Elizabeth McGeorge

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Seattle, WA

Professional Experience

Postdoctoral Scholar *University of Washington*
Jan 2024 – Current | Seattle, WA

- Collaboration with Dr. Yolande Serra (UW CICOES), Dr. Dongxiao Zhang (UW CICOES/NOAA PMEL) and Dr. Meghan Cronin (NOAA PMEL).
- Investigating the usefulness of acoustic doppler current profilers (ADCPs) on Saildrones for calculating vertical velocity. This work aims to assist in reducing model biases in the eastern tropical Pacific and improving skill in El Niño Southern Oscillation (ENSO) predictions.

Teaching Lecturer *University of Canterbury*
Feb 2022 – Nov 2022 | Christchurch, New Zealand

- Lectured on two courses in 2022: ENCH298 and EMTH119.
- For both, I was responsible for delivering lectures, providing regular office hours and both writing and marking examinations.

Mathematics Tutor *University of Canterbury*
Feb 2022 – Nov 2022 | Christchurch, New Zealand

- Ran help sessions in applied mathematics, mainly in linear algebra and differential equations.
- Topics taught include: vector spaces, linear transformations, eigenvalues, and orthogonality with applications to Markov chains, population and economic models, least squares approximation, cryptography, coding theory, data compression, systems of linear and non-linear first order differential equations, phase plane techniques, numerical methods, stiff systems, Laplace transforms (including initial value problems, shift theorems, step functions and impulses, convolution, resonance), Fourier series and elementary Fourier transforms.

Publications

*2024 E. K. McGeorge, M. Moyers-Gonzalez, M. Sellier, and P. L. Wilson (Apr. 2024). "Recovery of basal slip and ice thickness for ice flow describe by the Shallow Ice Approximation using an adjoint based optimisation method in two-dimensions." In preparation.

2022 E. K. McGeorge, M. Moyers-Gonzalez, M. Sellier, and P. L. Wilson (Dec. 2022). "Exact recovery of kiwi-shaped bed topography in a no-slip ice sheet using only surface data." 23rd Australasian Fluid Mechanics Conference Proceedings. Sydney.

2022 E. K. McGeorge, M. Moyers-Gonzalez, M. Sellier, and P. L. Wilson (Mar. 2022). "An augmented Lagrangian algorithm for recovery of ice thickness in unidirectional flow using the Shallow Ice Approximation". In: Applied Mathematical Modelling 107, pp. 650–669.

2021 E. K. McGeorge, M. Sellier, M. Moyers-Gonzalez, and P. L. Wilson (Jan. 2021). "Bedrock reconstruction from free surface data for unidirectional glacier flow with basal slip". In: Acta Mechanica 232.1, pp. 305–322

2023 Career Break

In 2023, I sailed 7,000 nm across the Pacific from New Zealand to Japan in a 37 ft sailing yacht. While crossing the Pacific, as one half of a double-handed crew, I was in command of the vessel for a total of 12 hours a day, split into four 3-hour shifts. To date, I have spent 66 days offshore, including one non-stop passage lasting 32 days. I contributed to all decision making while onboard and was solely in charge of provisioning. After arriving to Japan, I remained onboard for 5 months while cruising the Seto Inland Sea. This experience has given me competence in a broad range of areas related to vessel command, weather routing, logistics planning, and vessel clearance procedures.

Education

PhD (Mathematics)
2019 – 2023 | University of Canterbury

Beyond Observations: Recovery of unknown parameters in ice flows using optimisation techniques and other tools. Conferred October 11, 2023.

BSc (Hons. First Class)
2015 – 2018 | University of Canterbury

Major: Mathematics.
GPA: 8.75/9.00

Teaching Experience

• Lecturing undergraduate mathematics (in person/online)
• Writing/marking examinations and assignments
• Preparing lecture notes and tutorial material
• Course management
• Pastoral care

Numerical Skills

Methods

finite elements • CFD • optimal control • sensitivity analysis • analytical solutions

Languages

Proficient:

Python • MATLAB • LATEX

Familiar:

Sage Math • R • html

Learning:
julia

Libraries/Packages/Modules

FEniCS • dolfin-adjoint • matplotlib • xarray • netcdf4 • scipy • statsmodels • pandas

Tools/Platforms

Git • conda • linux

References

Yolande Serra
Senior Research Scientist
Cooperative Institute for Climate, Ocean, and Ecosystems Studies
University of Washington

Miguel Moyers-Gonzalez
Associate Professor
School of Mathematics and Statistics
College of Enginnering
University of Canterbury

Mathieu Sellier
Head of Department
Dept. of Mechanical Engineering
College of Engineering
University of Canterbury