Xander Huggins

groundwater-connected systems • social-ecological systems
global hydrology • groundwater-dependent ecosystems
freshwater sustainability • human-Earth system dynamics

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Professional appointments

Lecturer (Assistant Professor) in Global Terrestrial Water — **09/2026 - present**
University of Glasgow
School of Geographical and Earth Sciences
James Watt School of Engineering (Affiliate)

Research Associate — **2025 – present**
Stockholm Resilience Centre

Postdoctoral Research Associate — **2024 – 2026**
Princeton University
High Meadows Environmental Institute

NSERC, Killam, Canadian Space Agency Postdoctoral Research Fellow — **2024 – 2026**
University of British Columbia
Institute for Resources, Environment, and Sustainability

Researcher — **2023**
International Institute for Applied Systems Analysis
Water Security Research Group

Education

PhD in Civil Engineering — **2024**
University of Victoria
Department of Civil Engineering
Dissertation: ***Groundwater-connected systems: A social-ecological framing, global data-driven applications, and sustainability implications*** link: *hdl.handle.net/1828/17590*

Award highlight
- *recipient of the top PhD thesis awards at the university and across Canada*

Direct transfer ("fast-track") from MASc to PhD program in 2020

B.Eng. in Water Resources Engineering *with distinction* — **2018**
University of Guelph
School of Engineering

Group leadership and organisation

Global Freshwater Systems Science Workshop — **2023 – present**
Initiative co-lead
Multi-institutional working group of freshwater resilience scientists, with collaboration from the Stockholm Resilience Centre, Aalto Univ., Univ. of Eastern Finland, Univ. of Amsterdam, and the Potsdam Institute for Climate Impact Research (PIK). *Workshop website:* https://freshwatersystemsworkshop.org/

Regime Shifts and Tipping Points in Social-Ecological Systems **2026 – present**
Working group member
Working group, as part of the Society for Social-Ecological Systems' working groups initiative, focused on understanding and predicting regime shifts in ecosystems and social systems, contributing to the Regime Shifts Database and Global Tipping Points Report. Members span institutions across Sweden, South Africa, Italy, Canada, the UK, China, Colombia, and India.

Earth resilience and sustainability Initiative **2026 – present**
Princeton representative organiser
A joint consortium between Princeton University, Stockholm Resilience Centre, and the Potsdam Institute for Climate Impact Research, that examines integrative, interdisciplinary linkages across the themes of urban sustainability transformations, food system resilience, and global systemic risk and resilience.

Publications

Under review Krueger, E.H., et al. (including **Huggins, X.**). From Phase Transitions to Tipping Points: The evolution of Critical Transitions concepts from their inception to current applications. In review with *Annual Reviews Environment and Resources*.

Under review **Huggins, X.**, Rohde, M.M., Reinecke, R., Gnann, S., Sacco, M., Hose, G.C., Stella, J.C., Kløve, B. Groundwater-dependent ecosystems are a missing component of global research and policy agendas. In review with *Nature Sustainability*. Preprint: https://doi.org/10.31223/X5D22K

Under review **Huggins, X.** †, Virkki, V. †, Krueger, E.H., Kaandorp, C., Fahrländer, S., Viriyaroj, B., Dahlmann, H., Lotcheris, R.A., Paavonen, E., Vasnovski, P., Lindao, D., Bohra, R., Andersen, L.S., Fezter, I., Gerten, D., Jaramillo, F., Kummu, M., Lasantha, V., Porkka, M., Rocha, J.C., & Wang-Erlandsson, L. Orientations to navigate the complexity of freshwater resilience in social-ecological systems. In review with *Ecology and Society*. († = joint lead authorship). Preprint: https://doi.org/10.31223/X5280S

Under review **Huggins, X.**, Gleeson, T., Famiglietti, J.S., Moore, M.-L., & Villholth, K.G. The puzzling yet tractable diversity of global groundwater sustainability challenges. In revision with *Nature Water*. Preprint: https://doi.org/10.31223/X56N16

Under review Yang, X., Feng, Y., Ziegler, A.D., Elsen, P.R., Spracklen, D.V., Xi, Y., Lin, Z., Qin, Y., Holden, J., Wu, J., Fendrich, A., Zou, Y., **Huggins, X.**, Liu, X., Xu, Y., Yao, W., & C. Zheng. Enduring protected-area effectiveness in reducing tropical forest disturbance and carbon loss.

17 Gleeson, T., **Huggins, X.**, Buckley, H.L., Da Silva Correa, L.H., Minet, L., Gupta, R., Zimmer, C., Froese, T., Ng, G.-H. C., Mohan, C., Horoscoe, N., Okibe, S., Milligan, K., & Schouten, M. Strengthening our wings of equity to empower civil engineering students to navigate our challenging world: embedding environmental justice, sustainability science, equity, diversity, and inclusion across an undergraduate program. *Journal of Civil Engineering Education* (Accepted).

16 Re., V., Frommen, T., Healy, A., **Huggins, X.** & P. Hynds. Socio-Hydrogeology: the past, present, and future of a people-centred and place-based approach to groundwater science. (2026). *Hydrogeology Journal* 34, 1639-1654.

15 Bäthge, A., Ruz Vargas, C., Lischeid, G., Collenteur, R., Cuthbert, M.O., Fleckenstein, J., Floerke, M., de Graaf, I., Gnann, S., Hartmann, A., **Huggins, X.**, Moosdorf, N., Wada, Y., Wagener, T. & R. Reinecke. (2026). GROW: A Global Time Series Dataset for Large-Sample Groundwater Studies. *Scientific Data* 13, 401.

14 **Huggins, X.**, Gleeson, T., Famiglietti, J.S., Reinecke, R., Zamrsky, D., Wagener, T., Taylor, R.G., Konar, M., Lindersson, S., Wada, Y., Bierkens, M.F.P., Pokhrel, Y., Rocha, J., Di Baldassarre, G., Kummu, M., Ferguson G., Mukherjee, A., Lo, M.-H., Scanlon, B.R., Johnson, M.S., & Zheng, C. (2025). A review of open data for studying global groundwater in social-ecological systems. *Environmental Research Letters* 20, 093002.

13 Sacco, M., **Huggins, X.**, Martinez, A., Reinecke, R. (2025). Collaborative science for groundwater biodiversity conservation. *Groundwater* 63(4), 450-451.

12 **Huggins, X.**, Gleeson, T., Villholth, K.G., Rocha, J.C., Famiglietti, J.S. (2024). Groundwaterscapes: A global classification and mapping of groundwater's large scale socioeconomic, ecological, and Earth system functions. *Water Resources Research* 60(10), e2023WR036287.

11 Jaramillo, F. et al. (including **Huggins, X.**). The potential of hydrogeodesy to address water related problems and sustainability challenges. (2024). *Water Resources Research* 60(11), e2023WR037020.

10 Rohde, M.M., Albano, C.M., **Huggins, X.**, et al. (2024). Groundwater-dependent ecosystem map exposes global dryland protection needs. *Nature* 632, 101-107.

9 Curran, D., Gleeson, T., **Huggins, X.** (2024). Reply to Comment on "Applying a science-forward approach to groundwater regulatory design". *Hydrogeology Journal* 31, 853-871.

8 Xu, L., Ferris, D., **Huggins, X.**, Wong, J.S., Mohan, C., Sadri, S., Chandanpurkar, H.A., Sanyal, P., Famiglietti, J.S. (2023). From coarse resolution to practical solution: GRACE as a science communication and policymaking tool for sustainable groundwater management. *Journal of Hydrology* 623, 129845.

7 **Huggins, X.** Gleeson, T., Castilla-Rho, J.C., Holley, C., Re, V., Famiglietti, J.S. (2023). Groundwater connections and sustainability in social-ecological systems. *Groundwater* 61(4), 463-478.

6 Curran, D., Gleeson, T., **Huggins, X.** (2023). Applying a science-forward approach to groundwater regulatory design. *Hydrogeology Journal* 31, 853-871.

5 **Huggins, X.**, Gleeson, T., Serrano, D., Zipper, S., Jehn, F., Rohde, M.M., Abell, R., Vigerstol, R., Hartmann, A. (2023). Overlooked risks and opportunities in groundwatersheds of the world's protected areas. *Nature Sustainability* 6, 855-864.

4 Mohan, C., et al. (including **Huggins, X.**). (2022) Poor correlation between large-scale environmental flow violations and freshwater biodiversity: implications for water resource management and the water planetary boundary. *Hydrology and Earth Systems Sciences*. 26, 6247–6262.

3 **Huggins, X**., Gleeson, T., Kummu, M., Zipper, S.C., Troy, T.J., Wada, Y., Famiglietti, J. (2022). Hotspots for social and ecological impacts from freshwater stress and storage loss. *Nature Communications* **13**, 439.

2 Diggle, R., Tait, D., Maher, D., **Huggins, X.**, Santos, I. (2019). The role of porewater exchange as a driver of CO2 flux to the atmosphere in a temperate estuary (Squamish, Canada). *Environmental Earth Sciences* 78, 1-13.

1 **Huggins, X**. Gleeson, T., Eckstrand, H., Kerr, B. (2018). Streamflow Depletion Modeling: Methods for an Adaptable and Conjunctive Water Management Decision Support Tool. *Journal of the American Water Resources Association* 54, 1-15.

Chapters and reports

3 **Huggins, X.** (*In preparation).* Groundwater and sustainable development. Invited contribution to the *Encyclopaedia of Hydrogeology* (Springer Nature).

2 **Huggins, X.** (2022). Global archetypes of groundwater interactions in social-ecological systems. IIASA Young Scientist Summer Fellowship Report.

- *recipient of the IIASA Mikhalevich Award*

1 Gleeson, T., **Huggins, X.**, Connor, R., Arrojo-Agudo, P., Vázquez Suñé, E. (2022). Groundwater and Ecosystems, Chapter 6 in the United Nation's *World Water Development Report 2022*: "Groundwater: Making the invisible visible" (UNESCO).

Manuscripts in preparation

5 Kummu, M**.** et al. (including **Huggins, X.**). Global subnational absolute and relative poverty dynamics reveal diverging trends with over three billion people under poverty.

4 Vesnovskii, P., Moore, M-L, **Huggins, X**, et al. Mapping global water resilience risks for river basin governance.

3 Viriyaroj, B. et al (including **Huggins, X.**). Evolution of global crop production systems from 2001 to 2020.

2 Nykänen, R., et al. (including **Huggins, X.**). Holistic typology of the world's grazing lands.

1 **Huggins, X.**, Galbraith, E., Hoffman, R., Kummu, M., et al. Tracking human-Earth system change: three decades of development trajectories, subnational archetypes, and impacts on subjective well-being.

Published datasets

6 Bäthge, A., Ruz Vargas, C., Lischeid, G., Collenteur, R., Cuthbert, M., Fleckenstein, J. H., Floerke, M., De Graaf, I., Gnann, S., Hartmann, A., **Huggins, X.,** Moosdorf, N., Wada, Y., Wagener, T., & Reinecke, R. (2026). GROW: A Global-Scale Time Series Dataset for Groundwater Studies within the Earth System (1.0) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.15149480

5 **Huggins, X.** (2025). The Global Groundwater Data Catalogue. Available via the *International Groundwater Resources Assessment Centre*: https://un-igrac.org/our-work/activities/global-groundwater-data-catalogue/

4 **Huggins, X.** (2024). Data and code from: Groundwaterscapes: A global classification and mapping of groundwater's large-scale socioeconomic, ecological, and Earth system functions. *Borealis*. https://doi.org/10.5683/SP3/MFYCWV

3 Rohde, M., Albano, C., **Huggins, X.**, Klausmeyer, K., & A. Sharman. (2024). Data, code, and outputs for: groundwater-dependent ecosystem map exposes global dryland protection needs. *Zenodo*. https://doi.org/10.5281/zenodo.11062894

2 **Huggins, X**. (2023). Data from: Overlooked risks and opportunities in groundwatersheds of the world's protected areas. *Borealis*. https://doi.org/10.5683/SP3/P3OU3A

1 **Huggins, X.**, et al. (2022). Data from: Hotspots for social and ecological impacts from freshwater stress and storage loss. *Borealis.* https://doi.org/10.5683/SP3/SLR3GF

Funding history (all values in CAD; total to date: $428,500)

Postdoctoral Supplement Award ($20,000) **2024-2026**
Canadian Space Agency
5 awards annually in this national funding competition.

Killam Postdoctoral Research Fellowship ($120,000) **2024-2026**
University of British Columbia
Fellowship awarded to those "likely to contribute to the advancement of learning or to win distinction in a profession."

Postdoctoral Fellowship Award ($140,000) **2024-2026**
Natural Sciences and Engineering Research Council of Canada (NSERC)
National fellowship funding awarded to "a core of the most promising researchers".

President's Research Scholarships ($15,000, $5,000/year awarded) **2021-2023**
University of Victoria

Alexander Graham Bell Canada Graduate Scholarship – Doctoral ($105,000) **2021-2024**
Natural Sciences and Engineering Research Council of Canada (NSERC)

Alexander Graham Bell Canada Graduate Scholarship – Masters ($17,500) **2018-2020**
Natural Sciences and Engineering Research Council of Canada (NSERC)

Undergraduate Student Research Award ($6,000) **2015**
Natural Sciences and Engineering Research Council of Canada (NSERC)

Major funding acquisition activity

Co-PI: A virtual, transdisciplinary network for regional to global groundwater sustainability transformations **2025**
Schmidt Sciences – Virtual Institute for Earth's Water
Co-PI on application that was shortlisted (19 of 200+) but not selected for $10M USD grant.

Participant and writer – The Global Groundwater Coalition **2022**
New Frontiers Research Fund – Canadian Research Tri-Councils
Grant proposal was shortlisted (12 nationally) but not selected for $24M CAD.

Awards and recognition

Editors' Choice Award **2026**
Water Resources Research
Awarded to the Huggins et al. 2024 paper "Groundwaterscapes: A global classification and mapping of groundwater's large-scale socioeconomic, ecological, and Earth system functions"

Distinguished Dissertation Award in Engineering, Medical, and Natural Sciences **2025**
Canadian Association for Graduate Studies and ProQuest
Recognizes the top Canadian doctoral dissertation that makes "unusually significant and original contributions to their academic field and Canadian society at large".

Governor General's Gold Medal **2025**
University of Victoria
Recognizes the top PhD dissertation within the university's graduating class.

Mikhalevich Award **2022**
International Institute for Applied Systems Analysis
Awarded to the top mathematical and methodologically oriented PhD fellowship work.

Outstanding Student Presentation Award **2019**
American Geophysical Union
Awarded to top 5% of student presentations.

Professor Ross W. Irwin Scholarship in Water Resources **2018**
University of Guelph
In recognition of active involvement in water conservation and academic excellence.

Raymond Theodore Guther Memorial Scholarship **2018**
University of Guelph
In recognition of extra-curricular work in water conservation and water resources.

Conference presentations

20 **Huggins, X.** (along with J. Famiglietti, E. Lictevout, R. Taylor). Towards a Transdisciplinary Global Groundwater Sustainability Network. *IAH World Groundwater Congress*. Budapest, Hungary. (*Plenary)* **2026**

19 **Huggins, X.** & Gleeson, T. Strengthening our wings of equity to help civil engineering students navigate and soar in our challenging world: successes and lessons from a bottom-up curriculum initiative in Canada. *EGU General Assembly.* Vienna, Austria. (*Oral*) **2026**

18 **Huggins, X.** et al. Global groundwater sustainability puzzles: a coupled human–groundwater systems approach to identify distinct management challenges, strengthen solution networks, bridge global and local scales, and enable pathways to sustainability. *EGU General Assembly.* Vienna, Austria. (*Oral*) **2026**

17 **Huggins, X.**, & Rohde, M.M. Groundwater-dependent ecosystem map highlights global dryland protection needs. *EGU General Assembly.* Vienna, Austria. (*Invited Oral*) **2025**

16 Kummu et al. (including **Huggins, X.**). Unveiling global humanscapes: harmonised subnational socio-economic datasets for understanding societal changes and enhancing risk assessments. *EGU General Assembly.* Vienna, Austria. (*Oral*) **2025**

15 Bäthge et al. (including **Huggins, X.**). GROW: A Global Time Series Dataset for Large-Sample Groundwater Studies. *EGU General Assembly.* Vienna, Austria. **2025**

14 **Huggins, X.** et al. A review of open data for studying global groundwater in social-ecological systems. *EGU General Assembly.* Vienna, Austria. (*Oral*) **2025**

13 **Huggins, X.** Groundwaterscapes & riskscapes: Early empirical approaches to understand global groundwater in social-ecological systems. *Critical Transitions in Socio-Ecological Systems Workshop*. Princeton, USA. (*Oral flash talk*). **2025**

12 **Huggins, X.,** Gleeson, T, Villholth, K.G., Rocha, J.C., Famiglietti, J.S. Groundwaterscapes: A global application of a new conceptual framing to understand groundwater systems as social-ecological systems. *World Groundwater Congress*. Davos, Switzerland. (*Oral*) **2024**

11 **Huggins, X.,** Gleeson, T, Villholth, K.G., Rocha, J.C., Famiglietti, J.S. Global groundwater system archetypes: a data-driven typology of social, ecological, and Earth system interactions with groundwater at the global scale. *6th International Research Workshop on Archetypes in Sustainability Research.* Lund, Sweden. (*Oral*) **2023**

10 **Huggins, X.,** Gleeson, T., Villholth, K.G., Rocha, J., Famiglietti, J.S. Global groundwater archetypes: a new typology of groundwater interactions with social and ecological systems and an outlook for sustainable development. *EGU General Assembly*. Vienna, Austria. (*Highlighted oral*) **2023**

9 Xu, L., Famiglietti, J.S., Ferris, D., **Huggins**, **X.**, Mohan, C., Sadri, S., Sanyal, P. From coarse resolution to realistic resolution: GRACE as a science communication and policymaking tool for sustainable groundwater management. *EGU General Assembly*. Vienna, Austria. (*Oral*) **2023**

8 **Huggins, X.,** Gleeson, T., Serrano, D., Zipper, S., Jehn, F., Rohde, M.M., Abell, R., Vigerstol, R., Hartmann, A. Overlooked risks and opportunities for global protected areas revealed by mapping groundwatersheds. *World Water Week*. Stockholm, Sweden. *(Solicited oral)* **2022**

7 **Huggins, X.,** Gleeson, T., Kummu, M., Zipper, S.C., Troy, T.J., Wada, Y., Famiglietti, J.S. Vulnerable basins for global prioritisation: Hotspots for social and ecological impacts from freshwater stress and freshwater storage loss. *EGU General Assembly*. Vienna, Austria. *(Invited oral)* **2022**

6 **Huggins, X.** Gleeson, T., Castilla-Rho, J.C., Holley, C., Re, V., Famiglietti, J.S. (2022). Groundwater in complex adaptive social-ecological systems. Canadian Water Resources Association National Conference. Canmore, Canada. (*In-absentia poster*). **2022**

5 **Huggins, X.**, Gleeson, T., Famiglietti, J. (2021). An open-access interdisciplinary database to facilitate data science on cross-cutting global groundwater sustainability challenges. Delft International Conference on Sociohydrology. (*Oral, online*). Delft, the Netherlands **2021**

4 Gleeson, T., **Huggins, X.**, & T. Froese. Teaching human- and sustainability-centered design: A civil engineering design spine supported by sustainability muscles and a heart of anti-racism, equity, diversity, and inclusion. (*Pre-recorded oral*). Let's Talk About Teaching. **2021**

3 **Huggins, X.**, Gleeson, T., Kummu, M., Zipper, S.C., Troy, T.J., Wada, Y., Famiglietti, J. (2020). Sustainability hotspots of changing global freshwater availability. Invited lighting talk at the American Geophysical Union Fall Meeting. (*Invited oral, online*). San Francisco, USA. **2020**

2 **Huggins, X.,** Gleeson, T., Zipper, S.C., Troy, T.J., Wada, Y., Famiglietti, J.S. Human dimensions of changing global freshwater availability. *AGU Fall Annual Meeting*. San Francisco, CA. *(Oral).* **2019**

1 **Huggins, X.**, Gleeson, T., Eckstrand, H., Kerr, B. Streamflow depletion modeling: Methods for an adaptable and conjunctive water management decision support tool. *Canadian Water Resources Association Annual Conference*. Victoria, Canada (Oral) **2018**

Invited seminars and talks

18 **Earth Systems Science Research Theme Seminar**, University of Glasgow **2026**

17 **High Meadows Environmental Institute**, Mini Symposium at the interface of ecology and evolution, Princeton University | *KEYNOTE* **2026**

16 **ICTA (Institute on Environmental Systems and Technology)**, Autonomous University of Barcelona **2026**

15 **Integrated Earth Systems Dynamics Lab**, McGill University **2025**

14 **Hydrological Systems Analysis Research Group,** University of Potsdam **2025**

13 **Conversations on Environment, Responsible Energy, and Life (CEREAL)**, High Meadows Environmental Institute, Princeton University **2025**

12 **Land Use and Global Environment Lab Seminar**, University of British Columbia **2025**

11 **Department of Earth Sciences Seminar**, Uppsala Universitet **2025**

10 **Water Resilience Colloquium**, Stockholm Resilience Centre **2025**

9 **Maxwell Research Group seminar**, Princeton University **2024**

8 **Water and Development Research Group Seminar**, Aalto University **2024**

7 **International Groundwater Resources Assessment Centre** **2023**

6 **Geographisches Institut Seminar**, Johannes Gutenberg University Mainz **2023**

5 **Graduate Hydrogeology Course**, Arizona State University **2023**

4 **Global Groundwater Group Talk Series**, The Nature Conservancy **2022**

3 **Water and Development Research Group Seminar**, Aalto University **2022**

2 **Water Security Research Group Seminar**, IIASA **2022**

1 **Water Research Roundup**, POLIS Water Sustainability Project **2022**

Conference sessions organized

7 Freshwater social-ecological systems: feedbacks, thresholds, resilience, and sustainability from local to global scales. *EGU General Assembly*. Vienna, Austria. Co-convened with: Vili Virkki, Elisabeth Krueger, Marta Tuninetti, Maria J. Santos. *Upcoming*. **2027**

6 Groundwater-Dependent Ecosystems: Processes, Feedbacks, Adaptations, and Resilience in a Changing World. *EGU General Assembly*. Vienna, Austria. Co-convened with Nicole Gyakowah Otoo, Emmanuel Dubois, Mattia Saccò, Christian Griebler. *Upcoming.* **2027**

5 Advancing Socio-Hydrogeology: Bridging Groundwater Science, Social Systems, and Decision-Making. *World Groundwater Congress.* Budapest, Hungary. Co-convened with Viviana Re, Adrian Healy. **2026**

4 Emerging interdisciplinary perspectives in water resilience and risk science: society–ecology–freshwater nexus approaches and socio-meteorology. *EGU General Assembly.* Vienna, Austria. Co-convened with: Md. Rezuanul Islam, Vicky Anand, Qing He, Elisabeth Krueger, Vili Virkki **2026**

3 How does groundwater shape critical zone dynamics and groundwater-dependent ecosystems in a changing environment? *EGU General Assembly*. Vienna, Austria. Co-convened with: Agnès Rivière, Nicole Gyakowah Otoo, Ronan Abhervé, Konstantina Katsanou **2026**

2 Open meeting of the Global Freshwater Resilience Workshop. *EGU General Assembly*. Vienna, Austria. Co-organized with Vili Virkki. **2025**

1 People and Groundwater in the Anthropocene - Socio-hydrogeology for addressing human-groundwater relationships in a changing world. *World Groundwater Congress*. Davos, Switzerland. Co-chaired with Viviana Re. **2024**

Workshop participation

6	Earth Resilience and Sustainability Initiative. Potsdam, Germany.	**2026**
5	Creative Water Connections Workshop. Victoria, BC, Canada.	**2025**
4	Critical Transitions in Socio-Ecological Systems. Princeton Center for Theoretical Science. Princeton, USA.	**2025**
3	Environmental Data Science Summit. Santa Barbara, USA. *(in absentia)*	**2024**
2	6th Workshop on Archetypes in Sustainability Research. Lund, Sweden	**2023**
1	Bolin Workshop: Lakes, peatlands and wetlands: Functions and fate. Tovetorp, Sweden.	**2023**
n=6	Global Freshwater Systems Science Workshops; semi-annual workshops I co-lead. Workshops to date: 5/2023, 11/2023, 6/2024, 1/2025, 6/2025, 1/2026	

Student advising

Doctoral

Bhattarabhop Viriyaroj, Aalto Univ. Advisor (committee member). **2025 – present**

Masters

Sukshith P H, IISER Pune. Co-supervisor. **2025 – 2026**

Reeti Nykänen, Aalto University. Advisor. **2025**

Undergraduate

Harsidak Singh, Princeton University. Co-supervisor. **2026**

Bilal Bartaai, Univ. of British Columbia. Supervisor. **2025**

Teaching and curriculum development

Courses taught

Principles of GIS (GEOG 5019). University of Glasgow. **2026**

Applied Spatial Analysis (GEOG 4111). University of Glasgow. **2026**

Learn and teach green, people-centered civil engineering **2020-2022**

Department of Civil Engineering, University of Victoria

I co-led this initiative to integrate core sustainability science and environmental justice concepts across the undergraduate civil engineering curriculum at the University of Victoria. This involved targeted curriculum development across multiple courses, including lecture slides, in-class activities, and assignments. In total, the **initiative generated >20 lecture decks, and 8 in-class breakout activities**. Webpage with open access materials: https://oac.uvic.ca/civelearningandteaching/

Teaching assistant positions

Groundwater Hydrology (CIVE 445/545). University of Victoria. **2020, 2021**

Hydrology and Hydraulics (CIVE 440/540). University of Victoria. **2020**

Fluid Mechanics (CIVE 345). University of Victoria. **2019, 2020**

Sustainable Water Resources (CIVE 340). University of Victoria. **2019**

*Mean teaching assistant effectiveness score of **9.5/10***

Guest teaching lectures

Equity and sustainability for hydrogeologists, in *Communications in Hydrogeology* (HWRS 565B), University of Arizona. **2026**

Sustainability science fundamentals, in *Groundwater Hydrology* (CIVE 445), University of Victoria. **2025**

Groundwater ecohydrology: core concepts, in *Ecohydrology of watersheds and water systems* (ENVR 420), University of British Columbia. **2025**

Open channel flow, routing, and flooding, in *Sustainable Water Resources* (CIVE 340), University of Victoria. **2023**

Groundwater sustainability in social-ecological systems, in *Groundwater Hydrology* (CIVE 445/545), University of Victoria. **2023**

Engineering for sustainability in a complex world, in *Capstone Engineering Design* (CIVE 400), University of Victoria. **2022**

Open channel flow, in *Hydrology and Hydraulics* (CIVE 440), University of Victoria. **2019**

Groundwater hydrology, in *Sustainable Water Resources* (CIVE 340), University of Victoria. **2019**

Adjudication boards

Judge for the Canadian Distinguished Dissertation Award **2026**

Canadian Association for Graduate Studies / ProQuest

Awarded to two Canadian doctoral dissertations that make unusually significant and original contributions to their academic field.

Science outreach

Science Meets Parliament BC **2026**

Event designed to strengthen the connection between the science and policy communities in British Columbia, bringing scientists to the provincial Legislative Assembly for extensive engagements with MLAs. *Invited as delegate in 2025, deferred to 2026 due to schedule conflict.*

Water Day on Parliament Hill **2020**

Inaugural event to bring scientists from across Canada to meet with parliamentarians and senior federal officials to raise awareness around water security in Canada. Write up on event: link.

Water availability stripes data visualization **2020**

A science communication tool to bring awareness to recent trends in water availability in the major basins of the world. The initiative was based on and inspired by Ed Hawkins's global warming stripes data visualization. The water availability stripes have been accessed by tens of thousands of people online, and the initiative is archived here.

***waterunderground* blog** **2016-2021**

Managing editor of the groundwater blog “waterunderground” which is hosted by both the European Geosciences Union and American Geophysical Union’s respective blogospheres.

Writing for a public audience

2 Ripple effect: As global freshwater basins dry up, the threat to ecosystems and communities grows. *Conversation Canada*. (Link)

1 Perspective: How does the coronavirus crisis compare to the global groundwater crisis? *Circle of Blue*. (Link)

Media coverage

2025 The Global Groundwater Data Catalogue: Your 'one-stop shop' to Groundwater Datasets. *International Groundwater Resources Assessment Centre – Data story.* (*Link*)

The Canadian Association for Graduate Studies Announces Winners of 2025 CAGS-ProQuest Distinguished Dissertation Award. *Canadian Association for Graduate Studies.* (*Link*)

2024 Groundwater is key to protecting global ecosystems. *World Bank – The Water Blog*. (*Link*)

Mapping groundwater-dependent ecosystems shows the need for more protection globally. *Nature Research Briefing*. (*Link*)

Groundwater is Key to Protecting Global Ecosystems. *Desert Research Institute News*. (*Link*)

2023 Why protected areas must consider what's beneath the surface. *TNC Science Brief. (*Link)

USask-led research: Majority of world's protected ecosystems vulnerable to groundwater degradation. *USask news*. (Link)

Groundwater and biodiversity: A new study reveals global gaps in the protection of nature reserves. *Smart Water Magazine*. (Link)

Exceptional young scientists awarded. *IIASA news*. (Link)

2022 The US is losing some of its biggest freshwater reserves. *Popular Science*. (Link)

When we run out of water. *The Tyee*. (Link)

Global water basin hotspots prioritize areas under threat: USask research. *USask news*. (Link)

Global hotspots mapped out in new water study. *UVic news*. (Link)

Journal reviews

I have provided peer review for several journals:

* Nature Water (*IF = 24.1*)
Science Advances (*IF = 12.5*)
* Nature Communications *(IF = 14.7)*
* Environmental Research Letters *(IF = 5.8)*
* Groundwater *(IF = 2.9)*
‡ Water Resources Research *(IF = 4.6)*
Journal of Hydrology *(IF = 6.4)*
* Environmental Research: Water
Ecology and Society *(IF = 5.3)*
* Hydrogeology Journal *(IF = 2.4)*
Geophysical Research Letters *(IF = 4.6)*
Global Sustainability *(IF = 4.6)*
Water International *(IF = 3.1)*
PLOS Water (*IF = 2.5*)

* = multiple reviews for the journal; ‡ = over 5 reviews for the journal.

Competencies

Programming languages:	R, Python, Google Earth Engine, Bash
Software:	Visual MODFLOW, ArcGIS, QGIS, Affinity Designer, Inkscape
Languages:	English (*native*), French (*advanced*)

Open science

GitHub Repositories	Code repository for the Water availability stripes data visualization initiative. [GitHub link]
	Code for: Hotspots for social and ecological impacts from freshwater stress and storage loss. [GitHub link]
	Code for: Overlooked risks and opportunities in groundwatersheds of the world's protected areas. [GitHub link]
	Code for: Global groundwater system archetypes. [GitHub link]
	Groundwaterscapes code repository [GitHub link]
	Global groundwater data catalogue data and code repository [GitHub link]
	Groundwater sustainability puzzle code repository [GitHub link]

Other professional experience

Stockholm Resilience Centre Stockholm, Sweden **2023**
Visiting PhD researcher

International Institute for Applied Systems Analysis Vienna, Austria **2022**
Young Scientist Summer Program PhD Fellowship

Global Institute for Water Security Saskatoon, Canada **2020 – 2023**
Graduate student member

City of Hamilton Hamilton, Canada **2017**
Student Groundwater Technician

City of Ottawa Ottawa, Canada **2016**
Water Resources Engineering Intern

G360 Groundwater Research Institute, University of Guelph Guelph, Canada **2015**
Undergraduate student research assistant