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Cornelis Schwenk

Education

Since 2022 **Doctoral Studies**, *Universität Mainz*, PhD in Atmospheric Physics.
Research in clouds and dynamics using advanced numerical modeling, high-performance computing and large-scale data analysis.

2019–2021 **Masters**, *Universität Heidelberg*, Physics, grade: 1.0 (best possible grade).
Specialization in environmental physics.

2015–2019 **Bachelor**, *Universität Heidelberg*, Physics, grade: 1.9 (best: 1.0, passing: 4.0).
Theoretical and experimental physics, mathematics, programming.

Research Experience

Since 2022 **Doctoral Research**, *with Annette Miltenberger, University Mainz, Germany*.
- Developed novel Lagrangian formulations for the analysis of microphysical processes in clouds.
- Implemented high-performance computing scripts to efficiently process, mask, and bin large 4D datasets. Also developed a codebase for efficient interpolation of data in NWP models with non-uniform vertical grids.
- Methods: Random forest regression models, multi-threading, high-performance-computing.
- Science Communication: Delivered a talk at the LCOY youth climate conference and developed a game-based approach to research outreach.

Sept 2021 - Jan 2022 **Research Associate**, *with Bertram Boehrer, Environmental Research Centre Magdeburg (UFZ)*.
Authored two peer-reviewed publications as first author (full references below).

2021 **Master's Thesis**, *with Bertram Boehrer and Werner Aeschbach-Hertig, University of Heidelberg and the Environmental Research Centre Magdeburg (UFZ). Grade: 1.0 (best possible grade)*.
Experimental measurements of noble gas solubilities at high temperatures and their implementation for the analysis of noble gas concentration measurements in Lake Kivu's deep water.

Nov 2019 - Feb 2020 **Academic assistant**, *at the research group for hydrogeography and climatology at the University of Heidelberg*.
Conducted field measurements and automatized the analysis of data.

2021 **Bachelor's Thesis**, *with Bernd Jähne, University of Heidelberg. Grade: 1.0 (best possible grade)*.
Expansion and implementation of the method of momentum balance in an annular wind-wave tank to measure the friction velocity under non-stationary conditions.

March – April 2018 **Academic internship**, *at the Max-Planck Institute for Nuclear Physics, Heidelberg*.
Evaluation of measurement data for the separation of N2 molecules in intense laser pulses using python.

Teaching Experience

Since 2022 **Tutor (Teaching Assistant)**, *University of Mainz*.
- Taught Clouds and Aerosols for master's students
- Taught Introduction to Meteorology for first semester students
- Created a role-playing game which simulates a large research collaboration and implemented it with a group of students during their first semester project practicals
- Assisted in the lecture for Modeling and Data Analysis in Atmospheric Sciences

2018-2021 **Tutor (Teaching Assistant)**, *University of Heidelberg*.
- Supervised laboratory work, demonstrated experiments and corrected protocols for the physics lab courses for students of physics, medicine and biotechnology

Publications

2022 Schwenk, C. and Miltenberger, A.: "The role of ascent timescales for warm conveyor belt (WCB) moisture transport into the upper troposphere and lower stratosphere (UTLS)", Atmos. Chem. Phys., 24, 14073–14099, https://doi.org/10.5194/acp-24-14073-2024

2022 Schwenk, C., Negele, S., Balagizi, C. M., Aeschbach, W., Boehrer, B. (2022): "High temperature noble gas thermometry in Lake Kivu, East Africa", Science of the Total Environment, 837, 155859. https://doi.org/10.1016/j.scitotenv.2022.155859

2022 C. Schwenk, S. Negele, W. Aeschbach, B. Boehrer: "Extending noble gas solubilities in water to higher temperatures for environmental application", ACS J. Chem. Eng. Data, 67 (2022), pp. 1164-1173, 10.1021/acs.jced.2c00009

2021 Boehrer, B., Jordan, S., Leng, P., Waldemer, C., Schwenk, C., Hupfer, M., Schultze, M.: "Gas pressure dynamics in small and mid-size lakes", Water, 13, 1824. https://doi.org/10.3390/w13131824

Talks and Conferences (Selection)

2024 International Conference on Clouds and Precipitation, Jeju, South Korea: "A Lagrangian investigation of the (micro)physical processes controlling warm conveyor belt moisture transport and cloud properties", talk, also presented at EGU 2024 General Assembly, Vienna, Austria.

2024 LCOY 2024 (German Youth Climate Conference) Berlin, Germany: "Hands-on climate research: how do clouds influence the climate? And what does this have to do with geoengineering?" (translated title from german), talk

2023 EGU 2023 General Assembly, Vienna, Austria: "Physical processes controlling warm conveyor belt moisture transport to the UTLS and dependence on model resolution, talk

2022 DACH 2022 Meteorology Conference, Leipzig, Germany: "Creating high Temperature Noble Gas Solubility Functions to analyse missing Noble Gases in Lake Kivu's deep Water", talk, also at SIL 100, Congress of the International Society of Limnology, Berlin, Germany

Skills

Languages German (native), English (native), Danish (proficient), French (medium proficiency, with room for improvement).

Programming Python (data science libraries xarray, netCDF4, scipy, pandas, etc.), Julia (NCDatasets, multithreading, DecisionTrees, etc.), Fortran (ICON NWP model), Git, Bash, LateX

Computer Linux/Debian, Windows (Powerpoint, Word, Excel), Anaconda, Jupyter Notebook

Soft Skills Public speaking, group work, international sensibilities and cross-cultural communication skills (multi-cultural upbringing in a diplomatic environment).

Scholarships and prizes

2023 **Best Poster Presentation Award**, *TPChange Annual Meeting*.

2022 **Schwoerbel-Benndorf Young Scientist Award**, *German Limnological Society (DGL)*, First Place Recipient of the Schwoerbel-Benndorf Nachwuchspreis, German Limnological Society.

2014 **Student of the Year**, *Copenhagen International School*, Recognized for academic performance and significant contributions to school life, including active participation in extracurricular activities such as sports, theatre, and music, as well as for fostering a positive, supportive community..

2012-2014 **Academic Scholarship**, *Copenhagen International School*, Awarded a scholarship that fully funded all extracurricular music classes and activities..

Interests and Hobbies

Hobbies I take great interest in history, advances in natural sciences, geopolitics and music. I love hiking, skiing, surfing and to play football/soccer and table tennis.

Passions Combating climate change, advocating for sustainable energy and practices, striving for a more ethical, environmentally responsible future. Championing feminism and gender equality.