




Emil Ryd

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Education

- University of Oxford** *Oct 2023 – Jun 2026*
BA in Physics
- Grade: Distinction
- UWC Red Cross Nordic** *Aug 2021 – May 2023*
International Baccalaureate
- Grade: 42/45

Research



- Machine learning for flood forecasting** *Kigali, Rwanda*
Carnegie Mellon University Africa (CMU-Africa) *Jul 2024 – present*
- Worked as a full-time research intern under Prof. Moise Busogi, as a part of a newly started research initiative on improving flood forecasting together with Microsoft Research Africa and Rwanda Water Resources Board
 - Started a research collaboration with Grey Nearing from Google Research, investigating how machine learning models for flood forecasting trained on global datasets can be finetuned on local basins (still ongoing)
 - Curated Rwandan data on river streamflow and submitted to the European Commission's global flood forecasting model, GloFAS, for calibration. Increased the number of basins covered in Rwanda.

- Nonlinear climate dynamics** *Jun 2022 – Sep 2024*
Supervised by Prof. Holger Kantz, Max Planck Institute for the Physics of Complex Systems
- Investigated possible mechanisms behind the infamous 100,000-year problem in the Earth's ice age history
 - Found new regimes in which vibrational and nonlinear resonance can occur in dynamical systems, suggesting new hypotheses for the 100,000-year problem. Paper published in Phys Rev E.

- Agent-based modelling of COVID-19** *Aug 2023 – Feb 2024*
Collaboration with Dr. Leila Hedayatifar, New England Complex Systems Institute
- Helped as a research volunteer on creating agent-based models for simulating the spread of COVID-19 in closed spaces.
 - Converted the research group's model from NetLogo to Python using Mesa and ran some experiments on the model to find characteristic behaviors in the transmission.

- Modelling airplane boarding in multi-aisle aircraft** *Jun 2022 – Nov 2023*
Supervised by Prof. Jason Steffen, University of Nevada, Las Vegas
- Based on the initial work we did as part of the 2022 IMMC competition, we investigated the possibilities of parallelizing boarding procedure in planes with multiple aisles.
 - I wrote a full agent-based model in Repast Symphony (Java) to simulate airplane boarding. Preprint available on arXiv.

Publications & preprints

- Analysis of parallel boarding methods in a multi-aisle aircraft (preprint)** *Oct 2024*
Emil Ryd, Vihaan Khandelwal, Hayden So, Jason H. Steffen
[arXiv:2410.17870](https://arxiv.org/abs/2410.17870) 
- Nonlinear resonance as a model for paleoclimate oscillations** *Sep 2024*
Emil Ryd, Holger Kantz
[10.1103/PhysRevE.110.034213](https://doi.org/10.1103/PhysRevE.110.034213) 

Projects

Vaccess

[vaccess](#) 

- Developed and launched an app on the App Store in Sweden, which enables users to catalogue vaccinations they've taken and be notified about future vaccinations. 1000+ downloads. (Discontinued).
- Tools Used: Swift, Xcode

Water Supply Forecast

[water-supply-forecast](#) 

- Part of a team from my university participating in the Water Supply Forecast Rodeo, a competition hosted by the U.S. Bureau of Reclamation to help develop their forecasting models. We developed an LSTM model for prediction, making use of both geospatial and temporal data.
- Tools Used: Python, Pandas, Pytorch

Scholarships & grants

New College (Oxford) Scholar: Scholarship awarded for excellent academic performance in first year of university. 2024

Nick Roth Travel Award: Travel award for my stay in Rwanda doing research. 2024

United World College Scholar: Full scholarship to study at this international residential high school in Norway with 90+ nationalities, aimed at promoting inter-cultural understanding and world peace. 2021

Honours & awards

Dyson fellow: Academic program for 15 of the best physics students in each year at Oxford. Admitted on the recommendation of my tutors. 2024

Silver medal at the International Physics Olympiad (IPhO) 2023

Bronze medal at the European Physics Olympiad (EuPhO) 2023

5th place in the Norwegian Mathematics Olympiad (Abelkonkurransen) 2023

Winner (1st place) of the Norwegian Physics Olympiad 2022

Meritorious distinction in the International Mathematical Modelling Challenge 2022

Other things I've done that I think are cool

Physics olympiad club in Rwanda

Aug 2024 - present

- Started this club teaching olympiad physics to high school grads and university students in Rwanda.
- The German development agency (GIZ) are supporting us by letting us use their maker space for our meetings. I was in Rwanda when we started, and I currently lead sessions online from the UK.
- Currently working with the members of the club on setting up a small physics competition in Rwanda, which we hope to then grow into a national olympiad.

Tutoring underprivileged gifted students in math in Sweden

Sep 2023 - May 2024

- Part of Intize's (a Swedish NGO) program for giving Swedish students in rural areas better access to further education in mathematics.
- Led weekly tutoring sessions with two students, teaching problem solving techniques in geometry and algebra.

Renovating school in Ghana

Aug 2022 - Feb 2023

- Raised money by organizing workshops on environmental challenges and world development for young kids.
- Coordinated with people on the ground. had a water pump and storage facility successfully installed, providing more easily accessible drinking water at the school.

Programmers' club

Apr 2022 - Mar 2023

- Taught competitive programming in C++ and Python to fellow students at my high school. Organized the qualifying round of the Norwegian Informatics Olympiad at my school.