

# Xander Huggins

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🌐 <https://xanderhuggins.github.io>

🌐 [github.com/xanderhuggins](https://github.com/xanderhuggins)

🌐 [@xander\\_huggins](https://twitter.com/xander_huggins)

## Education

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- PhD – University of Victoria, Canada** 2019-present  
Department of Civil Engineering  
Fast-track entry from MASC in 05/2020  
Dissertation: *Sustainability and data sciences in groundwater-connected systems*  
Tentative defence date: 05/2024
- BEng – University of Guelph, Canada** 2013-2018  
Degree in Water Resources Engineering with Distinction, Co-operative stream

## Professional experience

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- Stockholm Resilience Centre, Stockholm, Sweden** upcoming 2023  
Visiting PhD researcher
- International Institute for Applied Systems Analysis (IIASA), Vienna, Austria** 2022-present  
Young Scientist Summer Program Fellowship – Water Security Group (2022)  
Guest Research Scholar; Water Security Research Group (2022-present)
- Global Institute for Water Security, Saskatoon, Canada** 2020-present  
Graduate student member
- City of Hamilton, Hamilton, Canada** 2017  
Groundwater Technician Intern (undergraduate co-op placement)
- City of Ottawa, Ottawa, Canada** 2016  
Water Resources Engineering Intern (undergraduate co-op placement)
- G360 Groundwater Research Institute, University of Guelph, Guelph, Canada** 2015  
Undergraduate student research assistant (undergraduate co-op placement)

## Peer-reviewed publications

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8. Rohde, M.M., Albano, C.M., **Huggins, X.**, et al. *In review with Nature*. Mapping groundwater dependent ecosystems globally exposes the fragility of vulnerable ecosystems and communities.
7. **Huggins, X.**, Gleeson, T., Castilla-Rho, J.C., Holley, C., Re, V., Famiglietti, J.S. (In Press). Groundwater connections and sustainability in social-ecological systems. *Groundwater*.
6. Curran, D., Gleeson, T., **Huggins, X.** (In Press). Applying a science-forward approach to groundwater regulatory design. *Hydrogeology Journal*.
5. **Huggins, X.**, Gleeson, T., Serrano, D., Zipper, S., Jehn, F., Rohde, M.M., Abell, R., Vigerstol, R., Hartmann, A. (In Press). Overlooked risks and opportunities in groundwatersheds of the world's protected areas. *Nature Sustainability*.
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., Kumm, 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 CO<sub>2</sub> 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

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1. Gleeson, T., **Huggins, X.**, Connor, R., Arrojo-Agudo, P., Vázquez Suñé, E. (2022). Groundwater and Ecosystems, Chapter 6 of *UNESCO Water Development Report 2022: "Groundwater: Making the invisible visible"*.
2. **Huggins, X.** (2022). Global archetypes of groundwater interactions in social-ecological systems. IIASA Young Scientist Summer Program Fellowship Report.

## Manuscripts in preparation

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1. **Huggins, X.**, Gleeson, T., Villholth, K.G., Rocha, J.C., Famiglietti, J.S. *In preparation*. Global groundwater archetypes: a new typology of groundwater interactions with social and ecological systems and an outlook for sustainable development.
2. **Huggins, X.**, Gleeson, T., Froese, T. *In preparation*. Embedding equity across an undergraduate civil engineering curriculum through environmental justice, sustainability science, and anti-racism modules and program-wide organization.
3. Xu, L., Ferris, D., **Huggins, X.**, et al. (6 others). *In preparation*. From Coarse Resolution to Practical Solution: GRACE as a Science Communication and Policymaking Tool for Sustainable Groundwater Management.

## Awards (all values in CAD)

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<b>Mikhalevich Award</b> (~\$8,000) International Institute for Applied Systems Analysis	<b>2023</b>
<b>President's Research Scholarship</b> (\$5,000 per year awarded) University of Victoria	<b>2021, 2022, 2023</b>
<b>Young Scientists Summer Program Fellowship</b> (N/A) International Institute for Applied Systems Analysis	<b>2022</b>
<b>Alexander Graham Bell Doctoral Scholarship - Doctoral</b> (\$105,000) Natural Sciences and Engineering Research Council of Canada	<b>2021</b>
<b>Fall Meeting Outstanding Student Presentation Award</b> (\$250) American Geophysical Union	<b>2019</b>
<b>Alexander Graham Bell Canada Graduate Scholarship – Masters</b> (\$17,500)	<b>2018</b>

Natural Sciences and Engineering Research Council of Canada <b>Professor Ross W. Irwin scholarship in Water Resources</b> (\$1,000) University of Guelph	<b>2018</b>
<b>Raymond Theodore Guther Memorial Scholarship</b> (\$2,000) University of Guelph	<b>2018</b>
<b>Undergraduate Student Research Award</b> (\$6,000) Natural Sciences and Engineering Research Council of Canada	<b>2015</b>

## Selected Conference Presentations

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<b>Huggins, X.</b> , 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. <i>6<sup>th</sup> International Research Workshop on Archetypes in Sustainability Research</i> . Lund, Sweden.	<b>2023</b>
<b>Huggins, X.</b> , 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. <i>World Water Week</i> . Stockholm, Sweden. ( <i>Solicited oral</i> )	<b>2022</b>
<b>Huggins, X.</b> , 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. <i>EGU General Assembly</i> . Vienna, Austria. ( <i>Invited oral</i> )	<b>2022</b>
<b>Huggins, X.</b> , Gleeson, T., Zipper, S.C., Troy, T.J., Wada, Y., Famiglietti, J.S. Human dimensions of changing global freshwater availability. <i>AGU Fall Annual Meeting</i> . San Francisco, CA. ( <i>Oral</i> ) Awarded outstanding student presentation award.	<b>2019</b>

## Invited talks

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<b>Graduate Hydrogeology Course, Arizona State University</b> , Tempe, USA Talk title: Groundwater sustainability in social-ecological systems: putting relationships and system interactions at the center of the discourse	<b>2023</b>
<b>Global Groundwater Group, The Nature Conservancy</b> (online). Talk title: Overlooked risks and opportunities for global protected areas revealed by mapping groundwatersheds.	<b>2022</b>
<b>Water and Development Research Group, Aalto University</b> , Espoo, Finland Talk title: Groundwater connected systems: A new approach for groundwater science and sustainability in social-ecological systems	<b>2022</b>
<b>Water Security Research Group, IIASA</b> , Vienna, Austria and online Talk title: Groundwater-connected systems as complex adaptive social ecological systems	<b>2022</b>
<b>Annual Water Research Roundup, POLIS Water Sustainability Project</b> , Victoria, Canada Talk title: The global vulnerability of humans and ecosystems to insufficient freshwater availability	<b>2022</b>

## Abilities/Skills

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Programming Languages (by proficiency):	R, Python, Shell/Bash
Software proficiency:	Affinity Designer, ArcGIS, QGIS, Inkscape
Reviewer for scientific journals:	<i>Groundwater, Ecology and Society,</i> <i>Geophysical Research Letters,</i> <i>Water Resources Research</i>
Languages:	English ( <i>native</i> ), French ( <i>intermediate</i> )

## Teaching

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**Curriculum development**, Department of Civil Engineering, University of Victoria.

A funded initiative to integrate core sustainability science and environmental justice theory across the undergraduate Civil Engineering program.

Selection of resources developed for instructors [[link here](#)]:

1. **Huggins, X.**, and Gleeson, T. Slide deck 1.3 on *HydroShare*: Sustainability Fundamentals for Groundwater Hydrologists.
2. Gleeson, T., and **Huggins, X.** Slide deck 6 on *HydroShare*: Groundwater Resources and Global Change.
3. Gleeson, T., Mohan, C., Okibe, S., Horoscoe, N., **Huggins, X.**, Ng, C., Jacoby, A. Slide deck 1.2 on *HydroShare*: Environmental Justice Fundamentals for Groundwater Hydrologists.

Teaching assistant positions (University of Victoria):

2019 Sustainable Water Resources, 300 level course, Teaching assistant & lab lecturer

2020 Fluid Mechanics, 200 level course, Teaching assistant & guest lecturer

2020 Hydrology and Hydraulics, 400 level course, Teaching assistant & lab lecturer

2020, '21 Groundwater Hydrology, 400 level course, Teaching assistant & guest lecturer

2021 Capstone Engineering design, 400 level course, Guest lecturer

## Selected science outreach

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### **Water Day on the 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.

### **waterunderground blog**

2016-

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

2021