

Danyka K. Byrnes

Engineering 2 3314
200 University Ave W.
Waterloo, ON N2L 3G1

dkbyrnes@uwaterloo.ca



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@DanykaKByrnes

Hydrology ▪ Water Quality ▪ Water Security ▪ Sociohydrology ▪ Anthropogenic Impacts
Food-Water Nexus ▪ Agroecosystems ▪ Ecohydrology ▪ Biogeochemistry

EDUCATION

- 2020 – present Department of Civil and Environmental Engineering
University of Waterloo, Waterloo, Ontario
Doctor of Philosophy
Advisor: Dr. Nandita Basu
Thesis: The Nitrogen Memoryscape: N Legacies at Time Lags at Continental and Global Scales
- 2017 – 2019 Department of Civil and Environmental Engineering
University of Waterloo, Waterloo, Ontario
Master of Applied Science (Water)
Advisor: Dr. Nandita Basu
Thesis: Typologies of Nitrogen Surplus Across Continental U.S.: Shifting Hotspots and Dominant Controls (GPA 4.0)
- 2012 – 2017 Department of Civil and Environmental Engineering
University of Waterloo, Waterloo, Ontario
Bachelor of Applied Science
Graduated with Distinctions and on Deans Honor List (GPA 3.86)

PEER-REVIEWED ARTICLES

- 2021 **D.K. Byrnes**, K.J. Van Meter, N.B. Basu. Nitrate Memoryscape: Point and Non-Point Source Controls on Stream Nitrogen. *In prep.*
- 2021 N.B. Basu, K.J. Van Meter, **D.K. Byrnes**, R. Bhattacharya, R. Brouwer, M.C. Cunha, G. Destouni, B. H. Jacobsen, J. Jarsjö, N. Nelson, S. Bøye Olsen, D.L. Rudolph, P. Van Cappellen. Managing Nitrogen Legacies to Accelerate Water Quality Improvement. *In Review at Nature Geoscience (in review March 19th 2021).*
- 2021 S.Y. Chang, Q. Zhang, **D.K. Byrnes**, N.B. Basu, K.J. Van Meter. Chesapeake legacies: The importance of legacy nitrogen to improving Chesapeake Bay water quality. *Environmental Research Letters* (IF: 6.19), doi.org/10.1088/1748-9326/ac0d7b

- 2020 F.Y. Cheng, K.J. Van Meter, **D.K. Byrnes**, N.B. Basu, (2020). Maximizing Nitrate Removal Through Wetland Protection and Restoration. *Nature* 588, 625–630 (IF: 43.07), doi.org/10.1038/s41586-020-03042-5
- 2020 **D.K. Byrnes**, K.J. Van Meter, N.B. Basu, (2020). Long-term shifts in US nitrogen sources and sinks revealed by the new TREND-nitrogen dataset (1930-2017). *Global Biogeochemical Cycles* 34-9 (IF: 5.73), doi.org/10.1029/2020GB006626
- 2019 K.J. Van Meter, S. Chowdhury, **D.K. Byrnes**, N.B. Basu, (2019). Biogeochemical Asynchrony: Ecosystem Drivers of Concentration-Discharge Dynamics Across Temporal Scales. *Limnology & Oceanography* 64, 4 (848-862) (IF: 4.325). doi.org/10.1002/lno.11353

PUBLISHED DATASETS

- 2020 **D.K. Byrnes**, K.J. Van Meter, N.B. Basu, (2020). Trajectories Nutrient Dataset for Nitrogen (TREND-nitrogen). PANGAEA, doi.org/10.1594/PANGAEA.917583.

HONORS & AWARDS

*All monetary awards are in CAD

- 2021 Horton Research Grant, American Geophysical Union, July 2021 (10,000\$)
- 2021 Outstanding Student Presentation Award (OSPA) Winner, American Geophysical Union Fall Meeting, December 2020 (250\$)
- 2020 Term Activity Report Faculty of Engineering Awards for Academic Excellence and Scholarly Contributions, Civil and Environmental Engineering Department, University of Waterloo (\$500)
- 2020 First Place Graduate Students Poster (*Basic Science Category*). Society of Freshwater Science (SFS) Summer of Science Conference (\$550)
- 2020 Engineering Excellence PhD Fellowship, University of Waterloo, Waterloo, Ontario (\$120,000) (*deferred*)
- 2020 President's Graduate Scholarship, University of Waterloo, Waterloo, Ontario (\$55,000)
- 2020 Natural Sciences and Engineering Research Council of Canada (NSERC) CGS D Scholarship, University of Waterloo, Waterloo, Ontario (\$105,000)
- 2020 Provost's Doctoral Entrance Award for Women, University of Waterloo, Waterloo, Ontario (\$5,000)

- 2019 Globalink Research Award, MITACS, Exchange Program to the University of Illinois at Chicago, Chicago, IL (\$6,000)
- 2018 Queen Elizabeth II Graduate Scholarship in Science & Technology (QEII-GSST), University of Waterloo, Waterloo, Ontario (\$15,000)
- 2018 President's Graduate Scholarship (PGS), University of Waterloo, (\$5,000)
- 2018 RBC Water Scholarship for Academic Excellence and Commitment to Interdisciplinary Research, University of Waterloo (\$5,000)
- 2018 HeForShe Engineering Travel Grant, University of Waterloo (\$500)
- 2018 Best Graduate Student Poster Award, World Water Day 2018, University of Waterloo (\$500)
- 2017 Graduated Bachelors of Applied Science with Deans Honor and Distinction
- 2015 Teaching Assistant Excellence Award, CIVE/ENVE 100, Sr. Sandford Fleming Foundation, University of Waterloo (\$300)

PRESENTATIONS

*first author is presenting author

- 2021 **D.K. Byrnes**, K.J. Van Meter, N.B. Basu, "Nitrate Memoryscape: Point and Non-Point Source Controls on Stream Nitrogen Export", American Geophysical Union Fall Meeting, December 2021. (*Invited*)
- 2021 K.J. Van Meter, F. Y. Cheng (presenting authors), **D.K. Byrnes**, N.B. Basu, "Wetlandscapes: Land-Use Legacies and Water Quality Futures," Howard T. Odum Center for Wetlands, University of Florida, January 2021. (oral presentation, *Invited*)
- 2021 D.K. Byrnes, K.J. Van Meter, N.B. Basu, "Typologies of Nitrogen Surplus Trajectories using the new TREND-nitrogen dataset: Shifting Hotspots and Dominant Controls", Canadian Geophysical Union Student Meeting, Virtual Conference, January 2021. (poster)
- 2020 K.J. Van Meter, S. Chowdhury, **D.K. Byrnes**, N.B. Basu "Biogeochemical Asynchrony: Land-Use Drivers of Seasonal Nutrient Concentration Regimes across the Great Lakes Basin", American Geophysical Union Fall Meeting, December 2020, Virtual Conference. (oral presentation, *Invited*)
- 2020 K.J. Van Meter, S. Chang, N.B. Basu, Q. Zhang, **D.K. Byrnes**, " Chesapeake Legacies: Implications of Legacy N Accumulation for Water Quality Improvements in the Chesapeake Bay", American Geophysical Union Fall Meeting, December 2020, Virtual Conference. (oral presentation, *Invited*)

- 2020 **D.K. Byrnes**, K.J. Van Meter, N.B. Basu, "Typologies of Nitrogen Surplus Trajectories using the new TREND-nitrogen dataset: Shifting Hotspots and Dominant Controls", American Geophysical Union Fall Meeting, December 2020, Virtual Conference (*poster, OSPA Winner*)
- 2020 **D.K. Byrnes**, K.J. Van Meter, N.B. Basu, " Long-term shifts in US nitrogen sources and sinks revealed by the new TREND-nitrogen dataset (1930-2017)", Department of Biological and Agricultural Engineering, North Carolina State University, October 2020, Department Seminar (oral presentation, *Invited*)
- 2020 **D.K. Byrnes**, K.J. Van Meter, N.B. Basu, "Trajectories Nutrient Dataset for Nitrogen (TREND-Nitrogen): Shifting Hotspots and Dominant Controls", Society of Freshwater Sciences Summer of Science Conference, June 2020 (*poster, Winner of Best Graduate Student Poster Award*)
- 2019 **D.K. Byrnes**, K.J. Van Meter, N.B. Basu, "Typologies of Nitrogen Surplus Across Continental U.S.: Shifting Hotspots and Dominant Controls", American Geophysical Union Fall Meeting, December 2019, San Francisco, CA (poster)
- 2019 F.Y. Cheng, **D.K. Byrnes**, K.J. Van Meter, N.B. Basu, "Missed Opportunities: Decoupling of wetlands from nutrient source areas limits denitrification potential across the United States", American Geophysical Union Fall Meeting, December 2019, San Francisco, CA (oral presentation)
- 2019 R. Bhattacharya, **D.K. Byrnes**, K.J. Van Meter, N.B. Basu, "Watershed nutrient legacy and hydrological extremes as drivers of lake water quality trends and synchrony", American Geophysical Union Fall Meeting, December 2019, San Francisco, CA (poster)
- 2019 **D.K. Byrnes**, K.J. Van Meter, N.B. Basu, "Typologies of Nitrogen Surplus Across Continental U.S.: Shifting Hotspots and Dominant Controls", World Water Day, March 2019, Waterloo, ON (poster)
- 2018 **D.K. Byrnes**, K.J. Van Meter, N.B. Basu, "Back to the Future: Impact of Current Versus Historical Land Use on Water Quality Trends Across the Contiguous U.S.", 2018 American Geophysical Union, Fall Meeting, Washington DC, USA. (oral presentation)
- 2018 K.J. Van Meter, S. Chowdhury, **D.K. Byrnes**, N.B. Basu, "Biogeochemical Asynchrony: Ecosystem Drivers of Seasonal Concentration Regimes Across the Great Lake Basin", 2018 American Geophysical Union, Fall Meeting, Washington, DC, USA. (oral presentation, *Invited*)

- 2018 **D.K. Byrnes**, K.J. Van Meter, S. Chowdhury, N.B. Basu, "Biogeochemical Asynchrony: Anthropogenic and Landscape Controls on Nutrient Seasonality in the Great Lakes and Beyond", 2018 Joint Meeting of the Canadian Geophysical Union and Canadian Soil Science Society, Niagara Falls, ON (oral presentation)
- 2018 K.J. Van Meter, S. Chowdhury, **D.K. Byrnes**, N.B. Basu, "Biogeochemical Asynchrony: Ecosystem Drivers of Seasonal Concentration Dynamics", Global Water Futures 2018 Annual Science Meeting, Hamilton, ON (oral presentation, *Winner of Best Postdoctoral Presentation Award*)
- 2018 K.J. Van Meter, S. Chowdhury, **D.K. Byrnes**, N.B. Basu, "Biogeochemical Asynchrony: Ecosystem Drivers of Concentration Discharge Dynamics Across Temporal Scales", Society for Freshwater Science 2018 Annual Meeting, Detroit, MI (oral presentation)
- 2018 **D.K. Byrnes**, K.J. Van Meter, N.B. Basu, "Time's up! The Tale of Nitrogen Time Lags in Canada and U.S.", World Wetlands Day, February 2018, Waterloo, ON (poster, *Winner of Best Student Poster*)
- 2017 N.B. Basu, K.J. Van Meter, **D.K. Byrnes** "A Race Against Time: Time Lags in Terrestrial-Aquatic Linkages", 2017 American Geophysical Union, Fall Meeting, New Orleans, USA. (oral presentation, *Invited*)
- 2017 **D.K. Byrnes**, K.J. Van Meter, N.B. Basu, "Nutrient Legacies and Time Lags in Eastern U.S. and Southern Ontario", American Geophysical Union 2017 Virtual Poster Showcase (poster)

SYNERGISTIC ACTIVITIES

- 2021 AGU Fall Meeting Town Hall Convener, Finding You Place for Change: How and Where to Take an Active Role in DEI Initiatives as Early Career Researchers and Students
- Purpose: My team and I will be hosting a town hall to discuss the ways in which students and early career researchers can address inequity and the lack of diversity in geosciences within our field.
- 2021 AGU Hydrology Section Workshop Organizer and Marketing Team
- Purpose: My team and I helped organize and host a AGU Hydrology Section wide workshop delivered by NSF Funded ADVANCEGeo. *Improving Our Work Climate: Bystander Intervention Training and Responding to Hostile Behaviors* teach participants about exclusionary behaviors and how to intervene when someone is being harassed.

- 2021 AGU Early Career Improving Field Work Culture Coffee Hour, AGU Atmospheric Science Early Career Committee and Hydrology Section Student Subcommittee (H3S)
- Purpose: Organized a coffee hour to introduce tools and approaches individuals can take to be active allies during field campaigns, and practice applying those tools to real-life scenarios that have occurred in the field. I helped facilitate discussing in a breakout room with scientists from all career-stages.
- 2021 Justice, Equity, Diversity and Inclusion Committee Co-Chair, AGU Hydrology Section Student Subcommittee (H3S)
- Purpose: Facilitate efforts of H3S committee is delivering Justice, Equity, Diversity and Inclusion resources and services. We are working on compiling existing resources for students and early career researchers to help remove barrier to success.
- 2021 Canadian Geophysical Union 2020 Student Conference Organizer, University of Waterloo (*delayed due to COVID-19*)
- Purpose: Organize the annual student meeting for the CGU hydrology and biogeochemistry chapters. Organized and executed a 2-day [virtual conference](#) involving virtual poster session and oral presentation. Attendees exceeded 100 students and early career researchers.
- 2020 AGU Fall Meeting JEDI Town Hall Convener, Justice, Equity, Diversity, and Inclusion (JEDI) in the AGU Hydrology Community and Beyond
- Purpose: Present JEDI initiatives published in [White Paper](#) propose by H3S JEDI committee and moderate discussion about plans to improve diversity, inclusion, and equity efforts in the hydrology section leadership.
- 2020 *WaterPOC* Database Co-Creator
- Purpose: Curate and maintain a [database of BIPOC scientists](#) within the water resource research community inspired by the database from Dr. Jennifer Glass (Geoscientists of Color). Recently hosted by AGU Hydrology Section Student Subcommittee.
- 2020 Justice, Equity, Diversity, and Inclusion Committee Member, AGU Hydrology Section Student Subcommittee (H3S)
- Purpose: Work with AGU Hydrology Section leadership and AGU Diversity and Inclusion Advisory Committee to address inequity of marginalized scientists within the hydrology community. See this blog post outlining our groups efforts: <https://agu-h3s.org/2020/10/14/agu->

[hydrology-section-call-to-action-for-a-just-equitable-diverse-and-inclusive-scientific-society/](#)

- 2020 Development Team Co-lead, AGU Hydrology Section Student Subcommittee (H3S)
- Purpose: Develop "Navigating Academic Waters: Essential Skills to Thrive as a Student and Early Career Scientist" cyberseminar series to provide the broad AGU geoscience community with professional and academic skill development. Average attendance of 170 people.
- 2020/2021 AGU Hydrology Section Student Subcommittee (H3S) committee member
- Purpose: Work with a 12-person team to deliver services to student and early career academics, tasks include brainstorming new activities or services for the community, problem solving in a group setting, and writing research highlight articles. See my recent piece here: <https://agu-h3s.org/2020/07/29/secret-life-of-water-after-a-wildfire/>.
- 2020-2021 Peer Reviewer for *Journal of Environmental Quality* (IF: 2.405) and *Earth's Future* (IF: 6.14)
- 2017 Let's Talk Science, Science Outreach Volunteer, University of Waterloo
- Purpose: Teaching elementary students about hydrology and water quality issues faced in the Grand River Watershed and beyond.
- 2017 Students of the Water Institute Graduate Section (SWIGS), World Water Day 2017 Academia and Industry Outreach, University of Waterloo

TEACHING ASSISTANTSHIPS AND STUDENT SUPERVISION

- Anisha Karkera, Undergraduate Research Assistant, Continental Phosphorus Surplus Budget, Fall 2021
- Celina Mohni, Undergraduate Research Assistant, Global Groundwater Nitrate, Spring 2020
- CIVE 382 Teaching Assistant, Hydrology and Open Channel Flow, Winter 2019
- Nicole Khun, Undergraduate Thesis, Seasonal Biogeochemical Regimes of Nutrients Across the Contiguous U.S, Fall 2018
- Kathryn Starratt, Undergraduate Research Assistant, Quantifying Nitrate Time Lags Under Changing Management Regimes across the Contiguous U.S, Spring 2018
- Nicole Khun, Undergraduate Research Assistant, Quantifying Nitrate Time Lags Under Changing Management Regimes across the Contiguous U.S, Spring 2018
- Linea Miller, Undergraduate Research Assistant, Quantifying Nitrate Time Lags Under Changing Management Regimes across the Contiguous U.S, Winter 2018

Megan Jordan, Undergraduate Research Assistant, Quantifying Nitrate Time Lags Under Changing Management Regimes across the Contiguous U.S, Winter 2018

Sara Deschant, Undergraduate Research Assistant, Quantifying Nitrate Time Lags Under Changing Management Regimes across the U.S Eastern Seaboard, Fall 2017

PRESS AND MEDIA

2020 K. Wheeling (2020), The legacy of nitrogen pollution, Eos, 101,
<https://doi.org/10.1029/2020EO150644>. Published on 21 October 2020.

PROFESSIONAL MEMBERSHIPS

American Geophysical Union (AGU)

Canadian Geophysical Union (CGU)

Society of Freshwater Sciences (SFS)