

Julia Kaltenborn

Machine Learning for Climate and Cryospheric Sciences

EDUCATION

- 2021–today **M.Sc. / Ph.D. Computer Science (Fast-Track)**
Machine Learning for Climate Modeling and Cryospheric Sciences
McGill University & Mila - Quebec AI Institute, Canada
Supervised by Prof. David Rolnick
- 2017–2021 **B.Sc. Cognitive Science**
Machine Learning and Computational Statistics
University of Osnabrück, Germany
GPA: 4.0 (A+) out of 4.0, with distinction
- 2019–2020 **Semester Abroad at Chuo University**
Tokyo, Japan
- 2008–2016 **Higher Education Entrance Qualification**
Private Secondary School Pindl, Regensburg
GPA: 4.0 (A+) out of 4.0, with distinction
- 2013–2015 **Early Studies for A-Level Students**
Chemistry and English at University of Regensburg

EXPERIENCE

- 01/2024–today **Predicting Snowpack Stability with Machine Learning**
WSL Institute for Snow and Avalanche Research (ETH), Switzerland
Supervised by Tiziano Di Pietro and Dr. Martin Schneebeli
- 06/2023–08/2023 **Juneau Icefield Research Program**
Foundation for Glacier and Environmental Research
Traverse of Juneau icefield with focus on glaciology & cryospheric sciences, mountaineering, wilderness survival, and research expedition skills.
- 05/2021–05/2022 **Extratropical Cyclone Prediction**
Intern, Climate Modeling Alliance Team, California Institute of Technology
Supervised by Prof. Tapio Schneider, Dr. Lenka Novak and Dr. Jinlong Wu
- 11/2020–04/2021 **Bachelor Thesis on Automatic Snow Classification**
WSL Institute for Snow and Avalanche Research (ETH), Switzerland
Supervised by Dr. Martin Schneebeli, Dr. Viviane Clay and Amy Macfarlane
- 10/2018–03/2021 **Teaching and Research Assistant at the Institute of Cognitive Science (University of Osnabrück, AI Department)**
(2020) Teaching Assistant for “Methods of Artificial Intelligence”
(2019) Tutoring in “Introduction to AI and Logic Programming”
(2018) Research Assistant for Leonid Berov, Computational Storytelling

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SCHOLARSHIPS AND AWARDS

2023	DFW Award, School of Computer Science, McGill University Joan W. Miller Scholarship (Juneau Icefield Research Program)
2022	Mila Startup Status (15k CAD for "Our Dialogue About AI")
2021–2023	McGill DeepMind Fellowship Mitacs Globalink Graduate Fellowship
2017–2023	Scholarship of the German Academic Scholarship Foundation
2018	Second Place in the Cognitive Science AI Tournament
2016	Excellence Award for Achievements at A-Levels A-Levels Award of the German Physical Society (DPG) Golden Badge of Honor for Classics (Excellence in Latin) by the German Association for Classics REWAG A-Levels Award for Best Scientific Study Workpaper

PUBLICATIONS

- [1] J. Kaltenborn, C. E. Lange, V. Ramesh, P. Brouillard, Y. Gurwicz, C. Nagda, J. Runge, P. Nowack, and D. Rolnick, "ClimateSet: A large-scale climate model dataset for machine learning", *arXiv preprint arXiv:2311.03721*, 2023.
- [2] J. Boussard, C. Nagda, J. Kaltenborn, C. E. E. Lange, P. Brouillard, Y. Gurwicz, P. Nowack, and D. Rolnick, "Towards causal representations of climate model data", *arXiv preprint arXiv:2312.02858*, 2023.
- [3] J. Kaltenborn, V. Clay, A. R. Macfarlane, and M. Schneebeli, "Automatic snow type classification of snow micropenetrogram profiles with machine learning algorithms", *Geoscientific Model Development*, vol. 16, no. 15, pp. 4521–4550, 2023.
- [4] J. Kaltenborn, V. Clay, A. R. Macfarlane, and M. Schneebeli, "Machine learning for snow stratigraphy classification", in *NeurIPS 2021 Workshop on Tackling Climate Change with Machine Learning*, 2021.

POSTERS

- **J. Kaltenborn**, C. E. Lange, V. Ramesh, P. Brouillard, Y. Gurwicz, C. Nagda, J. Runge, P. Nowack, and D. Rolnick, "ClimateSet: A large-scale climate model dataset for machine learning", *NeurIPS 2023: Thirty-seventh Annual Conference on Neural Information Processing Systems*, New Orleans, USA, 10–16 Dec 2023, <https://nips.cc/virtual/2023/poster/73703>, 2023.
- J. Boussard, C. Nagda, **J. Kaltenborn**, C. E. E. Lange, P. Brouillard, Y. Gurwicz, P. Nowack, and D. Rolnick, "Towards causal representations of climate model data", *NeurIPS 2023 Workshop: Tackling Climate Change with Machine Learning*, New Orleans, USA, 16 Dec 2023, <https://neurips.cc/virtual/2023/76906>, 2023.
- **J. Kaltenborn**, V. Ramesh, and T. Wright, "Ice Lead Network Analysis", *EGU General Assembly 2022*, Vienna, Austria, 23–27 May 2022, EGU22-8945, <https://doi.org/10.5194/egusphere-egu22-8945>, 2022.
- **J. Kaltenborn**, V. Clay, A. R. Macfarlane, J. M. L. King, and M. Schneebeli, "A Comparison of Machine Learning Algorithms for the Segmentation and Classification of Snow Micro Penetrogram Profiles on Arctic Sea Ice", *EGU General Assembly 2021*, online, 19–30 Apr 2021, EGU21-15637, <https://doi.org/10.5194/egusphere-egu21-15637>, 2021.

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TALKS

- “Machine Learning for the Cryosphere - A Call for Collaboration”, C42A - Machine Learning and the Cryosphere, AGU Annual Meeting 2023, San Francisco, USA, 14th Dec 2023. *Invited Talk.*
- “Juneau Icefield Research Program 2023”, Sustainability Reading Group, Mila - Quebec Artificial Intelligence Institute, Montreal, Canada, 2nd Oct 2023.
- “What is AI?”, Our Dialogue, Germany, 06th Aug 2022. Available in German on YouTube.
- Invited Panelist: “The future of Neuro-AI: Climate change”, Unique Student Symposium 2022, 10th Jun 2022.
- “Climate Change and Machine Learning: An Overview”, NEC Laboratories Europe GmbH, Heidelberg, 6th Apr, 2022.
- “Machine Learning for Climate Science”, Institute of Cognitive Science, Osnabrück, 14th Oct, 2021.

MEDIA

- “How can AI help us fight climate change?”, AI by You - Julia’s story, DeepMind, UK, 7th Nov 2022. Social media content, available on YouTube, Twitter, LinkedIn and Instagram.
- “Julia Kaltenborn: Being a climate activist, Arctic expeditions, participatory democracy and hope”, The Polymess Podcast, Benno Krojer, 14th Mar 2023. Available on Spotify.
- “Women, science and changing the world with Julia Kaltenborn”, Why we will make it Podcast, Ariana Gomez, 3rd May 2023. Available on Spotify.
- “Using AI to predict climate variations over a century”, Mila Interview, Julien Besset, 5th Dec 2023. Available on Mila’s website.

SELECTED SERVICE

2023	Member of Mila’s Sustainability Committee Supporting Mila to become a sustainable AI research institute
2022	Committee member of “AI Helps Ukraine - Charity Conference” 🌐 aihelpsukraine.cc
2020–today	Co-Founder of “Unser Dialog” Building effective solutions from diverse and structured dialogue Organizing “Our Dialogue About AI”, an educational program for the public 🌐 unserdialog.org
2020	Student Representative in the Appointment Procedure of the “Ethics of AI” Professorship at the Osnabrück University
2018–2020	German Zambian Exchange Project Sustainable urban development (SDG11) by <i>Terre des hommes</i> & <i>German Federal Ministry for Economic Cooperation and Development</i>
2012–2016	Volunteer at Greenpeace Leadership of the Greenpeace Youth Group Regensburg

FORMAL LANGUAGES

- **Python:** PyTorch, TensorFlow
- **Java:** Android SDK
- **R:** Stan, brms
- **Prolog:** ?- help(life).

NATURAL LANGUAGES

- **German:** Native Speaker
- **English:** C1
- **Italian:** B2
- **Japanese:** Basics

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