

## Dexter W. Howard

Virginia Tech Department of Biological Sciences

### EDUCATION

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| 2021 – Present | <b>Doctor of Philosophy</b> in Biological Sciences (expected 2026)<br><b>Virginia Polytechnic Institute and State University (Virginia Tech)</b><br>Advisor: Dr. Cayelan Carey       |
| 2016 – 2020    | <b>Bachelor of Science</b> in Water: Resources, Policy, and Management<br><b>Virginia Tech</b><br><i>Magna Cum Laude</i> , Minors in Biological Sciences and Environmental Economics |

### RESEARCH EXPERIENCE

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|-------------------------|---|
| January 2021 – Present  | <b>Ph.D. Candidate at Virginia Tech</b> <ul style="list-style-type: none"> <li>Dissertation title: Quantifying and predicting the effects of global change on organic carbon in freshwater reservoirs</li> </ul>  |
| May 2020 – August 2020  | <b>Water Quality Technician with Carey Lab at Virginia Tech</b> <ul style="list-style-type: none"> <li>Implemented and led new sampling and monitoring routine at a drinking water reservoir in Roanoke, VA</li> </ul>  |
| July 2019 – May 2020    | <b>Senior Thesis Project at Virginia Tech</b> <ul style="list-style-type: none"> <li>Conducted independent senior thesis project looking at dominant time scales of variability and drivers of dissolved organic matter DOM</li> </ul>  |
| October 2016 – May 2020 | <b>Undergraduate Research Assistant in Carey Lab at Virginia Tech</b>   |
| 2018                    | <ul style="list-style-type: none"> <li>Conducted independent project in 2018 looking at organic carbon quality and drivers in local drinking water reservoirs</li> </ul>  |
| 2016 – 2020             | <ul style="list-style-type: none"> <li>Helped with the preparation and running of chemical analysis for nitrogen and phosphorus in water samples</li> <li>Performed data compilation and management for various projects and data sets using R software and Excel</li> <li>Helped and prepared for field sampling in local drinking water reservoirs including grab sampling and use of high frequency sensors</li> </ul> |

### TEACHING AND MENTORING EXPERIENCE

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| Fall 2023, 2022, 2021 | <b>Graduate Teaching Assistant (TA) for Freshwater Ecology (BIOL 4004)</b> <ul style="list-style-type: none"> <li>Led one lab session of ~16 students and assisted with another of ~16. Led students on field trips and lab activities teaching fundamentals of freshwater ecology sampling and monitoring.</li> <li>Was responsible for all grading related to my lab session and assisted with exam grading for the lecture component of class.</li> <li>2023 co-nominated for Virginia Tech Graduate TA Excellence award.</li> </ul> |
| Fall 2021 – Present   | <b>Mentor for Undergraduate students in Carey Lab</b> <ul style="list-style-type: none"> <li>Co-mentored Evelyn Tipper and Ryan Keverline since Spring 2023</li> <li>Mentored George Haynie since Summer 2022</li> <li>Mentored Connor Gnasso from Fall 2021 – Spring 2022</li> <li>Helped train students on lab tasks including field preparation, field sampling, data management, and acid washing.</li> </ul>   |

## PUBLICATIONS

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- In review     **Howard, D.W.**, J.A. Brentrup, D.C. Richardson, A.S.L. Lewis, F. Olsson, C.C. Carey. Variability in ice cover does not affect annual metabolism estimates in a small eutrophic reservoir. *JGR Biogeosciences*. In review
- Ming, C.L., A. Breef-Pilz, **D.W. Howard**, M.E. Schreiber. Geochemical drivers of manganese removal in drinking water reservoirs under hypolimnetic oxygenation. *Applied Geochemistry*. In review
- In revision     Wander, H.L., A.S.L. Lewis, **D.W. Howard**, W.M. Woelmer, B.L. Brown, M. Lofton, C.C. Carey. Zooplankton exhibit multiple diel migration strategies and substantial interannual changes in community structure in a eutrophic reservoir. *Journal of Plankton Research*. In revision
- 2024     Lewis, A.S.L., A. Breef-Pilz, **D.W. Howard**, M.E. Lofton, F. Olsson, H.L. Wander, C.E. Wood, M.E. Schreiber, C.C. Carey. Reservoir Drawdown Highlights the Emergent Effects of Water Level Change on Reservoir Physics, Chemistry, and Biology. *JGR Biogeosciences*. doi:10.1029/2023JG007780
- Lewis, A.S.L., **D.W. Howard**, G. Koren, C. Kowalski, J. McLachlan, J.A. Peters, O. Tabares, G. Smies. Ethics in forecasting: a case-based learning set. *Teaching Issues and Experiments in Ecology*. Vol. 19: Practice #13. [https://tiee.esa.org/vol/v19/issues/case\\_studies/lewis/abstract.html](https://tiee.esa.org/vol/v19/issues/case_studies/lewis/abstract.html), teaching resources additionally hosted at QUBES Educational Resources. doi:10.25334/5D99-Y019
- Lewis, A.S.L., M.P. Lau, S.F. Jane, K.C. Rose, Y. Be'eri-Shlevin, S.H. Burnet, F. Clayer, O. Erina, H. Feuchtmayr, H.P. Grossart, **D.W. Howard**, H. Mariash, J. D. Martin, R.L. North, I. Oleksy, R.M. Pilla, A.P. Smagula, R. Sommaruga, S.E. Steiner, P. Verburg, D. Wain, G.A. Weyhenmeyer, C.C. Carey. Anoxia Begets Anoxia: a positive feedback to the deoxygenation of temperate lakes. *Global Change Biology*. doi:10.1111/gcb.17046
- 2023     Lofton, M.E., **D.W. Howard**, R.Q. Thomas, C.C. Carey. Progress and opportunities in advancing near-term forecasting of freshwater quality. *Global Change Biology*. doi: 10.1111/gcb.16590
- 2022     Lofton, M.E., **D.W. Howard**, R.P. McClure, H.L. Wander, W.M. Woelmer, A.G. Hounshell, A.S.L. Lewis, C.C. Carey. Experimental thermocline deepening alters vertical distribution and community structure of phytoplankton in a four-year whole-reservoir manipulation. *Freshwater Biology*. doi: 10.1111/fwb.13983
- Lewis, A. S. L., W.M. Woelmer, H.L. Wander, **D.W. Howard**, J.W. Smith, R.P. McClure, M.E. Lofton, N.W. Hammond, R.S. Corrigan, R.Q. Thomas, C.C. Carey. Increased adoption of best practices in ecological forecasting enables comparisons of forecastability. *Ecological Applications*. doi: 10.1002/eap.2500
- Carey, C.C., W.M. Woelmer, M.E. Lofton, R.J. Figueiredo, B.J. Bookout, R.S. Corrigan, V. Daneshmand, A.G. Hounshell, **D.W. Howard**, A.S.L. Lewis, R.P. McClure, H.L. Wander, N.K. Ward, R.Q. Thomas. Advancing lake and reservoir water quality management with near-term, iterative ecological forecasting. *Inland Waters* doi: 10.1080/20442041.2020.1816421

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- 2021 **Howard, D.W.**, A.G. Hounshell, M.E. Lofton, W.M. Woelmer, P.C. Hanson, C.C. Carey. Variability in fluorescent dissolved organic matter concentrations across diel to seasonal time scales is driven by water temperature and meteorology in a eutrophic reservoir. *Aquatic Sciences* 83, 30. doi: 10.1007/s00027-021-00784-w

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#### GRANTS, SCHOLARSHIPS, and HONORS (\$24,150 total raised)

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- 2022 GLEON Student Travel Award (\$900)
- 2022 Leo Bourassa Virginia Lakes and Watershed Association Scholarship (\$1500)
- 2022 NSF Graduate Research Fellowship Program (GRFP) Honorable Mention
- 2021 Virginia Water Resources Research Center Student Competitive Grant (\$5,000)
- 2021 Leo Bourassa Virginia Lakes and Watershed Association Scholarship (\$1,000)
- 2019 Stephen H. Schoenholtz Water Undergraduate Research Fund (\$3,000)
- 2019 Virginia Tech Global Change Center Undergraduate Research Grant (\$1,000)
- 2019 Leo Bourassa Virginia Lakes and Watershed Association Scholarship (\$1,000)
- 2019 Peter P. Feret Memorial Scholarship (\$1,750)
- 2018 Virginia Tech Global Change Center Undergraduate Research Grant (\$1,000)
- 2016 American Disposal Services Inc. Scholarship (\$2,500)
- 2016 Old Dominion Land Conservancy Scholarship (\$2,000)
- 2016 Loudoun Fair & Associates Inc. Scholarship (\$1,500)
- 2016 Virginia Trade Partner Council Scholarship (\$1,000)

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#### FELLOWSHIPS

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- 2022 - **GLEON Lake Expedition 2022 Fellowship Program**
- 2024 Selected as a graduate student fellow to work with an interdisciplinary team of scientists for 1.5 years on a project using hyperspectral remote sensing data to infer ecosystem processes ranging from microbial community composition to metabolism rates. This project is supported by NASA to help advance their Surface Biology and Geology (SBG) mission.
- 2021 - **Interfaces of Global Change Fellow – VT Global Change Center**
- Present Selected as a graduate student fellow to participate in a graduate curriculum to gain breadth in the multifaceted realm of global change and the science-policy interface.

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#### PUBLISHED DATA PRODUCTS

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- 2024 Carey, C.C., A. Breef-Pilz, **D.W. Howard**, and A.D. Delany. 2024. Time series of high-frequency sensor data measuring water temperature, dissolved oxygen, conductivity, specific conductance, total dissolved solids, chlorophyll a, phycocyanin, and fluorescent dissolved organic matter at discrete depths in Carvins Cove Reservoir, Virginia, USA in 2020-2023 ver 2. Environmental Data Initiative. <https://doi.org/10.6073/pasta/5995542a893c73583a65f511463410cf>
- Carey, C.C., A. Breef-Pilz, **D.W. Howard**, and A.D. Delany. 2024. Time series of high-frequency meteorological data at Carvins Cove Reservoir, Virginia, USA 2021-2023 ver 2. Environmental Data Initiative. <https://doi.org/10.6073/pasta/8101e224a95adcae1a938855f198ec34>
- Carey, C.C., A. Breef-Pilz, and **D.W. Howard**. 2024. Manually-collected discharge

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- data for multiple inflow tributaries entering Falling Creek Reservoir, Beaverdam Reservoir, and Carvins Cove Reservoir, Virginia, USA from 2019-2023 ver 7. Environmental Data Initiative.  
<https://doi.org/10.6073/pasta/805eb3da2e714f249793d0ff2f11d8f1>
- 2023 Carey, C.C., H.L. Wander, **D.W. Howard**, A. Breef-Pilz, and B.R. Niederlehner. 2023. Water chemistry time series for Beaverdam Reservoir, Carvins Cove Reservoir, Falling Creek Reservoir, Gatewood Reservoir, and Spring Hollow Reservoir in southwestern Virginia, USA 2013-2022 ver 11. Environmental Data Initiative. <https://doi.org/10.6073/pasta/457120a9de886a1470c22a01d808ab2d>
- Carey, C.C., A. Breef-Pilz, W.M. Woelmer, **D.W. Howard**, B.R. Niederlehner, B.D. Geisler, A.R. Das, and G. Haynie. 2023. Filtered chlorophyll a time series for Beaverdam Reservoir, Carvins Cove Reservoir, Claytor Lake, Falling Creek Reservoir, Gatewood Reservoir, Smith Mountain Lake, Spring Hollow Reservoir in southwestern Virginia, and Lake Sunapee in Sunapee, New Hampshire, USA during 2014-2022 ver 3. Environmental Data Initiative.  
<https://doi.org/10.6073/pasta/88171603d5f6972ac52f00a08dfc2f28>
- Carey, C.C., A. Breef-Pilz, **D.W. Howard**, W.M. Woelmer, B. Geisler, and G. Haynie. 2023. Manually-collected discharge data for multiple inflow tributaries entering Falling Creek Reservoir, Beaverdam Reservoir, and Carvins Cove Reservoir, Virginia, USA from 2019-2022 ver 6. Environmental Data Initiative.  
<https://doi.org/10.6073/pasta/dd75aba9ea4a87904091c49b77795588>
- Carey, C.C., **D.W. Howard**, P.A. Gantzer, R.P. McClure, A.B. Gerling, M.E. Lofton, A. Breef-Pilz, and WVWA. 2023. Time series of high-frequency sensors measuring water temperature and dissolved oxygen at discrete depths in Falling Creek Reservoir, Virginia, USA in 2012-2018 ver 1. Environmental Data Initiative.  
<https://doi.org/10.6073/pasta/964a5b5bbb4d5826b5acb30098dbae59a>
- 2022 Carey, C.C., A.S. Lewis, **D.W. Howard**, W.M. Woelmer, P.A. Gantzer, K.A. Bierlein, J.C. Little, and WVWA. 2022. Bathymetry and watershed area for Falling Creek Reservoir, Beaverdam Reservoir, and Carvins Cove Reservoir ver 1. Environmental Data Initiative.  
<https://doi.org/10.6073/pasta/352735344150f7e77d2bc18b69a22412>
- Carey, C.C., H.L. Wander, **D.W. Howard**, B.R. Niederlehner, W.M. Woelmer, M.E. Lofton, A.B. Gerling, and A. Breef-Pilz. 2022. Water chemistry time series for Beaverdam Reservoir, Carvins Cove Reservoir, Falling Creek Reservoir, Gatewood Reservoir, and Spring Hollow Reservoir in southwestern Virginia, USA 2013-2021 ver 10. Environmental Data Initiative.  
<https://doi.org/10.6073/pasta/7bd797155cddb5f1acdf0547c6ba9023>
- Carey, C.C., A. Breef-Pilz, and **D.W. Howard**. 2022. Time series of high-frequency meteorological data at Carvins Cove Reservoir, Virginia, USA 2021 ver 1. Environmental Data Initiative.  
<https://doi.org/10.6073/pasta/244549a10f571df6bd412ea612295ed7>
- Carey, C.C., A. Breef-Pilz, and **D.W. Howard**. 2022. Time series of high-frequency sensor data measuring water temperature, dissolved oxygen, pressure,

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conductivity, specific conductance, total dissolved solids, chlorophyll a, phycocyanin, and fluorescent dissolved organic matter at discrete depths in Carvins Cove Reservoir, Virginia, USA in 2021 ver 1. Environmental Data Initiative. <https://doi.org/10.6073/pasta/0d9660ac0fcd510bc6a424aeeef29998>

Carey, C.C., A. Breef-Pilz, **D.W. Howard**, W.M. Woelmer, and A.G. Hounshell. 2022. Manually-collected discharge data for multiple inflow tributaries entering Falling Creek Reservoir, Beaverdam Reservoir, and Carvins Cove Reservoir, Vinton and Roanoke, Virginia, USA from 2019-2021 ver 5. Environmental Data Initiative. <https://doi.org/10.6073/pasta/9992f38175e38a03ce5aa794eefec857>

2021 Lofton, M.E., **D.W. Howard**, R.P. McClure, H.L. Wander, W.M. Woelmer, A.G. Hounshell, A.S. Lewis, and C.C. Carey. 2021. Time series of phytoplankton biovolume at the depth of the vertical chlorophyll maximum in Falling Creek Reservoir, Vinton, VA, USA 2016-2019 ver 1. Environmental Data Initiative. <https://doi.org/10.6073/pasta/2de760e8b72e474c31e42526f5360f9a>

Lewis, A.S., W.M. Woelmer, H.L. Wander, **D.W. Howard**, J.W. Smith, R.P. McClure, M.E. Lofton, N.W. Hammond, R.S. Corrigan, R.Q. Thomas, and C.C. Carey. 2021. Systematic review of near-term ecological forecasting literature published between 1932 and 2020 ver 1. Environmental Data Initiative. <https://doi.org/10.6073/pasta/c4bea94f100f39a6b73c7b9a577df214>

Carey, C.C., A.S. Lewis, R.P. McClure, A.B. Gerling, S. Chen, A. Das, J.P. Doubek, **D.W. Howard**, M.E. Lofton, K.D. Hamre, and H.L. Wander. 2021. Time series of high-frequency profiles of depth, temperature, dissolved oxygen, conductivity, specific conductivity, chlorophyll a, turbidity, pH, oxidation-reduction potential, photosynthetic active radiation, and descent rate for Beaverdam Reservoir, Carvins Cove Reservoir, Falling Creek Reservoir, Gatewood Reservoir, and Spring Hollow Reservoir in Southwestern Virginia, USA 2013-2020 ver 11. Environmental Data Initiative. <https://doi.org/10.6073/pasta/5448f9d415fd09e0090a46b9d4020ccc>

Carey, C.C., W.M. Woelmer, A.S. Lewis, A. Breef-Pilz, **D.W. Howard**, and B.J. Bookout. 2021. Time series of high-frequency sensor data measuring water temperature, dissolved oxygen, pressure, conductivity, specific conductance, total dissolved solids, chlorophyll a, phycocyanin, and fluorescent dissolved organic matter at discrete depths in Falling Creek Reservoir, Virginia, USA in 2018-2020 ver 5. Environmental Data Initiative. <https://doi.org/10.6073/pasta/88896f4a7208c9b7bddcf498258edf78>

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PRESENTATIONS (Underlined name refers to presenter; \*refers to mentored student)

2023 Currinder, B., M. Glines, A. Gorsky, E. Hall, **D. Howard**, L. Jansen, C.H. Owens, A. Schmidt, S. Sharp, B. Poulter, S. Uz, P. Hanson, K. Weathers. Uniting remotely sensed and in situ data records to understand seasonal dynamics of lake metabolism: a GLEON-NASA collaboration. Poster presentation at: AGU 2023. San Francisco, California. December 2023.

Howard, D.W., W.M. Woelmer, A. Breef-Pilz, D. Scott, C.C. Carey. Spatiotemporal changes in dissolved organic matter across a reservoir watershed. Poster

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presentation at: *Ecological Society of America (ESA) 2023*. Portland, Oregon. August 2023.

Wander, H.L., A. Lewis, **D. Howard**, W.M. Woelmer, B.L. Brown, C.C. Carey. High variability in zooplankton community structure across space and time in an anoxic reservoir due to changing patterns of migration behavior. Oral presentation at: *ESA 2023*. Portland, Oregon. August 2023.

Keverline, R.L.\*, M.K. Kricheldorf\*, E.M. Tipper\*, A. Breef-Pilz, **D.W. Howard**, C.C. Carey. Establishing standard operating procedures for bathymetric mapping of small freshwater reservoirs. Poster presentation at: 2023 Summer Research Symposium at Virginia Tech. July 2023

Lofton, M.E., **D.W. Howard**, R.Q. Thomas, C.C. Carey. Progress and opportunities in advancing near-term forecasting of freshwater quality. Oral presentation at: Hacking Limnology 2023 Virtual Summit and Workshops. July 2023.

**Howard, D.W.**, A.D. Gray, C.C. Carey. Changes in lake pharmaceutical and personal care product concentrations after a large swimming event. Poster presentation at: *Lake Sunapee Protective Association Symposium*. Sunapee, New Hampshire. May 2023.

**Howard, D.W.**, A.D. Gray, A. Breef-Pilz, D. Scott, C.C. Carey. Improving reservoir monitoring of organic compounds through high frequency sensors and manual sampling. Oral presentation at: *Virginia Water Conference*. Richmond, Virginia. March 2023.

2022 **Howard, D.W.**, J.A. Brentrup, D.C. Richardson, A.S.L. Lewis, F. Olsson, C.C. Carey. The effect of variable winter dynamics on metabolism rates in a eutrophic reservoir over six years. Poster presentation at: *GLEON 2022*. Lake George, New York. November 2022.

Lewis, A. S. L., W.M. Woelmer, H.L. Wander, **D.W. Howard**, J.W. Smith, R.P. McClure, M.E. Lofton, N.W. Hammond, R.S. Corrigan, R.Q. Thomas, C.C. Carey. Near-term Ecological Forecasting: State of the Field. Oral Presentation (virtual) at: *INTECOL 2022*. Geneva, Switzerland. August 2022.

**Howard, D.W.**, J.A. Brentrup, D.C. Richardson, A.S.L. Lewis, C.C. Carey. The Influence of Winter Dynamics on Annual Metabolism Rates in a Eutrophic Reservoir Over Six Years. Oral presentation at: *Joint Aquatic Sciences Meeting (JASM)*. Grand Rapids, Michigan. May 2022.

**D.W. Howard**. Guest lecture on water quality in three sessions of Principles of Biology Lab (BIOL 1106) at Virginia Tech. 26 April 2022.

**Howard, D.W.**, A.D. Gray, C.C. Carey. Effects of a large swimming event in a drinking water reservoir. Oral presentation at: *Virginia Water Conference*. Richmond, Virginia. March 2022.

2021 **Howard, D.W.**, J.A. Brentrup, D.C. Richardson, A.S.L. Lewis, C.C. Carey. The influence of winter dynamics on annual metabolism rates in a eutrophic reservoir

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over multiple years. Poster presentation (Virtual) at: *Global Lakes Ecological Observatory Network (GLEON) Conference, 2021*.

**Howard, D.W.,** J.A. Brentrup, D.C. Richardson, A.S.L. Lewis, C.C. Carey. The influence of winter dynamics on annual metabolism rates in a eutrophic reservoir over multiple years. Poster presentation (Virtual) at: Association for the Society of Limnology and Oceanography 2021 meeting.

**Lofton, M.E., D.W. Howard,** R.P. McClure, H.L. Wander, W.M. Woelmer, A.G. Hounshell, A.S.L. Lewis, C.C. Carey. Whole-ecosystem experiments reveal that thermocline deepening shifts the peak biomass depth and community structure of phytoplankton in a eutrophic reservoir. Oral presentation (Virtual) at: Association for the Society of Limnology and Oceanography 2021 meeting.

2020 **Carey, C.C.,** W.M. Woelmer, M.E. Lofton, R.J. Figueiredo, B.J. Bookout, R.S. Corrigan, V. Daneshmand, A.G. Hounshell, **D.W. Howard,** A.S.L. Lewis, R.P. McClure, H.L. Wander, N.K. Ward, R.Q. Thomas (2020). Advancing lake and reservoir water quality management with near-term, iterative ecological forecasting. Poster Presentation (Virtual): *The Ecological Society of America 2020 Annual Meeting*.

**Howard, D.W.,** M.E. Lofton, A.G. Hounshell, W.M. Woelmer, C.C. Carey (2020). Variability in fluorescent dissolved organic matter concentrations and periodicity across diel to seasonal time scales over a year in a eutrophic reservoir. Oral Presentation (Virtual): *Undergraduate Senior Thesis Presentation*.

**Howard, D.W.,** M.E. Lofton, A.G. Hounshell, C.C. Carey (2020). Drivers of dissolved organic matter vary across multiple time scales in a drinking water reservoir. Oral presentation (Virtual): *2020 Dennis Dean Undergraduate Research Conference*.

**Howard, D.W.,** M.E. Lofton, A.G. Hounshell, R.P. McClure, W.M. Woelmer, C.C. Carey (2020). Drivers of dissolved organic matter vary across multiple time scales in a drinking water reservoir. Oral presentation at: *Virginia Water Conference*. Richmond, Virginia.

2019 **Howard, D.W.,** M.E. Lofton, A.G. Hounshell, B.J. Bookout, R.P. McClure, and C.C. Carey (2019). Drivers and patterns of dissolved organic matter fluorescence at diel to seasonal time scales in a drinking water reservoir. Poster presented at: *21<sup>st</sup> Global Lakes Ecological Observatory Network (GLEON) Conference*. Huntsville, Ontario.

**Howard, D.W.,** M.E. Lofton, R.P. McClure, B.R. Niederlehner, and C.C. Carey (2019). Identifying the drivers of organic carbon in drinking water reservoirs to improve water quality. Poster presented at: *2019 Dennis Dean Undergraduate Research Conference*. Blacksburg, Virginia.

**Howard, D.W.,** M.E. Lofton, R.P. McClure, B.R. Niederlehner, and C.C. Carey (2019). Identifying the drivers of organic carbon in drinking water reservoirs to improve water quality. Poster presented at: *Western Virginia Water Authority Project Report Back*. Roanoke, Virginia.

## SERVICE and OUTREACH

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**Peer reviewer**, Journal of Hydrology, November 2023

**Exhibitor**, Virginia Tech Science Festival Stream Team exhibit, November 2022

**Panelist**, Guest panelist for Virginia Tech NSF GRFP prep class, Fall 2022

**Activity table monitor**, SEEDS Nature Center (Summer 2021, Spring 2022)

**Travel Fund Reviewer**, Reviewed travel fund applications for Virginia Tech Graduate and Professional Student Senate, September 2022

## PROFESSIONAL ORGANIZATIONS

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Global Lake Ecological Observatory Network (GLEON)

Association for the Sciences of Limnology and Oceanography (ASLO)

Virginia Lakes and Watershed Associations (VLWA)

Ecological Society of America (ESA)