

Mees McCoy Franssen

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Education

Imperial College London — MSc. in Applied Computational Science and Engineering 2025-2026

- Graduate Courses: Advanced Programming, Deep Learning, Numerical Methods, Big Data Analytics, Inversion and Optimization, Computational Mathematics, Cloud Computing

McGill University — BSc. in Atmospheric and Oceanic Sciences 2019-2024

- Graduate Courses: Atmospheric and Oceanic Dynamics, Waves and Stability, Dynamics of Current Climates, Cloud Physics, Atmospheric Radiation, Advanced Quantitative Methods and Statistics

Posters and Publications

Franssen M., MacDonald M.: A Climatology of Solid-to-Liquid Ratio on Mount Washington (1980-2024). *Eastern Snow Conference*. June 10-12 2025, Syracuse NY.

Schmedding R., **Franssen M.**, Zuend A. (2025): A Machine Learning Approach for Predicting the Pure-Component Surface Tension of Atmospherically Relevant Organic Compounds. *ACS ES&T Air*, <https://doi.org/10.1021/acsestair.4c00291>

Professional Experience

Mount Washington Observatory—Meteorologist and Alpine Climate Research Intern 2025

- Produced 48-hour weather forecasts for the higher summits of the White Mountains in New Hampshire.
- Alpine climate project: Climatology of Solid-to-Liquid Ratio on Mount Washington (1980-2024).
- Results of research project presented at the Eastern Snow Conference in 2025 (see Posters and Publications).

ComputeCanada and McGill University—High Performance Computing Intern 2024

- Ported Community Earth System Model (CESM2.1.5) onto ComputeCanada HPC Facilities.
- Acted as liaison for other researchers porting the model for their work.
- Implemented source code changes to ice-microphysics schemes, and conducted comparison tests between generations of ice-microphysics schemes nudged to MERRA2 reanalysis data.

Prof. Daniel Kirshbaum Group, McGill University—Climatological Analysis and Field Campaigns 2022

- Climatological analysis of Monte Baldo region in Italy, applying a range of observational and reanalysis data. Supplemental to TEAMx field campaign (<https://doi.org/10.1175/bams-d-21-0232.1>).
- Applied fourier coherence and phase spectra to investigate aerosol-wind transport.
- Generated dataset of radar composite images of thunderstorms in study area for case study analysis.

Prof. Andreas Zuend Group, McGill University—Machine Learning and Atmospheric Chemistry 2021

- Developed machine learning approaches to predict the pure-component surface tension of common organic aerosol compounds
- ML Algorithms used: XGBoost, Random Forest, K-Nearest Neighbor
- Model vastly improved predictions of pure-component surface tension, with model accuracy >90%
- Results published in the American Chemical Society (see Posters and Publications)

Projects

Monte Carlo Hurricane Track Model with Environmentally-Constrained Markov Chains Present

- Developed a stochastic hurricane track simulator using discrete-time Markov chains realized from 10,000 years of synthetic STORM IBTrACS data.
- Ran parallelized Monte Carlo simulations to model ensemble storm paths and constructed 95% confidence cones using haversine-based distance metrics.
- Implementing real-time 500hPa geopotential biasing using cosine similarity with streamlines to constrain model forecast.

Benzie Conservation District — Invasive Species Risk Assessment 2025

- Developed a risk assessment for aquatic invasive species spread via the recreational boater and angler pathways in Benzie, Manistee, Grand Traverse, and Leelanau Counties in Michigan.
- Processed boater data with Fuzzy Matching using cosine similarity to reference list of lakes from the State of Michigan GIS (89% matching success).
- Conducted a Network Analysis of boater data plotting results using Folium to visualize relationships regionally and determine relative contamination risk.
- BCD apply results in grant proposals for congressional funding for boat washing initiatives and future research work.

Volunteering and Extra-Curricular Activities

Mount Washington Observatory—Science Outreach and Communication 2025

- Wrote articles for the Observer Blog and Windswept magazine
- Lead tours and lectures to MWOBS EduTrip Guests, teaching Introductory Weather Forecasting and Meteorology.
- Presented at the Science in the Mountains lecture series, presenting "A Climatology of Solid-to-Liquid Ratio on Mount Washington (1980-2024)", link to video <https://www.youtube.com/watch?v=h148BdeVuK4>

Faculty of Science, McGill University— Tomlinson Teaching Assistant 2022

- Undergraduate TA for ATOC214: Introduction to Physics of the Atmosphere.
- Developed a simple 1D climate model with tunable features allowing students to emulate: Earth with/without an atmosphere, the climate of Mars, and changing atmospheric CO₂ concentrations.
- Used this model to host an interactive guest lecture and write homework assignments.

Departmental Student Council—Vice-President and DEI Officer 2021-2023

- Organized monthly council meetings, lead accessibility discussions for council events.
- Coordinated with faculty to ensure DEI considerations in course curricula. For example, color-blind considerations when looking at radar composites or heatmaps.
- Represented the student body at faculty of science meetings concerning student health and accessibility.

aCADemy—Co-Founder and Vice-President 2020-2022

- Co-founded a web-based tutorial service teaching Computer Aided Design (CAD), endorsed by McGill Engineering faculty.
- Developed, designed, and wrote curriculum and tutorial designs.
- Designed website, see for details: <https://mcgillacademy.wixsite.com/website>

McGill Baja Racing—Engineering Subteam Leader 2019-2021

- Lead engineer for the design and manufacture of the toe-box and throttle system for the McGill Baja car.
- Participated in the inter-collegiate SAE Baja Racing series, best finish was 19/200.