

# Carolyn Voter

## **SECOND YEAR REVIEW**

DEPARTMENTS OF CIVIL & ENVIRONMENTAL ENGINEERING  
AND EARTH SCIENCES

# Table of Contents

---

<b>WORKLOAD STATEMENT</b> .....	<b>1</b>
JOINT APPOINTMENT .....	1
WORKLOAD EXPECTATIONS .....	1
<b>RESEARCH AND SCHOLARSHIP</b> .....	<b>2</b>
RESEARCH STATEMENT .....	2
RESEARCH PUBLICATIONS.....	3
PUBLICATION JOURNALS .....	3
AUTHORSHIP CONVENTIONS.....	4
REFEREED PUBLICATIONS .....	4
REFEREED CONFERENCE PAPERS .....	5
TECHNICAL REPORTS .....	6
RESEARCH PRESENTATIONS .....	6
INVITED AND CONTRIBUTED CONFERENCE ABSTRACTS .....	6
INVITED SEMINARS, SYMPOSIA AND PANELS .....	9
GRANTS AND FUNDING.....	12
<b>TEACHING AND MENTORING</b> .....	<b>13</b>
TEACHING AND MENTORING STATEMENT .....	13
TEACHING ACTIVITIES.....	14
TEACHING WORKLOAD .....	14
CIEG 305 FLUID MECHANICS.....	14
GEOL 467/667 ECOHYDROLOGY .....	18
TRAINING IN TEACHING .....	20
MENTORING ACTIVITIES .....	21
DOCTORAL STUDENTS ADVISED .....	21
MASTERS STUDENTS ADVISED .....	21
UNDERGRADUATE RESEARCH STUDENTS ADVISED.....	21
COMMITTEES.....	21
TRAINING IN MENTORING .....	22
<b>SERVICE</b> .....	<b>23</b>
SERVICE STATEMENT .....	23
UNIVERSITY OF DELAWARE SERVICE.....	23

<b>PROFESSIONAL SERVICE .....</b>	<b>24</b>
MANUSCRIPT REVIEW .....	24
PROPOSAL REVIEW .....	24
TECHNICAL COMMITTEES .....	24
<b><u>CURRICULUM VITAE .....</u></b>	<b><u>25</u></b>
<b>RESEARCH INTERESTS .....</b>	<b>25</b>
<b>EMPLOYMENT AND EDUCATION .....</b>	<b>25</b>
PROFESSIONAL APPOINTMENTS .....	25
EDUCATION .....	25
<b>PUBLICATIONS .....</b>	<b>25</b>
PEER-REVIEWED PAPERS .....	25
REFEREED CONFERENCE PAPERS .....	26
TECHNICAL REPORTS .....	26
<b>FUNDING .....</b>	<b>26</b>
GRANTS .....	26
FELLOWSHIPS.....	27
<b>AWARDS AND HONORS .....</b>	<b>27</b>
<b>PRESENTATIONS .....</b>	<b>28</b>
CONFERENCE ABSTRACTS ( <i>SELECTED</i> ).....	28
INVITED SEMINARS, SYMPOSIA AND PANELS ( <i>SELECTED</i> ) .....	30
<b>TEACHING .....</b>	<b>31</b>
UNIVERSITY OF DELAWARE.....	31
GUEST TEACHING .....	31
PROFESSIONAL DEVELOPMENT ( <i>SELECTED</i> ) .....	31
<b>MENTORING .....</b>	<b>32</b>
GRADUATE MENTEES .....	32
UNDERGRADUATE MENTEES .....	32
<b>SERVICE .....</b>	<b>32</b>
<b>PUBLIC ENGAGEMENT.....</b>	<b>33</b>
PROFESSIONAL DEVELOPMENT.....	33
PROFESSIONAL DEVELOPMENT.....	33

# Workload Statement

## JOINT APPOINTMENT

---

I have a joint appointment in both the Department of Civil and Environmental Engineering and the Department of Earth Sciences. Key features of this appointment include:

- **Appointment Distribution.** Per the Memorandum of Understanding effective January 1, 2021, through December 31, 2025, my appointment is distributed as follows:
  - **75% appointment** in Civil and Environmental Engineering (CEE), College of Engineering
  - **25% appointment** in Earth Sciences (ES), College of Earth, Ocean & the Environment
- **Primary Department (CEE).** CEE is my designated administrative home department with responsibility for setting workload and carrying out yearly evaluations. All of my promotion and tenure reviews are also led by CEE, following the CEE department bylaws and promotion and tenure guidelines.
- **Secondary Department (ES).** My workload assignment in ES is primarily focused on teaching with additional effort directed toward research or service. My activities may include but are not limited to: teaching one undergraduate or graduate course per year, performing field-based or numerical modeling research on hydrologic processes and water resources, and service to the ES Department.

## WORKLOAD EXPECTATIONS

---

During my first semester (Spring 2022), I had a teaching release. In AY2022-2023, I taught 6 credits per year and beginning in AY2023-2024 I am teaching 9 credits per year. My overall workload at the University of Delaware is distributed as follows:

- 65% Research
- 25% Teaching
- 10% Service

# Research and Scholarship

## RESEARCH STATEMENT

---

**In my research**, I quantify and describe the movement of water through groundwater, vadose water, surface water, vegetation, and the atmosphere in natural and built environments. I do this with the goal of extracting new insights into how we can more sustainably interact with water resources and restore ecosystem services that increase resiliency in human-dominated landscapes. My research approach relies on using physically-based hydrologic models to push the boundaries of our integrated understanding of water resources, then using these models to identify key ecosystem control points that are effective targets for management actions. The integrative and interdisciplinary nature of this work is at the heart of why I have a joint appointment in both an engineering and an earth sciences department.

My work advances many of the diverse types of research products and processes that are valued by the hydrologic sciences community<sup>1,2</sup>. In terms of traditional research products, all of my **publications** have been published or are under revision at top journals in hydrology and water resources and interdisciplinary environmental science (see [Publication Journals](#)). I have also obtained **three competitive grants** in my time at UD (see [Grants and Funding](#)). I am lead PI on a grant from the National Science Foundation (\$123,556), lead PI on a grant from the Department of Defense Environmental Security Technology Certification Program (ESTCP) (\$1,650,594), and co-PI on a grant from Delaware Sea Grant (\$115,000).

My contributions to the hydrologic science community also include **improving the capacity of models** to represent **interdisciplinary linkages and feedbacks**, particularly in urban areas. It can take many years, as much as an entire PhD student's graduate career, to develop and demonstrate new capabilities in these computationally intensive, physically-based hydrologic models, but my recent efforts are on the cusp of being publicly available. In particular, modifications we have made to the widely used land surface model Noah-MP to better represent urban water and energy processes are a) the focus of my under-revision paper at Water Resources Research, and b) are simultaneously being incorporated into the official version of Noah-MP maintained by the National Center for Atmospheric Research (NCAR). Although the PhD student leading this work is at the University of Wisconsin-Madison, not UD, this work stems from a successful grant I wrote as a graduate student (before obtaining PI status) and I continue to be intimately involved with this work as an advisor to the student, earning second author status on all presentations and publications, participating in every-other-week meetings, and serving on this student's PhD committee. Model development is also at the heart of the large, \$1.6M grant from DOD ESTCP that I am lead PI on. I used my startup funds to get an early start on this model development, and the graduate student working on this project was able to present initial results at the CUAHSI Biennial Meeting this past summer (see [Invited and Contributed Conference Abstracts](#)).

I am also investing time in developing the foundation for a **community- and stakeholder-engaged** research program that **advances justice in the hydrologic sciences**. These efforts are at the heart of the National Science Foundation Strengthening American Infrastructure planning grant that I am lead PI on, which has provided resources for myself and three other researchers at University of Delaware to engage with stormwater professionals across the Chesapeake Bay region to explore what this community feels are key barriers to effective and equitable green stormwater infrastructure in the region. We are currently finalizing a white

paper that will share our findings back to this community, and the key themes we heard serve as the foundation for a full proposal to the NSF Strengthening American Infrastructure program that we are currently developing. These collaborations and insights also led directly to the successful Delaware Sea Grant proposal that I am co-PI on alongside Becca Nixon, an environmental social scientist who is also a co-PI on the NSF project, and Victor Perez, a sociologist in the Department of Sociology at UD who has been critical in introducing us to community organizations in Wilmington, DE. The broader impacts of my work are as meaningful to me as the intellectual merits, and I look forward to continuing to collaborate with social scientists and stakeholders to ensure I am answering scientific questions with real-world impacts.

My work is well known in the hydrologic sciences community and I continue to work to **build relationships with other researchers across the country**. In addition to giving an invited talk at the 2022 American Geophysical Union Frontiers in Hydrology meeting and collaborating with seven other women urban hydrologists for a review of urban hydrology in 2023, I have given six [invited seminars or presentations](#) since I started at the University of Delaware. These activities include seminars at Georgia State University and the University of Maryland-Baltimore County (Center for Urban Environmental Research and Education), visits to the Urban Critical Zone Cluster in Washington D.C., Baltimore, and Philadelphia, and a stint as a featured plenary speaker at the Water@UW-Madison Symposium. I look forward to continuing to develop these relationships as I progress in my career at the University of Delaware.

## References

<sup>1</sup>CUAHSI Board of Directors & Officers. (2022). COVID-19 impacts highlight the need for holistic evaluation of research in the hydrologic sciences. *Water Resources Research*, 58, e2021WR030930. <https://doi.org/10.1029/2021WR030930>.

<sup>2</sup>CUAHSI. (2021). CUAHSI Statement on Holistic Evaluation of Research in the Hydrologic Sciences, HydroShare, <https://doi.org/10.4211/hs.21e61fe839004fd399439a2a3391a763>

## RESEARCH PUBLICATIONS

---

### Publication Journals

My research contributes to fundamental hydrological sciences and applied water resources engineering. The top journals that publish original research in the areas of Hydrology and Water Resources are listed below in order of decreasing h-5 index, with the SCImago Journal Rank (SJR) and impact factors also listed.

Rank	Journal	h-5 index <sup>1</sup>	SJR <sup>2</sup>	Impact Factor <sup>3</sup>	Papers Published
1	<i>Journal of Hydrology</i>	92	1.61	6.71	1
2	<i>Water Resources Research</i>	77	1.78	6.16	1
3	<i>Hydrology and Earth System Sciences</i>	75	1.78	6.62	-
4	<i>Advances in Water Resources</i>	58	1.30	5.36	-
5	<i>Water Resources Management</i>	52	0.93	4.43	-
6	<i>Hydrologic Processes</i>	48	1.01	3.57	-

<sup>1</sup>Largest number h such that h articles published in the last 5 years have at least h citations each (obtained from Google Scholar). <sup>2</sup>Weighted measure of citations which represents the prestige of a journal within its field (higher values are more prestigious; obtained from SCImago Journal Rank). <sup>3</sup>Frequency with which the average article in a journal has been cited in a particular year (obtained from the journal's home page).

Due to the interdisciplinary nature of my work, I also publish in a range of other geophysical and environmental science journals. These journals are also listed below.

Journal	SJR (field)	Impact Factor	Papers Published
<i>Environmental Research Letters</i>	2.11 (sustainability, environmental science)	6.95	1
<i>Journal of the American Water Resources Association</i>	0.79 (water resources, engineering)	2.70	1
<i>Journal of Contemporary Water Research and Education</i>	Not ranked (water education, outreach)	0.51	1

## Authorship Conventions

In hydrology and water resources, authors are typically listed in order of contribution. The exception is the lead PI who, if not listed as the first author, is listed last. In rare cases where contributions are considered equal, a portion of the authors may be listed alphabetically by last name. Corresponding author is either the lead author or the lead PI. I follow these conventions (i.e., first author did most of the work, last author is the lead PI if not listed first).

Below, the percent contribution is broken down into four areas suggested by the Proceedings of the National Academy of Sciences, defined as follows:

- **Designed Research:** contribution toward forming the idea and theory for the research
- **Performed Research:** contribution toward executing the core research tasks, including field and laboratory work and data collection. *Note – this is only included for papers in which laboratory or field work was performed.*
- **Analyzed Data:** contributions involving interpretation, including modeling
- **Wrote the Paper:** percentage of manuscript preparation and revisions

Publications are numbered in chronological order. I am listed in **bold** with <sup>gsc</sup>graduate students on whose committee I serve, my PhD advisor (<sup>m</sup>Loheide) and postdoc mentors (<sup>m</sup>Freihoefer, <sup>m</sup>Hein, <sup>m</sup>Hauxwell) all denoted with superscripts. The corresponding author is noted with an asterisk (\*).

## Refereed Publications

### Work currently in review or revision

- Alexander, G.A. <sup>gsc\*</sup>, **C.B. Voter**, D.B. Wright, S.P. Loheide II. *In revision*. Urban Ecohydrology: Resolving Sub-Grid Surface Lateral Water and Energy Transfers in a Land Surface Model. *Water Resources Research*.
  - *Role:* Designed Research: 25%, Analyzed Data 15%, Wrote the Paper 15%
  - *Authors:* UW-Madison graduate student (on committee; Alexander), UW-Madison faculty (Wright), UW-Madison PhD advisor (Loheide).

### Work completed while at UD

- Oswald, C.J.\* , C. Kelleher, S.H. Ledford, K.G. Hopkins, A. Sytsma, D. Tetzlaff, L. Toran, **C.B. Voter**. 2023. Moving beyond impervious surface cover: the need for integrated process understanding of Research and Scholarship

water flow in cities. *Journal of Hydrology*, 618 (129188).

<https://doi.org/10.1016/j.jhydrol.2023.129188>

- *Role*: Designed Research: 10%, Wrote the Paper 10% (last 5 authors made equal contributions and are listed alphabetically)
- *Authors*: Toronto Metropolitan University faculty (Oswald), Lafayette University faculty (Kelleher), Georgia State University faculty (Ledford), USGS scientist (Hopkins), Colorado School of Mines scientist (Sytsma), Leibniz Institute faculty (Tetzlaff), Temple University faculty (Toran).

### Work completed before arriving at UD

4. **Voter, C.B.**, F.J. Guerrero-Bolaño, A.W. Latzka, B.M. Maitland, and J. Hauxwell<sup>m\*</sup>. 2021. Adaptable University-Agency Early-Career Fellowship Program Creates a Win-Win-Win for Wisconsin's Waters. *Journal of Contemporary Water Research & Education*, 174:139-154. <https://doi.org/10.1111/j.1936-704X.2021.3365.x>
  - *Role*: Designed Research: 10%, Analyzed Data 25%, Wrote the Paper 30%
  - *Authors*: Oregon State University faculty (Guerrero-Bolaño), Wisconsin Department of Natural Resources scientist (Latzka), UW-Madison postdoc (Maitland), UW-Madison administrator (Hauxwell).
3. **Voter, C.B.\*** and S.P. Loheide II<sup>m</sup>. 2021. Climatic controls on the hydrologic effects of urban low impact development practices. *Environmental Research Letters*, 16(6): 064021. <https://iopscience.iop.org/article/10.1088/1748-9326/abfc06>
  - *Role*: Designed Research: 95%, Analyzed Data 100%, Wrote the Paper 95%
  - *Authors*: UW-Madison PhD advisor (Loheide)
2. **Voter, C.B.\*** and S.P. Loheide II<sup>m</sup>. 2020. Where and When Soil Amendment is Most Effective as a Low Impact Development Practice in Residential Areas. *Journal of the American Water Resources Association*, 56(5):776-789. <https://doi.org/10.1111/1752-1688.12870>
  - *Role*: Designed Research: 95%, Analyzed Data 100%, Wrote the Paper 95%
  - *Authors*: UW-Madison PhD advisor (Loheide)
1. **Voter, C.B.\*** and S.P. Loheide II<sup>m</sup>. 2018. Urban Residential Surface and Subsurface Hydrology: Synergistic Effects of Low-Impact Features at the Parcel-Scale. *Water Resources Research*, 54. <https://doi.org/10.1029/2018WR022534>
  - *Role*: Designed Research: 90%, Analyzed Data 100%, Wrote the Paper 95%
  - *Authors*: UW-Madison PhD advisor (Loheide)

### Refereed Conference Papers

1. Mayo, L.\* and **C.B. Voter**. 2019. Introducing Students to Engineering by Helping Them RePicture Their World. ASEE Annual Conference & Exposition, Tampa, FL. <https://peer.asee.org/32265>. (17p.)
  - *Role*: Designed Research: 5%, Analyzed Data 5%, Wrote the Paper 15%
  - *Authors*: RePicture founder (Mayo)



## Technical Reports

3. **Voter, C.B.**, C. Hein<sup>m</sup>, J. Chenevert, I. Anderson, R. Smail, M. Gibson, K. Doyle, S. Bunde. 2021. Appendix B: Central Sands Lakes Study Technical Report: Lake Ecosystem Characterization and Response. Wisconsin Department of Natural Resources. <https://doi.org/10.5281/zenodo.5708751>
  - *Role*: Designed Research: 50%, Analyzed Data 60%, Wrote the Paper 50%
  - *Authors*: Wisconsin Department of Natural Resources scientists (Hein, Chenevert, Anderson, Smail, Gibson, Doyle, Bunde)
2. **Voter, C.B.** and E. Verbeten. February 2017. "Groundwater: Powering Wisconsin's Economy." *Wisconsin Natural Resources*. Wisconsin Department of Natural Resources. <http://dnr.wi.gov/wnrmag/2017/02/Insert1.pdf>
  - *Role*: Designed Research: 30%, Analyzed Data 100%, Wrote the Paper 40%
  - *Authors*: Wisconsin Department of Natural Resources writer (Verbeten)
1. Loheide II, S.P.<sup>m</sup> and **C.B. Voter**. May 2015. Effects of Nuanced Changes in Lot Layout and Impervious Area Connectivity on Urban Recharge: A Report to the Wisconsin Department of Natural Resources in Completion of WRI Project Number WR12R002. University of Wisconsin-Madison.
  - *Role*: Designed Research: 40%, Analyzed Data 100%, Wrote the Paper 60%
  - *Authors*: UW-Madison PhD advisor (Loheide)

## RESEARCH PRESENTATIONS

---

Presentations are numbered in chronological order. The first author listed is the presenting author. I am listed in **bold** with <sup>gs</sup>graduate students, <sup>us</sup>undergraduate students, and <sup>pd</sup>postdocs advised by myself, <sup>gsc</sup>graduate students on whose committee I serve, and the my undergraduate advisor (<sup>m</sup>Higgins), PhD advisor (<sup>m</sup>Loheide) and postdoc mentors (<sup>m</sup>Freihoefer, <sup>m</sup>Hein, <sup>m</sup>Hauxwell) all denoted with superscripts. The presentation type (oral, eLightning, poster, panel) is also noted for each listing.

## Invited and Contributed Conference Abstracts

### While at UD

- 2023 32. Zobel, R.<sup>gs</sup>, **C.B. Voter**. Identifying the Current State of Stormwater Management and Green Stormwater Infrastructure on Public University Campuses in the Chesapeake Bay Region. CUAHSI Biennial Meeting. Lake Tahoe, CA. Jun 2023. *Poster*.
31. Erukubami, O.<sup>gs</sup>, **C.B. Voter**. Assessment of Sea Level Rise Impacts on Aquifer Systems in Coastal Environments: A Case Study of Bowers Beach, Delaware. CUAHSI Biennial Meeting. Lake Tahoe, CA. Jun 2023. *Poster*.
30. Alexander, G.A.<sup>gsc</sup>, **C.B. Voter**, S.P. Loheide II<sup>m</sup>, and D.B. Wright. Better representation of urban hydrologic processes alters surface water and temperature cycles in regional coupled climate models. Consortium for the Advancement of Hydrologic Sciences, Inc. (CUAHSI) Biennial Meeting. Lake Tahoe, CA. Jun 2023. *Poster & Lightning Talk*.
29. Alexander, G.A.<sup>gsc</sup>, **C.B. Voter**, S.P. Loheide II<sup>m</sup>, and D.B. Wright. Resolving Fine-Scale Lateral Water Transfers in Urban Environments Alters Regional Climate Simulations. American Meteorological Society Annual Meeting. Denver, CO. Jan 2023. *Poster*.

- 2022 28. Alexander, G.A.<sup>gsc</sup>, **C.B. Voter**, S.P. Loheide II<sup>m</sup>, and D.B. Wright. Better Representation of Urban Hydrologic Processes Alters How Heat Responds to Urban Vegetation in Regional Climate Models. American Geophysical Union Fall Meeting. Chicago, IL. Dec 2022. *Poster*.
27. **Voter, C.B.**, G.A. Alexander<sup>gsc</sup>, S.P. Loheide II<sup>m</sup>, D.B. Wright. Consider the Climate: Understanding What to Expect from Urban Hydrology Interventions Depending on Where You Are. American Geophysical Union Frontiers in Hydrology Meeting. San Juan, PR. Jun 2022. *Oral*.  
>> *Invited*

### Before arriving at UD

- 2021 26. **Voter, C.B.**, C. Hein<sup>m</sup>, J. Chenevert, I. Anderson. A Framework for Describing the Hydrologic Regime of Lakes for Improved Water Quantity Management. American Geophysical Union Fall Meeting. New Orleans, LA. Dec 2021. *Oral*.
25. Alexander, G.A.<sup>gsc</sup>, **C.B. Voter**, S.P. Loheide II<sup>m</sup>, and D.B. Wright. Incorporating Impacts of Green Infrastructure into a Large-Scale Land Surface Model. American Geophysical Union Fall Meeting. New Orleans, LA. Dec 2021. *Oral*.
24. Alexander, G.A.<sup>gsc</sup>, **C.B. Voter**, S.P. Loheide II<sup>m</sup>, and D.B. Wright. Incorporating the Hydrologic Impacts of Low Impact Development in a Large-Scale Land Surface Model. American Water Resources Association-Wisconsin Section Annual Meeting. Online. Mar 2021. *Oral*.  
>> *WI AWRA Outstanding Graduate Oral Presentation*
23. Parsen, M., **C.B. Voter**, C. Hein<sup>m</sup>, and A.H. Pruitt. Lake-Groundwater Interactions of Plainfield, Long, and Pleasant Lakes in the Central Sands of Wisconsin. American Water Resources Association-Wisconsin Section Annual Meeting. Online. Mar 2021. *Oral*.
- 2020 22. **Voter, C.B.**, C. Hein<sup>m</sup>, J. Chenevert, I. Anderson, A.H. Pruitt, M.N. Fienen, M.J. Haserodt, A. Leaf, and S. Westenbroek. Impacts of groundwater withdrawals on lake hydrology and ecology in a water-rich region: what matters most? American Geophysical Union Fall Meeting. Online. Dec 2020. *Poster*.
21. Avery, W.A., S.P. Loheide II<sup>m</sup>, W.R. Selbig, H. Barker, K. Rabeler, D.M. Ciruzzi, and **C.B. Voter**. The role of urban canopy architecture in precipitation redistribution. American Geophysical Union Fall Meeting. Online. Dec 2020. *eLightning*.
- 2019 20. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Advancing understanding of single family parcel hydrology to improve the hydroecologic outcomes of low impact practices. American Geophysical Union Fall Meeting. San Francisco, CA. Dec 2019. *eLightning*.  
>> *Invited*
19. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Restoring urban ecohydrologic fluxes on a lot-by-lot basis: Which doors to knock on first? American Geophysical Union Fall Meeting. San Francisco, CA. Dec 2019. *Oral*.
18. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Soil amendment as a green infrastructure practice in residential areas. American Water Resources Association-Wisconsin Section Annual Meeting. Delavan, WI. Mar 2019. *Oral*.  
>> *WI AWRA Outstanding Graduate Oral Presentation*

17. Nohr, K.<sup>ug</sup>, **C.B. Voter** and S.P. Loheide II<sup>m</sup>. Comparing soil infiltration capacity among and within residential parcels in Milwaukee. American Water Resources Association-Wisconsin Section Annual Meeting. Delavan, WI. Mar 2019. *Poster*.  
>> *WI AWRA Outstanding Undergraduate Presentation*
- 2018 16. **Voter, C.B** and S.P. Loheide II<sup>m</sup>. Quantifying weather-driven differences in the hydrologic outcomes of low-impact practices. American Geophysical Union Fall Meeting. Washington D.C. Dec 2018. *Oral*.  
>> *AGU Outstanding Student Presentation Award*
15. **Voter, C.B.** Where does the rain go? Three Minute Thesis. Madison, WI. Nov 2018.
14. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Climate- and development-driven heterogeneity in hydrologic fluxes from urban residential parcels. Long Term Ecological Research Network – All-Scientists Meeting. Monterey Bay, CA. Oct 2018. *Poster*.
13. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. What’s the weather like? How climate affects the hydrologic outcomes of low-impact practices on residential parcels. Consortium for the Advancement of Hydrologic Sciences, Inc. (CUAHSI) Biennial Colloquium. Shepherdstown, WV. Jul 2018. *Poster*.
12. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Measuring and modeling stormwater runoff from residential blocks in Milwaukee, WI. American Water Resources Association-Wisconsin Section Annual Meeting. Appleton, WI. Mar 2018. *Poster*.
- 2017 11. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Introducing a real-world design problem to an intro water resources engineering course: effects on cognitive skills, confidence, and perception of value. UW-Madison Teaching and Learning Symposium. Madison, WI. May 2017. *Poster*.
10. Stieve, J.<sup>ug</sup>, **C.B. Voter** and S.P. Loheide II<sup>m</sup>. Particle Size Analysis of Milwaukee Soils. UW-Madison Undergraduate Research Symposium. Madison, WI. Apr 2017. *Poster*.
9. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Potential change in groundwater recharge around the Madison Lakes under alternate residential development scenarios. American Water Resources Association-Wisconsin Section Annual Meeting. Elkhart Lake, WI. Mar 2017. *Oral*.
- 2016 8. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Effect of weather patterns in cities across the United States on surface runoff, deep drainage, and evapotranspiration from a residential parcel. American Geophysical Union Fall Meeting. San Francisco, CA. Dec 2016. *Oral*.
7. <sup>ug</sup>Calderon, M., **C.B. Voter** and S.P. Loheide II<sup>m</sup>. Soil Particle Size Analysis in Milwaukee. UW-Madison Undergraduate Research Symposium. Madison, WI. Apr 2016. *Poster*.
6. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Hydroecologic outcomes of alternate residential development patterns: what’s weather got to do with it? American Water Resources Association-Wisconsin Section Annual Meeting. Wisconsin Dells, WI. Mar 2016. *Oral*.
- 2015 5. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Changing spatial patterns of evapotranspiration and deep drainage in response to the interactions among impervious surface arrangement, soil characteristics, and weather on a residential parcel. American Geophysical Union Fall Meeting. San Francisco, CA. Dec 2015. *Oral*.

4. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Fine-scaled heterogeneity in urban features: effects on runoff, transpiration, and deep drainage. Long Term Ecological Research Network – All-Scientists Meeting. Estes Park, CO. Oct 2015. *Poster*.
3. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Fine-scaled heterogeneity in urban features: effects on runoff, transpiration, and deep drainage. Long Term Ecological Research Network – All-Scientists Meeting. Estes Park, CO. Oct 2015. *Poster*.
- 2014 2. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Modeling the hydrologic effects of parcel-scale changes in lot layout and impervious surface connectivity. American Water Resources Association-Wisconsin Section Annual Meeting. Wisconsin Dells, WI. Mar 2014. *Oral*.
- 2013 1. **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Modeling the effects of nuanced changes in lot layout and impervious area connectivity on urban recharge in COMSOL. American Water Resources Association-Wisconsin Section Annual Meeting. Brookfield, WI. Mar 2013. *Oral*.

## Invited Seminars, Symposia and Panels

### While at UD

- 2023 29. **Voter, C.B.** Urban (and non-urban!) ecohydrology at University of Delaware. Urban CZO Network. Apr 2023. *Oral*.
28. **Voter, C.B.** Connecting Science, Management, and Community in the Central Sands and Beyond. Water@UW-Madison Symposium. Apr 2023. *Oral + Panel*.
27. **Voter, C.B.** Chesapeake Bay Stormwater Partners Retreat. Apr 2023. *Oral*.
- 2022 26. **Voter, C.B.** Urban ecohydrology: Processes that matter, ways to model them, and implications for sustainable management. Georgia State University. Nov 2022. *Oral*.
25. **Voter, C.B.** Scaling up: Accounting for key fine-scale urban hydrologic processes at city and larger scales. UMBC Center for Urban Environmental Research and Education Seminar. Online. Feb 2022. *Oral*.
24. **Voter C.B.** What matters most? Tracking down key ecohydrologic processes in urban and agricultural landscapes to inform management strategies. University of Delaware Earth Sciences Seminar. Feb 2022. *Oral*.

### Before arriving at UD

- 2021 23. **Voter, C.B.** Using Co-productive Science to Address Wicked Water Problems in the Highly-irrigated Wisconsin Central Sands. University of Delaware Project WiCCED Seminar. Online. Oct 2021. *Oral*.
22. **Voter C.B.** Advancing Science and Management through the Central Sands Lakes Study. UW-Madison Environmental Chemistry and Technology Seminar. Online. Oct 2021. *Oral*.
21. **Voter C.B.** The Central Sands Lakes Study: Findings and Recommendations Overview. Wisconsin Department of Natural Resources. Online. May 2021. *Oral*.  
<https://dnr.wisconsin.gov/topic/Wells/HighCap/CSLStudy.html>.

20. **Voter C.B.**, Tackling Wisconsin's Water Challenges through UW Water Science-Policy Fellowships and Agency Partnerships. *Panel*. At:
- [Wisconsin Water Week](#), plenary session with panel discussion. Online. Mar 2021.
  - [University of Wisconsin-Madison 5<sup>th</sup> Annual Symposium for Research Administrators](#), panel discussion. Online. Sep 2020.
- 2020 19. **Voter, C.B.**, C.L. Hein<sup>m</sup>, J. Chenevert, I. Anderson. Defining a "significant" reduction in "average seasonal lake levels" in the Wisconsin Central Sands. *Oral*. At:
- [Wisconsin Potato and Vegetable Growers Association](#). Online. Mar 2020.
  - [Water@UW-Madison Spring Symposium](#). Online. May 2020.
  - [Wisconsin Lakes and Rivers Partnership](#). Online. Oct 2020.
- 2019 18. Parsen, M., **C.B. Voter**, C.L. Hein<sup>m</sup>. Lake-groundwater interactions of Plainfield, Long, and Pleasant Lakes in the Central Sands of Wisconsin under rising water level conditions. [Water@UW-Madison Fall Poster Session](#). Madison, WI. Nov 2019. *Poster*.
17. **Voter C.B.**, A. Arend, F. Guerrero-Bolano, and R. Lepak. Wisconsin and Great Lakes Fellowships: Connecting Science, Policy, and Management. [Water@UW-Madison Fall Poster Session](#). Madison, WI. Nov 2019. *Poster*.
16. **Voter, C.B.** High Throughput Computing in Your Backyard: Urban Hydrology Applications. [Open Science Grid User School](#). Madison, WI. Jul 2019. *Oral*.
15. **Voter, C.B.** Improving the quality of my research on urban residential hydrology by increasing the quantity of simulations using HTCondor. [HTCondor Week](#). Madison, WI. May 2019. *Oral*.
14. **Voter, C.B.** Same low-impact practices + different weather = different hydrologic response. [North Temperate Lakes - Long Term Ecological Research Station Early Career Scientists Meeting](#). Madison, WI. Mar 2019. *Oral*.
13. **Voter, C.B.** Protecting our Urban Waters. [Wisconsin Chapter of the Society for Conservation Biology](#), presentation and panel discussion. Madison, WI. Feb 2019. *Oral*.
- 2018 12. **Voter, C.B.** Making a Difference Through a Water Science-Policy Fellowship. [University of Wisconsin Sea Grant Institute](#), panel discussion. Webinar. Nov 2018. *Panel*.
11. **Voter, C.B.** Delta Future Faculty Panel. [Center for Integration of Research, Teaching, and Learning](#) Fall In-Person Meeting, panel discussion. Madison, WI. Oct 2018. *Panel*.
10. **Voter, C.B.** Low-impact practices in residential areas: how interactions among practices and with climate alter urban hydrology. [Marquette University Environmental and Water Resources Engineering Seminar](#). Milwaukee, WI. Oct 2018. *Oral*.
9. **Voter, C.B.** HTCondor in your backyard: modeling urban residential hydrology. [HTCondor Week](#). Madison, WI. May 2018. *Oral*.
8. **Voter, C.B.** Low-impact practices on residential parcels: How and where they cause the biggest (hydrologic) bang. [Nelson Institute Brown Bag Series](#). Madison, WI. Apr 2018. *Oral*.
- 2017 7. **Voter, C.B.** Variability in deep drainage from urban residential parcels: what interventions have the greatest potential impact? [Wisconsin Groundwater Association Speaker Series](#). Madison, WI. Sep 2017. *Oral*.

6. **Voter, C.B.** Making a Difference Through a Water Science-Policy Fellowship. University of Wisconsin Sea Grant Institute, Webinar. May 2017. *Panel*.
5. **Voter, C.B.** Getting the most bang for your buck: Mapping the hydrologic sensitivity of Madison parcels. North Temperate Lakes - Long Term Ecological Research Station Early Career Scientists Meeting. Madison, WI. Apr 2017. *Oral*.
- 2016 4. **Voter, C.B.** The Wisconsin Groundwater Coordinating Council: 2016 Updates and the Fellowship Experience. Water@UW-Madison Fall Poster Session. Madison, WI. Oct 2016. *Poster*.
- 2014 3. **Voter, C.B.** Modeling parcel-scale urban ecohydrology. North Temperate Lakes - Long Term Ecological Research Station Early Career Scientists Meeting. Madison, WI. Mar 2014. *Oral*.
- 2012 2. **Breden, C.L.** and M.J. Higgins<sup>m</sup>. Baseline monitoring of Miller Run. Miller Run Symposium. Bucknell University Miller Run Symposium. Lewisburg, PA. Jan 2012. *Poster*.
- 2011 1. **Breden, C.L.** and M.J. Higgins<sup>m</sup>. Removal of phthalates from drinking water. Bucknell University Kalman Research Symposium. Lewisburg, PA. March 2011. *Poster*.

## GRANTS AND FUNDING

My current, completed, pending, and not funded grants are listed in the table below. I have been PI or Co-PI on awards totaling **over \$1.7M** since arriving at UD, with my share totaling **over \$624,000**. All grants were obtained through submission of a formal proposal and a competitive review process.

Title	PIs (Contribution)	Funding Source	Award Total (Voter share)	Project Duration (Years)
<b>Current</b>				
An investigation of green infrastructure to enhance resilient stormwater management in the City of Wilmington	Lead: Nixon (50%), <b>Voter (35%)</b> Perez (15%)	NOAA Delaware Sea Grant	\$115,000 (\$40,250)	2 years (awarded, funds pending)
Integrated Assessment of Climate Change Impacts to Groundwater, Stormwater, and Wastewater Infrastructure at Coastal Military Facilities	<b>Lead: Voter (35%)</b> Michael (30%) Imhoff (20%) Trout (15%)	DOD Environmental Security Technology Certification Program (ESTCP)	\$1,527,038 (\$534,463)	3 years (awarded, funds pending)
SAI-P: Optimizing deployment of green stormwater infrastructure for maximum benefit	<b>Lead: Voter (40%)</b> Imhoff (20%) Nixon (20%) Hu (20%)	NSF Strengthening American Infrastructure	\$123,556 (\$49,422)	2 years (09/01/2022 – 08/31/2024)
<b>Completed</b>				
Mitigating flooding, extreme heat, and heavy rainfall in urban coastal communities by “greening”	Lead: Loheide (40%) Wright (40%) <b>Voter (AI; 20%)</b>	NOAA Wisconsin Sea Grant	\$240,000 (\$0)	2 years (02/01/2020 – 06/30/2022)
<b>Not Funded</b>				
Improved representation of urban processes in the Community Land Model	<b>Lead: Voter (100%)</b>	University of Delaware Research Foundation	\$49,200 (\$49,200)	2 years (submitted Dec 2022)
Interdisciplinary Frontier Graduate and Postdoctoral Fellows	Lead: Nixon (40%) <b>Voter (30%)</b> Hu (30%)	University of Delaware Graduate College	\$141,765 (\$42,529)	2 years (submitted Oct 2022)

# Teaching and Mentoring

## TEACHING AND MENTORING STATEMENT

---

**As a teacher**, I have myriad learning objectives for the students in my classes. I want them to be able to describe characteristics of fluid flow, solve engineering problems related to flow in pipes and open channels, develop stochastic “bucket models” that simulate soil moisture dynamics, and much, much more. To provide students with an environment for success that prepares them to achieve the objectives I set for them, I also set two keystone “teaching objectives” for myself:

- *Support students by fostering a safe-to-fail, not fail-safe learning community.* I strive to create abundant opportunities for students to practice new concepts and skills and feel safe to get things wrong before high-stakes assessment occurs. An important component of how I do this is the scaffolding of class activities and assignments. For example, after introducing new concepts in-class in CIEG 305 Fluid Mechanics, I deliberately call on students by name to help me with the next example (see [student feedback](#) on this), and harness “think-pair-share” for later examples. Similarly, assignments progress from homework (open resource, dedicated help session run by me, many days to complete) to mini-exams (open note, 4x more time to complete than on an exam) to exams (high stakes assessment). I also use a token system to encourage students to redo assignments they did not fully grasp for full credit back, provided they do so before the relevant exam date. While I know there is much more I can do to continue developing this safe-to-fail learning community (the token system in particular is continually evolving!), I am encouraged by the number of student who [report](#) that the structure of my courses works well for their learning.
- *Reflect honestly on student learning and ways in which I may be hindering success.* I recognize I am continually growing as an instructor and that no matter how hard may be for me to hear critical feedback from students, it is crucial that I listen with an open mind. To do this, I first ensure I am hearing from everyone by giving students course credit for providing me with (anonymous) feedback (see 94% response rate for student feedback in [Spring 2023](#) and [Fall 2023](#)). I also take time to process open-ended feedback systematically to help me remove my own biases and spot real patterns in student perceptions (see student feedback sections). Once these patterns become clear, I brainstorm on my own and with others (especially staff at the UD Center for Teaching and Learning; see [training](#)) as to how I can adjust my course design to better center student learning. It is a point of pride for me that nearly 50% of my first GEOL 467/667 Ecohydrology class volunteered in open ended comments that they appreciated that I regularly asked for feedback and that they felt I responded well to it (see [feedback](#)).

**As a mentor and advisor to graduate students**, I try to strike a balance between ensuring my students feel supported but also have the space to grow and develop into capable, independent researchers. I feel fortunate to be advising three great graduate students at UD: two PhD students and one masters student. The foundation of our relationship is clear, shared [expectations](#) which we revisit at the start of each semester at our uncreatively-named



“semester kickoff and lab fun day”. One element of our agreement that has been particularly helpful is twice-weekly “group check-ins” where we each (myself included) share in just a few minutes a) what we have been working on since the last check-in, b) what we are stuck on, and c) what we plan to do before the next check-in. This often provides students with just-in-time support from myself and/or their lab mates, while longer conversations can bleed into the “grad student office hours” I hold immediately following these check-ins. I also hold every-other-week one-on-one meetings with each student to ensure we touch on non-urgent items on a regular basis as well. It was a joy to see my students present their research at the 2023 CUAHSI Biennial Meeting this past summer and I look forward to continuing to support them in their graduate school journey.

## TEACHING ACTIVITIES

---

### Teaching Workload

I teach two courses at UD. **CIEG 305 Fluid Mechanics** is a large, required course for all 1) civil engineering, 2) environmental engineering, and 3) construction & engineering management students at UD. Most students take the course in their junior year. **GEOL 467/667 Ecohydrology** is a small- to medium-size elective course that is dual-listed (undergraduate and graduate) and cross-listed (with Civil & Environmental Engineering). Beginning in Spring 2024, it will be a required course for environmental engineering majors (~15-20 students/year).

Course	F22	S23	F23	S23
CIEG 305: Fluid Mechanics	109		104*	
GEOL 467/667: Ecohydrology		14		24**

\*class taught in 2 sections. \*\*enrolled as of Nov 15, 2023.

### CIEG 305 Fluid Mechanics

#### Course Summary

CIEG 305 Fluid Mechanics serves as an introduction to the fundamental properties of fluids and characteristics of fluid flow, with a primary emphasis on solving engineering problems related to forces in a static fluid, conservation laws, dimensional analysis, and flow in pipes and open channels.

**Requirements:** This course is required for all 1) civil engineering, 2) environmental engineering, and 3) construction & engineering management students at UD. By the time students complete the course, they are prepared for the fluid mechanics section on the Fundamentals of Engineering certification exam (6-9 questions out of 110 on the Civil FE Exam, 12-18 questions out of 110 on the Environmental FE Exam). For the Civil & Environmental Engineering Department, the course addresses ABET Outcome 1: *The successful graduate of the UD (civil/environmental/CEM) program must demonstrate an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.*

**Students:** Most students take the course in their junior year. Students participating in the civil engineering degree transfer program with Delaware Technical and Community College (~10 per year) take this course during the first semester that they take civil engineering classes at UD (equivalent to their junior year). This is the first water- or coastal-related course students take, and most enter with a stronger interest in a different sub-discipline of civil engineering.

**Format:** In Fall 2022 (Year 1), this course had one large (110 student) in-person section. Beginning in Fall 2023 (Year 2), the course changed to two medium (50-60 student) in-person sections. Classes generally begin with a demo and/or slides with visuals, videos, or animations, with the remaining time devoted to developing notes – largely example problems – on the board. A typical sequence starts with 1) me leading the class through a type of problem, 2) working through a second example with more input from the class, and 3) allowing students time to work through yet another example in a think-pair-share format. As we work through each lesson, I call on students randomly using a *question – pause – student name* approach to a) help students check their understanding, and b) help me gage the pace of the lesson. I give students a heads up about the questioning at the beginning of the semester and allow students to opt-out if this makes them anxious to the point that it interferes with their ability to concentrate in class.

### Course Timeline

Semester	Significant Modifications	Other Context	Reflections
Fall 2022	<ul style="list-style-type: none"> <li>- None.</li> <li>- My goal: avoid “reinventing the wheel”, simply do my best to learn the course in its current form and observe what works well vs. what does not work well for me.</li> </ul>	<ul style="list-style-type: none"> <li>- I benefited from the great work the previous instructor (Dr. Jack Puleo) put into thoughtfully structuring the course</li> <li>- Co-taught with Dr. Puleo; I taught first 2/3 (including Exams 1 and 2), he taught last 1/3 (including Exam 3).</li> <li>- Most recent change to the course: introduction of specifications grading in Fall 2020</li> </ul>	<ul style="list-style-type: none"> <li>- Specifications grading worked well for solidly A/B students but led to an enormous amount of stress for the average student (#1 complaint).</li> <li>- I agree with students that the grading system needed adjustments</li> </ul>
Fall 2023	<ul style="list-style-type: none"> <li>- Introduced more scaffolding to assignments, including new “mini-exams”</li> <li>- Updated specifications grading system, especially token system.</li> <li>- Extended review ahead of exams to two full classes (one practice problem, one conceptual review)</li> </ul>	<ul style="list-style-type: none"> <li>- Format change from one large section to two medium-size sections</li> </ul>	<ul style="list-style-type: none"> <li>- Student complaints about the grading system are down (from ~60% of the class to ~20% of the class)</li> <li>- Smaller class size does allow for more personal interactions with students</li> <li>- New mini-exams are very helpful but I may need to cut back on other assignments to better balance workload.</li> </ul>

## Student Feedback

### Quantitative Ratings

Semester	Respondents	Average	Q1	Q2	Q3	Q4	Q5	Q6
Fall 2022 [ <a href="#">raw feedback</a> ]	63/109 (58%)	Voter	4.63	4.57	4.43	4.41	4.17	4.73
		Department*	4.45	4.61	4.17	4.13	3.93	N/A
		Ratio	1.04	0.99	1.06	1.07	1.06	N/A

\* Department average from 2018-2023

### Questions:

1. The instructor is well prepared for class
2. The instructor has thorough knowledge of the subject
3. The instructor communicates the subject well
4. The instructor stimulated interest in the course content
5. The instructor is one of my best teachers
6. The instructor fostered an environment in which all students - including yourself - were treated with respect.

Fall 2022 (Year 1)

I received final course evaluations from 63/109 students (58%) [[raw feedback](#)].

Theme in open-ended responses	% of respondents mentioning theme	Example comments
<b>Positive Themes</b>		
Students liked the in-class content and activities	51% (22% example problems, 13% board notes, 10% easy to follow)	- I rarely walked away from a lecture feeling lost on the subject matter and found the ways she wrote notes on the board very easy to follow. Abundance of example problems. - The classes were always super fun and engaging. I especially appreciated when the professor brought in actual props, that helped my understanding as well as was exciting for the class.
I was accessible and responded helpfully to student questions	44%	- Always prepared, very open to questions, and super helpful! - The professor was extremely helpful and nice. Took time to answer questions and explain questions to students.
Great (for a first time) teacher	24%	- Did a wonderful job for her first year, she will be one of the top professors in the department in the next few years - For her first time teaching one of the hardest classes in the entire engineering discipline, Dr. Voter did a stellar job.
Students liked (an aspect of) the grading system	14%	- I enjoyed the grading style. It removed pressure to get everything 100% correct and this led me to focus more on understanding the concepts completely. - I liked how we can redo exam problems.
My classroom was a safe space	13%	- The room would always grow tense whenever Dr. Voter was about to call on someone from her phone's random generator of names. However, if you were the chosen one, you would never get belittled or degraded for not knowing a question, even if it was a rather simple one.

Theme in open-ended responses	% of respondents mentioning theme	Example comments
		- If we didn't get an answer right in class, the professor would help us walk through the question and guide us to a right answer. It was ok to be wrong in our environment.
<b>Critical Themes</b>		
Students disliked (an aspect of) the grading system	57%	- The grading system is whack. Partial credit for exams would be very beneficial. - Just get rid of the grading system it puts way too much pressure on students. Going into the final I could get anywhere from a D to an A despite all of the hard work I have put in this semester.
Students disliked me calling on students during class	16%	- Asking random people questions with the name generator was not productive - Some of the time, it took too much time out of class when she called on people
I seemed nervous/confused at times	6%	- The one drawback was she did not seem to have a whole lot of confidence when lecturing, sometimes second guessing herself and giving off a nervous demeanor. However, I imagine she will gain more confidence with experience.

Fall 2023 (Year 2)

I received final mid-semester evaluations from 98/104 students (94%) [[raw feedback](#)].

Theme in open-ended responses	% of respondents mentioning theme	Example comments
<b>Positive Themes</b>		
Students like the in-class example problems	66%	- [We should continue] going over examples and just the overall organization of lectures. I feel like the way topics are taught in this class work really well for me and I like how we go over the topic being lectured on then do examples.
Class is going well	32% (nothing we should <u>start</u> doing), 47% (nothing we should <u>stop</u> doing)	- I can't really say too much should change. I really enjoy class. - Nothing should be stopped, everything is good!
Students like the (newly redesigned) exam review week	16%	- We should continue to do the review week leading up to the exam. I think that was very helpful.
Students appreciate resources for help	14%	- I like how we have so many resources to get help so we should continue this. Student hours, homework help, and all the office hours are extremely helpful.
<b>Critical Themes</b>		
Students would like more, harder, or different examples	23%	- MORE examples that help me in better understand how to do the questions on exams. Handing out extra practice problems to help better understand the problems.

Theme in open-ended responses	% of respondents mentioning theme	Example comments
Students dislike the grading system	22%	- Stop specifications grading. I'm sure you have gotten this request A LOT but I'm going to reiterate it again.
Students dislike me calling on students during class	7%	- [Stop] calling on people by card. Just make me anxious all class and sometimes struggle to pay attention for fear of being called on.

## Peer Feedback

Semester	Invited Observer	Feedback
Fall 2022	Dr. Jack Puleo, Chair of the Department of Civil & Environmental Engineering (and course co-instructor) <a href="#">[raw feedback]</a>	<u>Strengths</u> : handwriting legible, figures nice, you had the audience attention, walk through the derivation was quite clear, question-response.  <u>Areas for Improvement</u> : larger text for figure, consistency on color usage will help students take notes, practice how much you can fit on a board vertically, repeat student questions (can't hear in the back), opportunity for more engagement

## GEOL 467/667 Ecohydrology

### Course Summary

GEOL 467/667 Ecohydrology is a dual-listed (undergraduate and graduate) and cross-listed (with Civil and Environmental Engineering) course that I developed based on a similar course at the University of Wisconsin-Madison.

**Requirements:** This course is required for civil engineering graduate students with a concentration in water resources engineering. Beginning in Spring 2024 (Year 2), this course will also be required for undergraduate environmental engineering majors (~15-20 per year).

**Students:** In Spring 2023 (Year 1), all students were senior undergraduate or graduate students who took the course as an elective. Most students (10/14) took the course at the graduate level and came from the water resources engineering (4+1 or traditional) or earth science programs, with one from the water science and policy program.

**Format:** This class is held twice per week (M/W) and is organized around two main goals for students: 1) solidify conceptual understanding of ecohydrologic processes by developing models using high-level coding languages (i.e., R), and 2) engage with the scientific literature on ecohydrology. To that end, the first class each week is more of a traditional lecture, where I use slides, videos, and board notes to introduce student to the context, background, and equations behind key ecohydrologic processes. For the first few weeks of the semester, the second class each week is a multi-week "intro to coding" in which I use live coding to introduce students to R and prepare them for upcoming homework assignments. As the semester progresses, we transition to using the second class each week to discuss a case study from the literature related to ecohydrology. I present the first case study to demonstrate what I

am looking for, and small groups of student present subsequent papers. As part of the final, I ask students to review a published paper from a predatory journal (i.e., a paper that has not undergone peer review) using the critical thinking skills they have developed during class.

### Course Timeline

Semester	Significant Modifications	Other Context	Reflections
Spring 2023	<ul style="list-style-type: none"> <li>- Newly developed course, based upon existing course at UW-Madison</li> <li>- I experimented with different ways of scaffolding the coding-based homework</li> </ul>	<ul style="list-style-type: none"> <li>- 10/14 students took this course at the graduate level</li> <li>- All students took as an elective</li> </ul>	<ul style="list-style-type: none"> <li>- This was a fun class for me, and I believe the balance of coding and journal discussions worked well</li> <li>- Focusing the initial “intro to coding” even more tightly on skills they will need for homeworks may help</li> </ul>

### Student Feedback

#### Quantitative Ratings

In Spring 2023 (Year 1), I did not appreciate until it was too late that students who took the course under the CIEG listing (7 respondents) were provided with different quantitative questions in course evaluations than students who took the course under the GEOL listing (6 respondents). While all quantitative ratings were excellent (average across all questions of 4.77/5), it is difficult to summarize these responses across the entire class. For full transparency, raw feedback is available [here](#) (see “quant” tab for quantitative summary).

#### Spring 2023 (Year 1)

I received final course evaluations from 13/14 students (93%). [[raw feedback](#)]

Theme in open-ended responses	% of respondents mentioning theme	Example comments
<b>Positive Themes</b>		
I was an enthusiastic, prepared, effective teacher	85%	<ul style="list-style-type: none"> <li>- Voter was great. She came prepared, asked questions and constantly modified her teaching to make sure we were understanding it to the best of our abilities.</li> <li>- Dr. Voter is an excellent teacher. She is clearly passionate about the subject as well as communicating it effectively to her students. One of the best lecturers I've had here at UD</li> </ul>
I fostered safe, open discussions	62%	<ul style="list-style-type: none"> <li>- Even during the days when [Dr. Voter] would lecture, it never felt like we were being talked at - instead, it always felt like she was talking with us...this approach led to great discussions and questions in class that might otherwise not have happened if the classroom environment that Dr. Voter created did not feel like an open, comfortable space.</li> </ul>
Students liked the journal critique components	62%	<ul style="list-style-type: none"> <li>- Choosing articles and discussing them stimulated interest</li> <li>- I loved the paper discussions!</li> <li>- Although I am not planning on attending graduate school, the paper critiques were new to me and gave me a greater</li> </ul>

Theme in open-ended responses	% of respondents mentioning theme	Example comments
		understanding of how to review papers and the work that goes into writing them.
Students liked the coding components	54%	- I appreciated the opportunity to learn about R coding since that is a good skill that I have not had the opportunity to learn in other classes - Learning coding, as difficult as it was, was very valuable as I know that it may come in handy in the future.
I was helpful and accessible	54%	- She was extremely helpful during Student Hours and offered extra hours when necessary.
I responded well to feedback	46%	- Dr. Voter regularly asks for feedback or student's opinions throughout the class to understand how she can improve and teach us better - She was very good about pivoting when the class was struggling and that was very impressive to me as not many professors are able to do that.
<b>Critical Themes</b>		
Coding assignments need better scaffolding	62%	- The coding was daunting. I think we could have done it had we had smaller assignments every week that built on each other. - Starting off the course a little bit less strong with the coding will save future students and the instructor time in understanding the homeworks.
Lectures could be leveled up	31%	- Powerpoint lectures are not always the best way for me to learn. Maybe this course could incorporate more interactive elements - Sometimes I would look back at the lecture notes and feel like it wasn't that useful to help me complete the homework.

## Training in Teaching

### Training completed while at UD

2023

#### **Course Design Institute**

*Host:* Center for Teaching and Learning, University of Delaware  
4-day workshop focused on redesigning a specific course (I chose CIEG305: Fluid Mechanics)

#### **Summer Institute on Teaching**

*Host:* Center for Teaching and Learning, University of Delaware  
2-hour workshop on specifications grading

2022

#### **Excellence in Civil Engineering Education (ExCEED) Workshop**

*Host:* American Society of Civil Engineers, Westpoint, NY  
6-day workshop that provides engineering educators with theory, examples, practice, and feedback to improve their teaching abilities

## Training completed prior to UD

- 2018      **Delta Certificate in Teaching, Research and Learning**  
*Host:* Delta Program, UW-Madison  
*Committee:* Dr. Trina McMahon (chair), Dr. Steve Loheide, Dr. Daniel Wright, Dr. Amber Smith, Dr. Rosemary Russ  
Certificate awarded after successful defense of a teaching portfolio following science education coursework and a teaching-as-research internship
- 2017      **Teaching Inclusively Workshop**  
*Host:* Center for the Integration of Teaching Research and Learning, online  
2-hr workshop that allowed participants to roleplay difficult classroom situations and get feedback from peers, with a focus on responding to disruptive students
- 2016      **Diversity Training Workshop**  
*Host:* Delta Program, UW-Madison  
3-hr workshop that allowed participants to roleplay difficult classroom situations and get feedback from peers, with a focus on responding to current events
- 2016      **Delta Internship Program**  
*Host:* Delta Program, UW-Madison  
Semester-long seminar (3 credit) in which each participant develops their own teaching-as-research project, implements it in a classroom, and presents findings
- 2015      **Teaching in the College Classroom**  
*Host:* Delta Program, UW-Madison  
Semester-long course (3 credit) that provides a deep foundational knowledge of evidence-based teaching practices with opportunities to practice new teaching approaches

## MENTORING ACTIVITIES

---

RA = Research Assistantship; TA = Teaching Assistantship

### Doctoral Students Advised

Fall 2023 – *present*      **Austin Farnum**, Ph.D. in Water Resources Engineering (UD)

Spring 2022 – *present*      **Rachel Zobel**, Ph.D. in Water Science and Policy (UD)

### Masters Students Advised

Fall 2022 – *present*      **Omowumi Erukubami**, M.S. in Geology (UD)

### Undergraduate Research Students Advised

Fall 2022 – *present*      **Abigail Pierson**, B.S. in Environmental Engineering (UD)

### Committees

*present*      **Dannielle Pratt** (University of Delaware; Holly Michael)  
Ph.D. in Water Resources Engineering

Teaching and Mentoring



*present*

**Aaron Alexander** (UW-Madison; Steven P. Loheide II and Daniel Wright)  
Ph.D. in Civil and Environmental Engineering

2023

**Lauren Donati** (University of Delaware; Holly Michael)  
M.S. in Water Science and Policy

## Training in Mentoring

### Training completed prior to UD

2017

#### **Research Mentor Training**

*Host:* Delta Program, UW-Madison

Semester-long seminar (1 credit) exploring strategies to become a more effective, culturally responsive mentor and discuss mentoring challenges as they arise

# Service

## SERVICE STATEMENT

---

**At the University of Delaware**, I have been an active member of multiple committees in the Department of Civil and Environmental Engineering. Currently, I serve on the department leadership team, a group of three faculty who meet regularly with the chair to discuss and provide feedback on department issues. Prior to that, I was an active member of the graduate student committee where I helped to organize the first prospective recruiting event the department hosted in several years. I have also served on two faculty search committees: one with a coastal/geotechnical focus and another with an environmental chemistry focus (currently active). For the second search, I designed the rubrics we are using to ensure we evaluate candidates consistently and fairly; these rubrics are now included as examples for College of Engineering Faculty ([example #6](#)). Although I do not have service expectations in the Department of Earth Sciences, I regularly attend Earth Sciences faculty meetings and support department initiatives.

I represent the University of Delaware in **professional service activities** as well. I am a representative for the University of Delaware to the Consortium for the Advancement of Hydrologic Sciences, Inc, an NSF-funded consortium which supports the water science community. I also serve as a reviewer for multiple journals and funding agencies. Since January 2022, I have reviewed 4 journal articles, served as an ad-hoc reviewer for National Science Foundation (3x) and Washington Sea Grant (1x), and served on two proposal panels (1 National Science Foundation, 1 Department of Energy). I have also been working to build connections with regional partners, including serving as a panelist at a recent Chesapeake Bay Science Technical Advisory Committee workshop on using biochar in the Chesapeake Bay.

## UNIVERSITY OF DELAWARE SERVICE

---

- 2023-present **Member**, Department of Civil & Environmental Engineering Leadership Team
- 2023-2024 **Member**, Environmental Engineering Faculty Search Committee
- 2022-present **University Representative**, Consortium for the Advancement of Hydrologic Sciences, Inc.
- 2022-present **Department Representative**, Junior Advisory Council, College of Engineering
- 2022-2023 **Member**, Department of Civil & Environmental Engineering Graduate Committee
- 2022 **Member**, Coastal Geotechnical Faculty Search Committee

## PROFESSIONAL SERVICE

---

### Manuscript Review

(4 articles reviewed since 2022; 9 since 2021)

- Environmental Research Letters
- Journal of Hydrology
- Water Resources Research
- Ecohydrology
- Journal of the American Water Resources Association
- Journal of Sustainable Water in the Built Environment
- Journal of Hydrologic Engineering
- Journal of Water Resources Engineering
- Journal of Contemporary Water Research and Education
- Environmental Research: Infrastructure and Sustainability

### Proposal Review

2022-present **National Science Foundation Hydrologic Sciences**, Ad hoc Reviewer (3x), Panel Reviewer (1x)

2023 **Washington Sea Grant**, Ad-hoc Reviewer (1x)

2022 **Department of Energy**, Panel Reviewer (1x)

### Technical Committees

2023 **Panelist**, Using Carbon to Achieve Chesapeake Bay (and Watershed) Water Quality Goals and Climate Resiliency: The Science, Gaps, Implementation Activities and Opportunities. *Chesapeake Bay Science Technical Advisory Committee Workshop.*

2016-present **Founding Contributor**, RePicture Engineering  
*Contributions:* support summer program, Roll Model profile, review grant proposals and papers, beta test new features

# Curriculum Vitae

---

## Carolyn B. Voter, PhD

360C DuPont Hall, 127 The Green, Newark, DE 19716  
w: [carolynbvoter.com](http://carolynbvoter.com) | e: [cvoter@udel.edu](mailto:cvoter@udel.edu) | p: (302) 831-2440

### RESEARCH INTERESTS

---

- Hydrologic feedbacks: surface water-groundwater interactions, land-atmosphere interactions
- Integrated hydrologic modeling, high throughput/performance computing
- Urban ecohydrology, green stormwater infrastructure, stormwater management
- Sustainable and resilient communities, coupled human-natural systems

### EMPLOYMENT AND EDUCATION

---

#### Professional Appointments

- 2022 - present **Assistant Professor**, University of Delaware  
Departments of Civil & Environmental Engineering and Earth Sciences  
*Affiliations:* Water Science & Policy Program, Delaware Environmental Institute, Data Science Institute, Data Science Institute
- 2019 – 2021 **Wisconsin Water Resources Science-Policy Fellow**, University of Wisconsin-Madison  
Water Use Section, WI Department of Natural Resources, Madison, WI

#### Education

- 2019 **Ph.D.**, Civil Engineering, University of Wisconsin-Madison
- 2012 **B.S.**, Civil Engineering, Bucknell University

### PUBLICATIONS

---

#### Peer-Reviewed Papers

6. Alexander, G.A. <sup>gsc\*</sup>, **C.B. Voter**, D.B. Wright, S.P. Loheide II. *In revision*. Urban Ecohydrology: Resolving Sub-Grid Surface Lateral Water and Energy Transfers in a Land Surface Model. *Water Resources Research*
5. Oswald, C.J., C. Kelleher, S.H. Ledford, K.G. Hopkins, A. Sytsma, D. Tetzlaff, L. Toran, **C.B. Voter**. 2023. Moving beyond impervious surface cover: the need for integrated process understanding of water flow in cities. *Journal of Hydrology*. <https://doi.org/10.1016/j.jhydrol.2023.129188>
4. **Voter, C.B.**, F.J. Guerrero-Bolaño, A.W. Latzka, B.M. Maitland, and J. Hauxwell. 2021. Adaptable University-Agency Early-Career Fellowship Program Creates a Win-Win-Win for Wisconsin's Waters. *Journal of Contemporary Water Research & Education*, 174:139-154. <https://doi.org/10.1111/j.1936-704X.2021.3365.x>

3. **Voter, C.B.** and S.P. Loheide II. 2021. Climatic controls on the hydrologic effects of urban low impact development practices. *Environmental Research Letters*, 16(6): 064021. <https://iopscience.iop.org/article/10.1088/1748-9326/abfc06>
2. **Voter, C.B.** and S.P. Loheide II. 2020. Where and When Soil Amendment is Most Effective as a Low Impact Development Practice in Residential Areas. *Journal of the American Water Resources Association*, 56(5):776-789. <https://doi.org/10.1111/1752-1688.12870>
1. **Voter, C.B.** and S.P. Loheide II. 2018. Urban Residential Surface and Subsurface Hydrology: Synergistic Effects of Low-Impact Features at the Parcel-Scale. *Water Resources Research*, 54. <https://doi.org/10.1029/2018WR022534>

## Refereed Conference Papers

1. Mayo, L. and **C.B. Voter**. 2019. Introducing Students to Engineering by Helping Them RePicture Their World. ASEE Annual Conference & Exposition, Tampa, FL. <https://peer.asee.org/32265>. (17p.)

## Technical Reports

2. **Voter, C.B.**, C. Hein, J. Chenevert, I. Anderson, R. Smail, M. Gibson, K. Doyle, S. Bunde. 2021. Appendix B: Central Sands Lakes Study Technical Report: Lake Ecosystem Characterization and Response. Wisconsin Department of Natural Resources. <https://doi.org/10.5281/zenodo.5708751>
1. **Voter, C.B.** and E. Verbeten. February 2017. "Groundwater: Powering Wisconsin's Economy." *Wisconsin Natural Resources*. Wisconsin Department of Natural Resources. <http://dnr.wi.gov/wnrmag/2017/02/Insert1.pdf>

## FUNDING

---

### Grants

- |             |   |
|-------------|---|
| 2024 – 2026 | <p><b>An investigation of green infrastructure to enhance resilient stormwater management in the City of Wilmington</b> (<u>\$115,000</u>)</p> <p><i>Funding:</i> Delaware Sea Grant</p> <p><i>Voter Role:</i> Co-PI</p> <p><i>Collaborators:</i> Rebecca Nixon (UD, lead PI), Victor Perez (UD)</p>  |
| 2023 – 2026 | <p><b>Integrated Assessment of Climate Change Impacts to Groundwater, Stormwater, and Wastewater Infrastructure at Coastal Military Facilities</b> (<u>\$1,541,829</u>)</p> <p><i>Funding:</i> Department of Defense Environmental Security Technology Certification Program</p> <p><i>Voter Role:</i> Lead PI</p> <p><i>Collaborators:</i> Paul Imhoff (UD), Holly Michael (UD), Larry Trout (Straughan Environmental)</p> |
| 2022 – 2024 | <p><b>SAI-P: Optimizing deployment of green stormwater infrastructure for maximum benefit</b> (<u>\$123,556</u>)</p> <p><i>Funding:</i> National Science Foundation, Strengthening American Infrastructure</p> <p><i>Voter Role:</i> Lead PI</p> <p><i>Collaborators:</i> Paul Imhoff (UD), Rebecca Nixon (UD), Yao Hu (UD)</p>   |

2020 – 2022 **Mitigating flooding, extreme heat, and heavy rainfall in urban coastal communities by “greening”** ([\\$238,582](#))  
*Funding:* Wisconsin Sea Grant Institute  
*Voter Role:* Co-Lead Author, Associate Investigator  
*Collaborators:* Steve Loheide (Lead PI, UW-Madison), Dan Wright (UW-Madison)

## Fellowships

2019 – 2021 **Wisconsin Water Resources Science-Policy Fellowship**, Wisconsin Water Resources Institute, UW-Madison (\$55,000 stipend)  
*Voter Role:* Postdoctoral Fellow

2015 – 2016 **Wisconsin Water Resources Science-Policy Fellowship**, Wisconsin Water Resources Institute, UW-Madison (\$33,231 tuition, stipend, fringe benefits)  
*Voter Role:* Student Fellow

2014 – 2015 **Weston Fellowship**, UW-Madison (\$37,466 for stipend, tuition, and fringe benefits; \$1,500 flexible funds)  
*Voter Role:* Student Fellow

2008 – 2012 **Presidential Fellowship**, Bucknell University (\$25,000 per year; \$1,500/semester research stipend)  
*Voter Role:* Student Fellow

## AWARDS AND HONORS

---

2022 **Most Valuable Professor**, Women’s Volleyball Team, University of Delaware

2021 **Team of the Year**, Wisconsin Department of Natural Resources Environmental Management Division, for the Central Sands Lake Study Team

2021 **AGU 2020 Editor’s Citation for Excellence in Refereeing**, Water Resources Research [[link](#)]

2019 **James R. Villemonte Excellence in Research Award**, Dept. of Civil and Environmental Engineering, UW-Madison

2019 **Outstanding Graduate Oral Presentation**, American Water Resources Association – Wisconsin Section Annual Meeting

2018 **Outstanding Student Presentation Award**, American Geophysical Union Fall Meeting

2012 **Chancellor’s Opportunity Award**, UW-Madison

2012 **Peer Award of Distinction**, Dept. of Civil Engineering, Bucknell University

2012 **Michael D. LaGrega Award for Excellence in Environmental Engineering**, Bucknell University [[description](#)]

2012 **Eleanor D. Decker Prize for Women**, Bucknell University [[description](#)]

2011 **Chi Epsilon**, Civil Engineering Honor Society

2011 **Tau Beta Pi**, Engineering Honor Society

## PRESENTATIONS

---

<sup>us</sup> = undergraduate student, <sup>gs</sup> = graduate student, <sup>gsc</sup> = graduate student committee, <sup>m</sup> = mentor

### Conference Abstracts (*selected*)

2023 Zobel, R.<sup>gs</sup>, **C.B. Voter**. Identifying the Current State of Stormwater Management and Green Stormwater Infrastructure on Public University Campuses in the Chesapeake Bay Region. CUAHSI Biennial Meeting. Lake Tahoe, CA. Jun 2023. *Poster*.

Erukubami, O.<sup>gs</sup>, **C.B. Voter**. Assessment of Sea Level Rise Impacts on Aquifer Systems in Coastal Environments: A Case Study of Bowers Beach, Delaware. CUAHSI Biennial Meeting. Lake Tahoe, CA. Jun 2023. *Poster*.

Alexander, G.A.<sup>gsc</sup>, **C.B. Voter**, S.P. Loheide II<sup>m</sup>, and D.B. Wright. Better representation of urban hydrologic processes alters surface water and temperature cycles in regional coupled climate models. Consortium for the Advancement of Hydrologic Sciences, Inc. (CUAHSI) Biennial Meeting. Lake Tahoe, CA. Jun 2023. *Poster & Lightning Talk*.

Alexander, G.A.<sup>gsc</sup>, **C.B. Voter**, S.P. Loheide II<sup>m</sup>, and D.B. Wright. Resolving Fine-Scale Lateral Water Transfers in Urban Environments Alters Regional Climate Simulations. American Meteorological Society Annual Meeting. Denver, CO. Jan 2023. *Poster*.

2022 Alexander, G.A.<sup>gsc</sup>, **C.B. Voter**, S.P. Loheide II<sup>m</sup>, and D.B. Wright. Better Representation of Urban Hydrologic Processes Alters How Heat Responds to Urban Vegetation in Regional Climate Models. American Geophysical Union Fall Meeting. Chicago, IL. Dec 2022. *Poster*.

**Voter, C.B.**, G.A. Alexander<sup>gsc</sup>, S.P. Loheide II<sup>m</sup>, D.B. Wright. Consider the Climate: Understanding What to Expect from Urban Hydrology Interventions Depending on Where You Are. American Geophysical Union Frontiers in Hydrology Meeting. San Juan, PR. Jun 2022. *Oral*.

>> *Invited*

2021 **Voter, C.B.**, C. Hein<sup>m</sup>, J. Chenevert, I. Anderson. A Framework for Describing the Hydrologic Regime of Lakes for Improved Water Quantity Management. American Geophysical Union Fall Meeting. New Orleans, LA. Dec 2021. *Oral*.

Alexander, G.A.<sup>gsc</sup>, **C.B. Voter**, S.P. Loheide II<sup>m</sup>, and D.B. Wright. Incorporating Impacts of Green Infrastructure into a Large-Scale Land Surface Model. American Geophysical Union Fall Meeting. New Orleans, LA. Dec 2021. *Oral*.

Alexander, G.A.<sup>gsc</sup>, **C.B. Voter**, S.P. Loheide II<sup>m</sup>, and D.B. Wright. Incorporating the Hydrologic Impacts of Low Impact Development in a Large-Scale Land Surface Model. American Water Resources Association-Wisconsin Section Annual Meeting. Online. Mar 2021. *Oral*.

>> *WI AWRA Outstanding Graduate Oral Presentation*

Parsen, M., **C.B. Voter**, C. Hein<sup>m</sup>, and A.H. Pruitt. Lake-Groundwater Interactions of Plainfield, Long, and Pleasant Lakes in the Central Sands of Wisconsin. American Water Resources Association-Wisconsin Section Annual Meeting. Online. Mar 2021. *Oral*.

- 2020 **Voter, C.B.**, C. Hein<sup>m</sup>, J. Chenevert, I. Anderson, A.H. Pruitt, M.N. Fienen, M.J. Haserodt, A. Leaf, and S. Westenbroek. Impacts of groundwater withdrawals on lake hydrology and ecology in a water-rich region: what matters most? American Geophysical Union Fall Meeting. Online. Dec 2020. *Poster*.
- Avery, W.A., S.P. Loheide II<sup>m</sup>, W.R. Selbig, H. Barker, K. Rabeler, D.M. Ciruzzi, and **C.B. Voter**. The role of urban canopy architecture in precipitation redistribution. American Geophysical Union Fall Meeting. Online. Dec 2020. *eLightning*.
- 2019 **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Advancing understanding of single family parcel hydrology to improve the hydroecologic outcomes of low impact practices. American Geophysical Union Fall Meeting. San Francisco, CA. Dec 2019. *eLightning*.  
>> *Invited*
- Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Restoring urban ecohydrologic fluxes on a lot-by-lot basis: Which doors to knock on first? American Geophysical Union Fall Meeting. San Francisco, CA. Dec 2019. *Oral*.
- Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Soil amendment as a green infrastructure practice in residential areas. American Water Resources Association-Wisconsin Section Annual Meeting. Delavan, WI. Mar 2019. *Oral*.  
>> *WI AWRA Outstanding Graduate Oral Presentation*
- Nohr, K.<sup>ug</sup>, **C.B. Voter** and S.P. Loheide II<sup>m</sup>. Comparing soil infiltration capacity among and within residential parcels in Milwaukee. American Water Resources Association-Wisconsin Section Annual Meeting. Delavan, WI. Mar 2019. *Poster*.  
>> *WI AWRA Outstanding Undergraduate Presentation*
- earlier **Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Quantifying weather-driven differences in the hydrologic outcomes of low-impact practices. American Geophysical Union Fall Meeting. Washington D.C. Dec 2018. *Oral*.  
>> *AGU Outstanding Student Presentation Award*
- Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Climate- and development-driven heterogeneity in hydrologic fluxes from urban residential parcels. Long Term Ecological Research Network – All-Scientists Meeting. Monterey Bay, CA. Oct 2018. *Poster*.
- Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Introducing a real-world design problem to an intro water resources engineering course: effects on cognitive skills, confidence, and perception of value. UW-Madison Teaching and Learning Symposium. Madison, WI. May 2017. *Poster*.
- Stieve, J.<sup>ug</sup>, **C.B. Voter** and S.P. Loheide II<sup>m</sup>. Particle Size Analysis of Milwaukee Soils. UW-Madison Undergraduate Research Symposium. Madison, WI. Apr 2017. *Poster*.
- Voter, C.B.** and S.P. Loheide II<sup>m</sup>. Effect of weather patterns in cities across the United States on surface runoff, deep drainage, and evapotranspiration from a residential parcel. American Geophysical Union Fall Meeting. San Francisco, CA. Dec 2016. *Oral*.
- <sup>ug</sup>Calderon, M., **C.B. Voter** and S.P. Loheide II<sup>m</sup>. Soil Particle Size Analysis in Milwaukee. UW-Madison Undergraduate Research Symposium. Madison, WI. Apr 2016. *Poster*.



## Invited Seminars, Symposia and Panels (*selected*)

- 2023 Connecting Science, Management, and Community in the Central Sands and Beyond. [Water@UW-Madison Symposium](#). Apr 2023. *Oral + Panel*.
- 2022 Urban ecohydrology: Processes that matter, ways to model them, and implications for sustainable management. [Georgia State University](#). Nov 2022. *Oral*.
- Scaling up: Accounting for key fine-scale urban hydrologic processes at city and larger scales. [UMBC Center for Urban Environmental Research and Education Seminar](#). Online. Feb 2022. *Oral*.
- What matters most? Tracking down key ecohydrologic processes in urban and agricultural landscapes to inform management strategies. [University of Delaware Earth Sciences Seminar](#). Feb 2022. *Oral*.
- 2021 Using Co-productive Science to Address Wicked Water Problems in the Highly-irrigated Wisconsin Central Sands. [University of Delaware Project WiCCED Seminar](#). Online. Oct 2021. *Oral*.
- Advancing Science and Management through the Central Sands Lakes Study. [UW-Madison Environmental Chemistry and Technology Seminar](#). Online. Oct 2021. *Oral*.
- The Central Sands Lakes Study: Findings & Recommendations Overview. [Wisconsin Department of Natural Resources](#). Online. May 2021. *Oral*. [dnr.wisconsin.gov/topic/Wells/HighCap/CSLStudy.html](http://dnr.wisconsin.gov/topic/Wells/HighCap/CSLStudy.html)
- Tackling Wisconsin's Water Challenges through UW Water Science-Policy Fellowships and Agency Partnerships. *Panel*. At:
- [Wisconsin Water Week](#), plenary session with panel discussion. Online. Mar 2021.
  - [University of Wisconsin-Madison 5<sup>th</sup> Annual Symposium for Research Administrators](#), panel discussion. Online. Sep 2020.
- 2020 Defining a “significant” reduction in “average seasonal lake levels” in the Wisconsin Central Sands. *Oral*. At:
- [Wisconsin Potato and Vegetable Growers Association](#). Online. Mar 2020.
  - [Water@UW-Madison Spring Symposium](#). Online. May 2020.
  - [Wisconsin Lakes and Rivers Partnership](#). Online. Oct 2020.
- 2019 Wisconsin and Great Lakes Fellowships: Connecting Science, Policy, and Management. [Water@UW-Madison Fall Poster Session](#). Madison, WI. Nov 2019. *Poster*.
- Improving the quality of my research on urban residential hydrology by increasing the quantity of simulations using HTCCondor. [HTCCondor Week](#). Madison, WI. May 2019. *Oral*.
- Protecting our Urban Waters. [Wisconsin Chapter of the Society for Conservation Biology](#), presentation and panel discussion. Madison, WI. Feb 2019. *Oral*.
- earlier Delta Future Faculty Panel. [Center for Integration of Research, Teaching, and Learning](#) Fall In-Person Meeting, panel discussion. Madison, WI. Oct 2018. *Panel*.

Low-impact practices in residential areas: how interactions among practices and with climate alter urban hydrology. Marquette University Environmental and Water Resources Engineering Seminar. Milwaukee, WI. Oct 2018. *Oral*.

Low-impact practices on residential parcels: How and where they cause the biggest (hydrologic) bang. Nelson Institute Brown Bag Series. Madison, WI. Apr 2018. *Oral*.

Variability in deep drainage from urban residential parcels: what interventions have the greatest potential impact? Wisconsin Groundwater Association Speaker Series. Madison, WI. Sep 2017. *Oral*.

The Wisconsin Groundwater Coordinating Council: 2016 Updates and the Fellowship Experience. Water@UW-Madison Fall Poster Session. Madison, WI. Oct 2016. *Poster*.

## TEACHING

---

### University of Delaware

Fall 2022      **CIEG 305: Fluid Mechanics** 3 credits, 109 students

Spring 2023    **GEOL 467/667: Ecohydrology** 3 credits, 15 students (undergrad + grad)

### Guest Teaching

Spring 2022    **CIEG 403: Sustainable Applications in Infrastructure** (UD)  
*Topic:* Green Stormwater Infrastructure

Fall 2019,  
Fall 2016      **CEE 311: Hydrosience** (UW-Madison)  
*Topic:* Urban Hydrology

Fall 2014      **CEE 411: Open Channel Hydraulics** (UW-Madison)  
*Topic:* Flow Routing

### Professional Development (*selected*)

2023            **Course Design Institute**  
*Host:* Center for Teaching and Learning, University of Delaware  
4-day workshop

2022            **Excellence in Civil Engineering Education (ExCEED) Workshop**  
*Host:* American Society of Civil Engineers, Westpoint, NY  
6-day workshop that provides engineering educators with theory, examples, practice, and feedback to improve their teaching abilities

2018            **Delta Certificate in Teaching, Research and Learning**  
*Host:* Delta Program, UW-Madison  
*Committee:* Dr. Trina McMahon (chair), Dr. Steve Loheide, Dr. Daniel Wright, Dr. Amber Smith, Dr. Rosemary Russ  
Certificate awarded after successful defense of a teaching portfolio following science education coursework and a teaching-as-research internship

- 2017      **Research Mentor Training**  
*Host:* Delta Program, UW-Madison  
Semester-long seminar (1 credit) exploring strategies to become a more effective, culturally responsive mentor and discuss mentoring challenges as they arise
- 2016      **Delta Internship Program**  
*Host:* Delta Program, UW-Madison  
Semester-long seminar (3 credit) in which each participant develops their own teaching-as-research project, implements it in a classroom, and presents findings
- 2015      **Teaching in the College Classroom**  
*Host:* Delta Program, UW-Madison  
Semester-long course (3 credit) that provides a deep foundational knowledge of evidence-based teaching practices with opportunities to practice new teaching approaches

## MENTORING

---

### Graduate Mentees

- 2023 – present Austin Farnum, PhD student, Water Resources Engineering, University of Delaware  
 2022 – present Omowumi Erukubami, MS student, Geological Sciences, University of Delaware  
 2022 – present Rachel Zobel, PhD student, Water Science and Policy, University of Delaware  
 2020 – present Aaron Alexander, PhD student, Civil and Environmental Engineering, UW-Madison

### Undergraduate Mentees

- 2022 – present Abigail Pierson, B.S. in Environmental Engineering, University of Delaware  
 2018 – 2019 Katlyn Nohr, B.S. in Geological Engineering, UW-Madison  
 2018 Aaron Canton, B.S. in Civil and Environmental Engineering, UW-Madison  
 2017 – 2018 Jared Stieve, B.S. in Civil and Environmental Engineering, UW-Madison  
 2016 Alex Bauch, B.S. in Environmental Sciences, UW-Madison  
 2015 – 2016 Martin Calderon, B.S. in Civil and Environmental Engineering, UW-Madison

## SERVICE

---

- 2023-2024      **Member**, Environmental Engineering Faculty Search Committee
- 2023-present      **University Representative**, Consortium for the Advancement of Hydrologic Sciences, Inc.
- 2022-present      **Department Representative**, Junior Advisory Council, College of Engineering
- 2022      **Member**, Coastal Geotechnical Faculty Search Committee
- 2016-present      **Founding Contributor**, RePicture Engineering  
*Contributions:* support summer program, Roll Model profile, review grant proposals and papers, beta test new features

*Manuscript Reviewer for:* Environmental Research Letters, Journal of Hydrology, Water Resources Research, Ecohydrology, Journal of the American Water Resources Association, Journal of Sustainable Water in the Built Environment, Journal of Hydrologic Engineering, Journal of Water Resources Engineering, Journal of Contemporary Water Research and Education

*Proposal Reviewer for:* National Science Foundation Hydrologic Sciences, Department of Energy

## PUBLIC ENGAGEMENT

---

### Professional Development

- 2018      **Green Infrastructure and Stormwater Management:** A workshop to explore decision support tools to support community resiliency workshop. Sea Grant Extension, Milwaukee, WI. [3-day workshop](#).
- 2017      **Community-Engaged Research Institute,** Sea Grant Extension, Lansing, MI. [5-day workshop](#).

### Professional Development

- 2021      Can green infrastructure influence the weather in Milwaukee? [\[link\]](#)
- 2020      UW-Madison College of Engineering. A green scene: Engineers take a comprehensive approach to mitigating urban heat islands. [\[link\]](#)
- 2019      Wisconsin Water Resources Institute. Voter Returns as Water Resources Science-Policy Fellow to Shed Light on Central Sands Lakes. [\[link\]](#)
- 2019      EOS Research Spotlight. Strategies to Improve Urban Hydrology. [\[link\]](#)
- 2017      UW-Madison News. A Data Tool for Homeowners to Make Rain Gardens More Effective. [\[link\]](#)
- 2015      Wisconsin Water Resources Institute. Voter Elects to Become Debut WRI Fellow. [\[link\]](#)
- 2012      Wisconsin Water Resources Institute. A Little from a Lot. [\[link\]](#)