

Curriculum Vitae

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Positions

- **2024–2025:** Postdoctoral Researcher, Vrije Universiteit Brussel — ICE³ project: Modelling the global multi-century evolution of glacier ice in 3D. Supervised by Harry Zekollari.
- **2025–present:** Postdoctoral Fellow (FWO), Vrije Universiteit Brussel — ICE-BUFFER project: Global glacier buffering of streamflow droughts in a changing climate using deep learning. FWO Postdoctoral Junior Fellowship. Supervised by Harry Zekollari.

Education

- **2019–2023:** PhD in Environmental Sciences, Universidad de Concepción, Concepción, Chile. Thesis: Assessment of the impacts of climate change on the spatio-temporal patterns of freshwater sources to the coastal system of Western Patagonia. Supervised by Mauricio Aguayo and Jorge León.
- **2022–2022:** Research Stay — Regional Glacier Modelling, University of Innsbruck, Innsbruck, Austria. Seven-month research stay working with Fabien Maussion at the Department of Ice & Climate.
- **2017–2019:** MSc in Civil Engineering (Water Resources), Universidad de Concepción, Concepción, Chile. Thesis: Impacts of anthropogenic climate change on the runoff of a trans-Andean basin in Patagonia. Supervised by Jorge León.
- **2012–2018:** Civil Engineering (Hydraulic-Environmental mention), Universidad de Concepción, Concepción, Chile. Thesis: Hydrological modeling of a Patagonian basin: Application of remote sensing. Supervised by José Vargas. Approved with maximum distinction.

Grants & Funding

- **2025–2028:** FWO Postdoctoral Junior Fellowship — ICE-BUFFER project
- **2019–2023:** ANID National Doctoral Fellowship —
- **2021–2022:** ANID Operational Expenses Grant —
- **2022:** ANID International Research Stay Fellowship —
- **2023:** ANID Doctoral Writing Extension Fellowship —

Awards

- **2025:** Outstanding Reviewer Award, *The Cryosphere (EGU)*
- **2017:** Professor Edgar Pino Barrueto Prize — Best thesis of the Civil Engineering promotion
- **2021:** Top 100 in Earth Science — Scientific Reports collection

Supervision

- **Magali Ponds** (PhD, Vrije Universiteit Brussel, 2024-2027) — The effect of irrigation on glacier evolution in High-Mountain Asia. Co-supervised with Harry Zekollari
- **Maziar Freki** (MSc, Vrije Universiteit Brussel, 2024-2025) — Closing the regional water budget in Western Patagonia using SWOT data. Co-supervised with Harry Zekollari
- **Garance du Bus de Warnaffe** (MSc, Vrije Universiteit Brussel, 2024-2025) — The time of emergence of glacier runoff in Patagonia. Co-supervised with Harry Zekollari
- **Francesco Calista** (MSc, Vrije Universiteit Brussel, 2025-2026) — Implications of glacier melt in High Mountain Asia for future water security. Co-supervised with Harry Zekollari and Magali Ponds
- **Fernanda Espinoza** (MSc, Universidad de Chile, 2025-2026) — Flood forecasting using deep learning in south-central Chile. Co-supervised with Pablo Mendoza
- **Isadora Leon** (MSc, Universidad Austral de Chile, 2023-2024) — Effects of land cover on the hydrological propagation of droughts in Southern Chile. Co-supervised with Jorge Leon and Alvaro Gonzalez
- **Paul Sandoval** (Bachelor, Universidad del Bío-Bío, 2021) — Potential impacts of global warming in the upper Manso River Basin.

Teaching

KU Leuven / Vrije Universiteit Brussel

- **Surface Water Hydrology** (2025-2026) (2 semesters)

Universidad de Concepción

- **GIS Applied to Environmental Science** (2023)
- **Fluid Mechanics** (2022)
- **Advanced Hydrology** (2020)
- **Distributed Hydrology** (2020)
- **Hydrology** (2016-2018) (5 semesters)
- **Introduction to Environmental Science** (2015)
- **Support Center for Learning Basic Sciences** (2014-2015) (4 semesters)

Talks & Presentations

Invited Talks

- **EGU General Assembly** (2026, Vienna, Austria) — Glacio-hydrological modelling in Patagonia
- **Student for Student Summerschool** (2022, Austria) — Climate datasets are the main source of uncertainty of glacier evolution
- **Glaciology Seminars** (2021, online) — A multi-institutional effort for an open hydrometeorological dataset in Western Patagonia
- **Seminar for Strategic Planning of Water Resources in Aysén** (2022, Aysén, Chile) — PatagoniaMet v1.0: Una base de datos hidro-meteorológica para la Patagonia Occidental

Conference Presentations

- **V Congress of the Chilean Cryosphere Society** (2023, Chile) — Assessing glacier projection uncertainties in the Patagonian Andes
- **6th OGGM Workshop** (2022, Norway) — Modelling freshwater inputs to the coastal system of Western Patagonia

- **III Congress of the Chilean Cryosphere Society** (2021, Online) — PatagoniaMet: A quality check observational dataset for Western Patagonia
- **Scientific Meeting of the Argentine Association of Geophysicists and Geodesists** (2021, Online) — PatagoniaMet: Generation and evaluation of precipitation and air temperature gridded datasets
- **XXIV Chilean Congress of Hydraulic Engineering** (2019, Chile) — The glass half-empty: Climate Change Impacts on Freshwater Input to the North Patagonia Coastal System
- **XXVIII Latin American Hydraulics Congress** (2018, Argentina) — Hydrological modeling of the trans-Andean basin of the Puelo River

Datasets

- **PatagoniaMet** (2023) — A multi-source hydrometeorological dataset for Western Patagonia (40–56°S). Includes precipitation, temperature, streamflow, and other variables from multiple observational sources.. DOI: [10.5281/zenodo.7992760](https://doi.org/10.5281/zenodo.7992760)
- **RGI v7.1 Lake Termini Classification** (2025) — Global mapping of lake-terminating glaciers — classification of Randolph Glacier Inventory v7.1 glacier termini as lake-terminating or not.. DOI: [10.5281/zenodo.15524733](https://doi.org/10.5281/zenodo.15524733)
- **Historical and Future Runoff in Western Patagonia** (2025) — Simulated historical and future runoff projections for Western Patagonia using hybrid glacio-hydrological modelling.. DOI: [10.5281/zenodo.15076803](https://doi.org/10.5281/zenodo.15076803)
- **Glacier Runoff Projections in Patagonia** (2024) — Ensemble of glacier runoff projections for the Patagonian Andes (40–56°S) under multiple climate scenarios.. DOI: [10.5281/zenodo.8384882](https://doi.org/10.5281/zenodo.8384882)
- **Model-Based Runoff in Northern Patagonia** (2024) — Hydrological model outputs for Northern Patagonia catchments under historical and future climate conditions.. DOI: [10.5281/zenodo.10949518](https://doi.org/10.5281/zenodo.10949518)

Service

- **Reviewer** — *The Cryosphere* (2025)
- **Reviewer** — *Journal of Glaciology* (2025)
- **Reviewer** — *Hydrology and Earth System Sciences* (2025)
- **Project Scientist** — Instrumentation and habilitation of a reference basin for snowpack studies in Aysén, CIEP (2021)
- **Hydrological Modeler and Climate Analyst** — Determination of average monthly flows in continental Chiloé, IFOP (2017)
- **Project Engineer** — Water Scenarios 2030, Fundación Chile (2017)
- **Scientific Advisor** — Strategic Water Management Plans for Puelo, Yelcho, Aysén, Baker and Pascua Basins, GEOSAFE (2021)
- **Scientific Advisor** — Predictive system for precipitation and streamflow in central-southern Chile, Universidad de Chile (2025)

Outreach & Media

- **2019:** [Estudio mide impacto del cambio climático en el sur de Chile](#) — *EMOL*
- **2021:** [Investigación analizó las consecuencias del cambio climático en los ríos de la Patagonia norte](#) — *Ladera Sur*
- **2021:** [Documentary RIO: Rivers Influencing the Ocean](#) — *YouTube*
- **2024:** [Ciencia local crea pionera base de datos de la Patagonia](#) — *Diario Concepción*
- **2024:** [Académico UCSC participó en PatagoniaMet](#) — *UCSC*
- **2024:** [Un adiós helado y esperado: Desaparición del último glaciar de Venezuela](#) — *Niboe*
- **2024:** [La metamorfosis de la Patagonia chilena](#) — *El País*
- **2024:** [The world's glaciers are melting faster than we thought](#) — *National Geographic*

- **2025:** [Proyectan futuros hídricos opuestos al norte y sur de la vital Patagonia](#) — *Diario Concepción*

Skills

- **Programming:** Python, R, Julia, Bash, shell scripting
- **Glacier Modelling:** OGGM, PyGEM, PISM, glacier dynamics
- **Hydrological Modelling:** HBV, TETIS, WRF-Hydro, hydrological signatures
- **Deep Learning:** PyTorch, TensorFlow, LSTM, neural hydrology
- **Geospatial:** GIS, remote sensing, Google Earth Engine, QGIS
- **Tools:** Quarto, Git, LaTeX, Docker, HPC, Linux
- **Languages:** Spanish (native), English (fluent)

Fieldwork

- **Puelo River basin, Chile** (2018-2021) — Trimestral hydrological campaigns for fjord land use change study (PI: Jorge Leon)
- **Aysén region, Chile** (2017) — Stream surveys in old-growth temperate forests (PI: Anna Astorga and Brian Reid)
- **Bordu and Kara-Batkak glaciers, Kyrgyzstan** (2024) — Glacier monitoring using drones (PI: Lander Van Tricht)

Publications

2026

- Steiner, J., Armstrong, W., Kochtitzky, W., McNabb, R., **Aguayo, R.**, ... and Zheng, W. (2026). [Global mapping of lake-terminating glaciers](#). *Earth System Science Data*.
- Van Tricht, L., Zekollari, H., Huss, M., Rounce, D., Schuster, L., ... and Farinotti, D. (2026). [Peak glacier extinction in the mid-twenty-first century](#). *Nature Climate Change*.
- Van Tricht, L., Zekollari, H., Huss, M., van Tiel, M., Vanderkelen, I., ... and Farinotti, D. (2026). [Reduced future summer water availability in the Tien Shan due to glacier wastage](#). *Water Resources Research*.

2025

- **Aguayo, R.**, Zekollari, H., Hanus, S., Baez-Villanueva, O., Mendoza, P. and Maussion, F. (2025). [Hybrid glacio-hydrological modelling reveals contrasting runoff changes in Western Patagonia over the 21st century](#). *Earth's Future*.
- Caro, A., Condom, T., Rabatel, A., **Aguayo, R.** and Champollion, N. (2025). [Glacio-hydrological changes along the Andes over the first half of the 21st Century](#). *Scientific Reports*.
- Farías-Barahona, D., Schaefer, M., Braun, M., Temme, F., Fürst, J., ... and Harrison, S. (2025). [QFuego-Patagonia: a comprehensive dataset and review of Southern South America's glaciers](#). *Journal of Glaciology*.

2024

- **Aguayo, R.**, León-Muñoz, J., Aguayo, M., Baez-Villanueva, O., Fernandez, A., Zambrano-Bigiarini, M. and Jacques-Coper, M. (2024). [PatagoniaMet: A multi-source hydrometeorological dataset for Western Patagonia \(40-56°S\)](#). *Scientific Data*.
- **Aguayo, R.**, Maussion, F., Ultee, L., Mackay, J., Caro, A., ... and Aguayo, M. (2024). [Unravelling the sources of uncertainty in glacier runoff projections in the Patagonian Andes \(40-56° S\)](#). *The Cryosphere*.

- León-Muñoz, J., **Aguayo, R.**, Corredor, A., Tapia, F., Iriarte, J. L., Ried, B. and Soto, D. (2024). [Hydrographic shifts in coastal waters reflect climate-driven changes in hydrological regimes across Northwestern Patagonia](#). *Scientific Reports*.
- Zekollari, H., Huss, M., Schuster, L., Maussion, F., Rounce, D. R., ... and Farinotti, D. (2024). [Twenty-first century global glacier evolution under CMIP6 scenarios and the role of glacier-specific observations](#). *The Cryosphere*.

2023

- León-Muñoz, J., **Aguayo, R.**, Echeverría, C., Nimptsch, J., Wolff, S., Avendaño-Herrera, R., Simon, J. and Soto, D. (2023). [Landscape dependency of salmon farming hatcheries under climate change](#). *Climate Risk Management*.

2021

- **Aguayo, R.**, León-Muñoz, J., Garreaud, R. and Montecinos, A. (2021). [Hydrological droughts in the southern Andes \(40-45°S\) from an ensemble experiment using CMIP5 and CMIP6 models](#). *Scientific Reports*.
- León-Muñoz, J., **Aguayo, R.**, Marce, R., Catalan, N., Wolff, S., ... and Miranda, A. (2021). [Climate and land cover trends affecting freshwater inputs to a fjord in Northwestern Patagonia](#). *Frontiers in Marine Sciences*.

2019

- **Aguayo, R.**, León-Muñoz, J., Vargas, J., Montecinos, A., Garreaud, R., Urbina, M., Soto, D. and Iriarte, J. L. (2019). [The glass half-empty: climate change drives lower freshwater input in the coastal system of the Chilean Northern Patagonia](#). *Climatic Change*.

In Review

- Mendoza, P. A., Toum, E., Wongchuig, S., Condom, T., Barco, J., Drenkhan, F. and **Aguayo, R.** (2026). Recent advances and challenges in process-based hydrological modeling over the Andes: A review. *WIREs Water (in review)*.
- Van Tricht, L., Huss, M., Zekollari, H., **Aguayo, R.**, van Tiel, M., von der Esch, A., Beer, J. and Farinotti, D. (2026). Resolving short-term meteorological variability amplifies projected glacier loss. *Nature Communications (in review)*.
- Ponds, M., **Aguayo, R.**, Yao, Y., Thiery, W. and Zekollari, H. (2026). Irrigation buffers glacier loss. *Nature Climate Change (in review)*.
- León-Muñoz, J., Reid, B., Iriarte, J. L., Mardones, J., **Aguayo, R.**, ... and Garreaud, R. (2026). Melt-driven freshwater inputs as potential drivers of harmful algal blooms in northwestern Patagonia. *Scientific Reports (in review)*.
- Fox, C., León-Muñoz, J., Reid, B., Astorga, A., **Aguayo, R.**, Moreno-Meynard, P., Blanchet, L. and Butman, D. (2025). Riverine Biogeochemical Exports from Major Watersheds to the Northwest Patagonian Estuarine Network. *JGR – Biogeosciences (in review)*.
- Moreno, P., **Aguayo, R.**, Astorga, A., Somos, M., Uribe, L. and Reid, B. (2025). Early detection of anthropogenic impacts on headwater streams in Patagonia through hydrological signatures metrics. *Hydrological Sciences Journal (in review)*.