Senior Environmental Data Scientist
Mario Krapp, PhD

Objective

I aspire to combine creative problem solving and data-science expertise with innovative thinking to influence strategic decision making.

Experience

2020 – Current

Senior Environmental Data Scientist *GNS Science | Te Pū Ao and Victoria University of Wellington | Te Herenga Waka*

My contribution: Value creation through stakeholder dialogue for small internal innovation projects (~100k p.a.) and through leading a research aim in the MBIE Endeavour programme *Our Changing Coast* (2022-2027). Innovate in traditional climate research areas such as glaciology and geology (e.g., ice & sediment cores, the Antarctic Ice Sheet) by applying machine learning and data science techniques, such as statistical emulation, digital twins, or neural networks.
What I learned: Context gives data meaning. No innovation without failure. Good leadership makes a great team.

2016 – 2020

Research Associate *Department of Zoology, University of Cambridge (United Kingdom)*

My contribution: Designing a computer model and reconstructing a climate dataset of the last 800,000 years that have influenced the distribution of species across the planet, for example, the dispersal of anatomically modern humans out of Africa. Promoting cross-institutional collaborations around climate science topics.
What I learned: Building a community across institutions is difficult and requires careful planning to be useful. Changing course mid-way through a project requires courage and discipline to follow through. But it is better than steering into the wrong direction.

2015 – 2016

Climate Scientist and Programmer *Climate Analytics (Berlin, Germany)*

My contribution: Assessing the historical responsibility of countries' emissions for climate change. Implementing an emulator for Integrated Assessment Models to downscale future energy system pathways to the country level. Estimating the adverse effects of future climate change (e.g., GDP loss) for Sub-Saharan countries.
What I learned: Climate change policy is a big arena where fast action and high quality are required. Problem-solving skills, technical skills (e.g., models), and (climate) science literacy are key to provide evidence-based advice and to support decision-making.

2012 – 2014

Postdoctoral Researcher *Potsdam Institute for Climate Impact Research (Germany)* & **Visiting Scientist** *(in 2014) International Pacific Research Center (SOEST, University of Hawaii, USA)*

My contribution: Developing a numerical model to calculate the surface mass balance from the Greenland Ice Sheet under present-day and future warming climate conditions.
What I learned: Creating tools and models that are meaningful, reproducible, and user-friendly requires extra effort, or quality. Testing a model under different assumptions is

key. What might feel like a slow process today will pay off in the future.

2008 - 2012

PhD candidate *Max Planck Institute for Meteorology (Hamburg, Germany)*

My contribution: Running computer simulations with a comprehensive earth system model for Middle Miocene boundary conditions, 15 million years ago.
What I learned: Numerical climate modelling is an art that requires patience, care, and dedication. Big models come with big responsibilities (and a lot of disk space).

Publications (selected)

19 peer-reviewed publications.

h-index of 13 according to Google Scholar.

Here is a selection of three papers I have (co-)authored. Link to my Google Scholar profile.

Batchelor, C.L., Margold, M., **Krapp, M.**, Murton, D.K., Dalton, A.S., Gibbard, P.L., Stokes, C.R., Murton, J.B, Manica, A.: "The configuration of Northern Hemisphere ice sheets through the Quaternary", Nature Communications 10, 3713, 2019. https://doi.org/10.1038/s41467-019-11601-2
This paper has started with a simple why: Why don't we have maps that show us how big the ice sheets really were? The rest had been dedication from the team and hard work (from C.L. Batchelor).

Krapp, M., Beyer, R.M., Edmundson, S.L., Valdes, P.J., Manica, A.: "A statistics-based reconstruction of high-resolution global terrestrial climate for the last 800,000 years", Sci Data, 228, 2021. https://doi.org/10.1038/s41597-021-01009-3
This paper is a personal success story. Climate data must be readily made available for other research areas, such as paleoecology or archaeology. Scientific data belongs to everyone.

Lowry, D.P., **Krapp, M.**, Golledge, N.R., Alevropoulos-Borrill, A.: "The influence of emissions scenarios on future Antarctic ice loss is unlikely to emerge this century", Commun Earth Environ 2, 221 (2021). https://doi.org/10.1038/s43247-021-00289-2
I was tasked to create a statistical emulator to estimate the parameter sensitivity of a numerical ice sheet model for Antarctica's melting ice shelves under different future warming scenarios. A technical challenge with a lot of learning for both me and the ice sheet modellers, as well as fun exercise for creative visual storytelling.

Education

2008 – 2012
PhD in Geosciences
Universität Hamburg (Germany)

2003 – 2008
Physics diploma (MSc equivalent)
Technische Universität Berlin (Germany)

Skills

- Problem solving
- Data Analysis & Data Visualisation
- Teaching in Higher Education (certified)
- Python (PyTorch, PyMC, scikit-learn, statsmodels), Julia, R, C/C++, FORTRAN; QGIS, GDAL; UNIX & HPC systems; Docker, K8s; Git

Strengths*

- Learner
- Strategic
- Intellection
- Individualization
- Ideation

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