemanian, A.R., Sorice, M., and K.C. Weathers. Integrating fast and slow processes is essential for simulating human—freshwater interactions. *Ambio*. <https://doi.org/10.1007/s13280-018-1136-6>.

Cobourn, K.M., Carey, C.C., Boyle, K.J., Duffy, C., Dugan, H.A., Farrell, K.J., Fitchett, L., Hanson, P.C., Hart, J.A., Henson, V.R., Hetherington, A.L., Kemanian, A.R., Rudstam, L.G., Shu, L. Soranno, P.A., Sorice, M.G., Stachelek, J., **Ward, N.K.**, Weathers, K.C., Weng, W.,

Zhang, Y. From concept to practice to policy: modeling coupled natural and human systems in lake catchments. *Ecosphere* 9(5): 1-15.

Carey, C.C., McClure, R.P., Doubek, J.P., Lofton, M.E., **Ward, N.K.**, and D. Scott. *Chaoborus* spp. transport CH₄ from the sediments to the surface waters of a eutrophic reservoir, but their contribution to water column CH₄ concentrations and diffusive efflux is minor. *Environmental Science and Technology* 52(3): 1165-1173.

Doubek, J.P., Campbell, K.L., Doubek, K.M., Hamre, K.D., Harrell, C.W., Lofton, M.E., McClure, R.P., **Ward, N.K.**, Carey, C.C. The effects of hypolimnetic anoxia on the diel vertical migration of freshwater crustacean zooplankton. *Ecosphere*. *Ecosphere* 9(7):e02332. 10.1002/ecs2.2332.

2017 **Ward, N.K.**, Maureira, F., Stöckle, C.O., Brooks, E.S., Painter, K.M., Yourek, M.A., and C.K. Gasch. Simulating field-scale variability and precision management with a 3D hydrologic cropping systems model. *Precision Agriculture* 19(2): 293-313.

MANUSCRIPTS IN REVIEW

Carey, C.C., **Ward, N.K.**, Farrell, K., Lofton, M., Krinos, A., McClure, R., Subratie, K., Figueiredo, R., Doubek, J., Hanson, P., Papadopoulos, P., Arzberger, P. Enhancing collaboration between ecologists and computer scientists: lessons learned and paths forward. In Revision. *Ecosphere*.

Hanson, P.C., Stillman, A.B., Jia, X., Karpatne, A., Dugan, H.A., Carey, C.C., Stachelek, J., **Ward, N.K.**, Zhang, Y., Read, J.S., and Kumar, V. Predicting lake surface water phosphorus dynamics using theory-guided data science. Submitted. *Limnology and Oceanography Letters*, Manuscript ID LOL2-19-0018.

TEACHING EXPERIENCE

2016 - present **Graduate Teaching Assistant**, Freshwater Ecology *Blacksburg, Virginia*
Virginia Polytechnic Institute and State University

Led field and laboratory based scientific investigations for 13-18 students each week during fall semester. Mentored students in semester long research project development and analysis.

11/2018 **Guest Lecturer**, Population & Community Ecology *Blacksburg, Virginia*
Virginia Polytechnic Institute and State University

Invited to give a guest lecture on scientific presentation tips. The lecture covered presentation style and how to create visually appealing power point slides. The lecture focused on how to create bullet-free slides, eliciting emotion to effectively communicate, and using visuals that enhance your message.

6/2013 – 5/2014 **NSF Gk-12 Teaching Fellow** *Palouse, Washington*
University of Idaho and Garfield-Palouse High School

Developed and delivered inquiry-based lessons in high school Physical Science, Biology, and Environmental Science classes (roughly 10 hours of classroom instruction per week).

Selected AWARDS, SCHOLARSHIPS, and FELLOWSHIPS

2019 – present **Associate Fellow**, Virginia Tech Graduate Academy of Teaching Excellence

2018 **Roundtable “Make-A-Difference” Scholarship**, Virginia Tech College of Science (\$10,000)

- 2018 **Travel Award**, Global Lakes Ecological Observatory Network Student Association (\$3,000)
- 2018 **1st Place Breakout Talk**, Virginia Tech Biological Sciences Research Day (\$200)
- 2018 **2nd Place Student Oral Presentation**, Universities Council on Water Resources (UCOWR) Annual Water Resources Conference in Pittsburgh, PA (\$200)
- 2017 **Virginia Tech Graduate Student Assembly Travel Fund Award** (\$320)
- 2017 **Selected Participant – National Socio-Environmental Synthesis Center (SESYNC) Graduate Student Workshop**, Annapolis MD (Travel, Room & Board; ~\$1,500)
- 2016 – present **Interfaces of Global Change Student**, Virginia Tech Global Change Center
- 2015 **3rd Place Oral Presentation**, Oregon State University Hydrophiles Water Symposium
- 2013 – 2014 **National Science Foundation GK-12 Fellowship** (\$30,000/yr living stipend + tuition)
- 2005 **2nd Place, Intel International Science & Engineering Fair**, Benthological Studies Category (\$300)
- 2002 **Environmental Achievement Award**, for outstanding contributions to environmental quality in Olmsted County, MN.

SPECIAL SESSIONS and WORKSHOPS ORGANIZED

- 2019 *Improving Environmental Decision-Making Through Integrated Governance, Public Engagement, and Translational Approaches*,
2019 Ecological Society of America Conference, Louisville, KY
(Symposium scheduled for August 14th)
- Learn to Integrate NEON and GLEON Data into your Classroom using Macrosystems EDDIE!*,
2019 Ecological Society of America Conference, Louisville, KY
(Workshop scheduled for August 13th)
- Introduction to Vector-based Graphic Design with Inkscape*,
Virginia Tech, Blacksburg, VA
(Workshop held on February 18th)

Selected PROFESSIONAL PRESENTATIONS (presenter is underlined)

- Ward, N.**, Steele, B., Weathers K.C., Cottingham K.L., Ewing, H.A., Hanson, P.C., Wood, R., Fichter, J., Carey, C.C. **2019**. Climate perspectives of phytoplankton futures. Oral presentation. CyanoSummit. Sunapee, New Hampshire. *Invited speaker*.
- Ward, N.**, Brentrup, J.A., Richardson, D.C., Weathers, K.C., Johnson, A., Carey, C.C. December **2018**. “Linking spatially explicit lake metabolism to spatially heterogeneous external nutrient loading.” Poster presentation at the Global Lakes Ecological Observatory Network Meeting. Perth, Australia.
- Ward, N.**, Steele, B., Weathers K.C., Cottingham K.L., Ewing, H.A., Hanson, P.C., Wood, R., Fichter, J., Carey, C.C. **2018**. Land use versus climate drivers of phytoplankton biomass in an oligotrophic lake. Oral presentation. Ecological Society of America Annual Conference. New Orleans, LA.

- Ward, N.,** Steele, B., Weathers K.C., Cottingham K.L., Ewing, H.A., Hanson, P.C., Wood, R., Fichter, J., Carey, C.C. **2018.** Connecting water and people. Oral presentation. Lake Sunapee Protective Association 2018 Annual Meeting, Sunapee, NH.
- Ward, N.,** Steele, B., Weathers K.C., Cottingham K.L., Ewing, H.A., Hanson, P.C., Wood, R., Fichter, J., Carey, C.C. **2018.** Land use versus climate drivers of phytoplankton biomass in an oligotrophic lake. Oral presentation. Universities Council on Water Resources (UCOWR) Annual Water Resources Conference, Pittsburgh, PA.
- Ward, N.,** Steele, B., Weathers K.C., Cottingham K.L., Ewing, H.A., Hanson, P.C., Wood, R., Fichter, J., Carey, C.C. **2018.** Land use versus climate drivers of algal production in an oligotrophic lake: it depends on season. Oral presentation. Virginia Tech Biological Sciences Research Day, Blacksburg, VA.
- Ward, N.,** Steele, B., Weathers K.C., Cottingham K.L., Ewing, H.A., Hanson, P.C., Wood, R., Fichter, J., Carey, C.C. **2017.** Improving lake water quality with citizen scientists, high frequency sensors, and ecosystem modeling. Poster presentation. Global Lakes Ecological Observatory Network Conference, New Paltz, NY.
- Ward, N.,** Steele, B., Weathers K.C., Cottingham K.L., Ewing, H.A., Hanson, P.C., Wood, R., Fichter, J., Carey, C.C. **2017.** Avoiding a poor water quality future in the face of global change. Oral presentation. Ecological Society of America Annual Conference, Portland, OR.
- Ward, N.,** C.C. Carey. **2017.** Lake Sunapee GLM Research Update. Oral presentation, Lake Sunapee Protective Association in Sunapee, NH.
- Ward, N.,** Steele, B., Weathers K.C., Cottingham K.L., Ewing, H.A., Hanson, P.C., Wood, R., Fichter, J., Carey, C.C. **2017.** Identifying early warning indicators of eutrophication to inform real-world management: engaging long-term datasets, ecosystem modeling, committed citizen scientists, and remote sensing. Poster presentation. Interfaces of Global Change Research Symposium, Blackburg, VA.
- Ward, N.,** Steele, B., Weathers K.C., Cottingham K.L., Ewing, H.A., Hanson, P.C., Wood, R., Fichter, J., Carey, C.C. **2017.** Identifying early warning indicators of eutrophication to inform real-world management: engaging long-term datasets, ecosystem modeling, committed citizen scientists, and remote sensing. Poster presentation. Pacific Rim and Grid Middleware Assembly (PRAGMA) 32 conference, Gainesville, FL.
- Lofton, M.E.,** McClure, R.P., Chen, S., Harrell, C.W., Doubek, J.P., **Ward, N.,** Schreiber, M.E., Little, J.C., Carey, C.C. **2017.** Storms can both stimulate and inhibit phytoplankton communities: lessons from a whole-ecosystem lake mixing experiment. Poster presentation. Pacific Rim Applications and Grid Middleware Assembly (PRAGMA) 32 conference, Gainesville, FL.
- Ward, N.,** Steele, B., Carey, C.C. **2017.** Lake Sunapee GLM Research Trajectory. Oral presentation to Lake Sunapee Protective Association in Sunapee, NH via Skype.
- Ward, N.** **2017.** Water and People. Oral presentation. Nutshell Games, Virginia Tech Center for Communicating Science, Blacksburg, VA.
- Ward, N.** **2016.** Lake Sunapee as a Coupled Human-Natural System. Oral presentation, Cross-boundary biogeosciences at Virginia Tech. Blacksburg, VA.
- Ward, N.,** C.C. Carey. **2016.** Lake Sunapee GLM Research Trajectory. Oral presentation, Lake Sunapee Protective Association in Sunapee, NH.
- Ward, N.,** Maureira, F., Brooks, E., Yourek, M., Stockle, C. **2015.** Cropsyst-Microbasin model as a tool to inform variable-rate nitrogen management and dryland farm profitability. Oral presentation, American Society of Agronomy 2015 Annual Meeting, Minneapolis, MN.
- Brooks, E., **Ward, N.,** Painter, K., Davis, H. **2015.** Use of the Nutrient Management Plan Policy Tool to Overcome Barriers to Adoption of Precision Agriculture in the Palouse Region of the Inland Pacific Northwest. Poster presentation, American Society of Agronomy 2015 Annual Meeting,

Minneapolis, MN.

Stockle, C., Maureira, F., **Ward, N.**, Yourek, M., Poggio, M., and Brooks, E. **2015**. Importance of Characterization of Soil Properties and Spatial Distribution in Watershed Modeling. Poster presentation, Soil Science Society of America 2015 Annual Meeting, Minneapolis, MN.

Ward, N., Brooks, E., Painter, K. **2015**. Improving agricultural nitrogen use through policy incentivized management strategies. Oral presentation, Oregon State University Hydrophiles Symposium, Corvallis, OR.

Ward, N., Maureira, F., Boylan, R., Brooks, E., Yourek, M., Wardall, A., Stockle, C. **2014**. Impacts of increased precipitation on Dryland Cereal Production Systems in the Pacific Northwest. Poster Presentation, Pacific Northwest Climate Conference, Seattle, WA.

Ward, N., Maureira, F., Yourek, M., Brooks, E., Stockle, C. **2014**. Assessing variable rate nitrogen fertilizer strategies within an extensively instrumented field site using the MicroBasin model. Poster Presentation, American Geophysical Union (AGU) Meeting, San Francisco, CA.

Brooks, E., Poggio, M., Anderson, T., Gasch, C., Yourek, M., **Ward, N.**, Magney, T., Brown, D., Huggins, D. **2014**. Capturing field-scale variability in crop performance across a regional-scale climosequence. Poster Presentation, American Geophysical Union (AGU) Meeting, San Francisco, CA.

Ward N., and Sietman, B. **2013**. Nocturnal mantle display behavior in three lamproline mussels. Poster presentation, Freshwater Mollusk Conservation Society Meeting, Guntersville, AL.

Sietman, B., Davis, M., **Ward, N.** **2013**. 14 Years Underwater – Documenting the Diversity and Status of Freshwater Mussels in Minnesota. Poster presentation, Freshwater Mollusk Conservation Society Meeting, Guntersville, AL.

Ward, N. **2012**. Native Mussels and the Zumbro Watershed. Oral Presentation, Lake Zumbro Improvement Association Meeting, Mazeppa, MN.

Ward, N., Sietman, B., Davis, M., Pletta, M. **2011**. Extirpation and Re-colonization of Freshwater Mussels in the Minnesota and Mississippi Rivers. Oral presentation, Freshwater Mollusk Conservation Society Meeting, Louisville, KY.

JOURNAL REVIEWS

2017-18 Ad-hoc referee for Limnology and Oceanography Letters, Geoscientific Model Development

PROFESSIONAL SOCIETIES

2016 – Present	Global Lakes Ecological Observatory Network (GLEON), Ecological Society of America (ESA)
2013 – 2016	International Association for Hydro-Environment Engineering and Research, American Society of Agronomy, Crop Science Society of America, Soil Science Society of America
2011 – 2013	Freshwater Mollusk Conservation Society

CONTRIBUTIONS TO COMMUNITY

2018 - present	Vice President – <i>IGC Graduate Student Organization</i>	Blacksburg, Virginia
2017 - present	Treasurer – <i>Biological Graduate Student Association (BGSA)</i>	Blacksburg, Virginia
2017 - 2018	Social Chair – <i>IGC Graduate Student Organization</i>	Blacksburg, Virginia
2016 - 2018	Merchandise Committee – <i>BGSA</i>	Blacksburg, Virginia
2017	Volunteer – <i>Gilbert Linkous Elementary Science Fair</i>	Blacksburg, Virginia
2017	Volunteer – <i>ReNEW the New, River Clean-up</i>	Montgomery Co., Virginia
2015	Judge - <i>The Confluence Project: Youth Water Summit</i>	Moscow, Idaho
2013 - 2015	Volunteer – <i>Annual Palouse River Clean-up</i>	Pullman, Washington

2010 – 2013	Reading Tutor - <i>Everybody Wins! Minnesota</i>	Saint Paul, Minnesota
2002 – 2013	Lake Monitoring Citizen , <i>MN Pollution Control Agency</i>	Oronoco, Minnesota
2012	Volunteer – <i>Friends of the Boundary Waters Wilderness</i>	Minneapolis, Minnesota

SKILLS

Process-based simulation modeling (CropSyst-MB, General Lake Model, Aquatic EcoDynamics), R, GIS, PADI Divemaster, science communication