Josef Bisits

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Education

- **Doctor of Philosophy**, The University of New South Wales — Sydney, 2022–2025
  School of Mathematics and Statistics
  - Supervisors: Associate Professor Jan Zika, Professor Trevor McDougall and Dr Taimoor Sohail
  - Thesis: Non-linear controls on ocean circulation and mixing in the high-latitude oceans
- **Bachelor of Science (Advanced mathematics, honours)**, The University of New South Wales — Sydney, 2016–2021
  School of Mathematics and Statistics
  - Major: Applied mathematics
  - Supervisors: Associate Professor Jan Zika and Dr Geoff Stanley
  - Thesis: Passive tracer mixing along isopycnal surfaces in turbulent flows
  - Honours grade: class 1
- **Bachelor of Music**, The University of Sydney — Sydney, 2007–2010
  Sydney Conservatorium of Music
  - Major: Performance, double bass
  - Double bass instructor: Alex Henery

Publications

Bisits, Josef I., Zika, Jan D., and Sohail, Taimoor. May 2025. "Cabbeling as a catalyst and driver of turbulent mixing". In: *Journal of Fluid Mechanics* 1011, A17. DOI: 10.1017/jfm.2025.349.

Bisits, Josef I., Zika, Jan D., and Evans, Dafydd Gwyn. Dec. 2024. "Does Cabbeling Shape the Thermohaline Structure of High-Latitude Oceans?" In: *Journal of Physical Oceanography* 54 (12), pp. 2419–2430. DOI: 10.1175/JPO-D-24-0061.1.

Bisits, Josef I., Stanley, Geoffrey J., and Zika, Jan D. Feb. 2023. "Can We Accurately Quantify a Lateral Diffusivity from a Single Tracer Release?" In: *Journal of Physical Oceanography* 53 (2), pp. 647–659. DOI: 10.1175/JPO-D-22-0145.1.

Conference Proceedings

Bisits, Josef I. June 2024. "Does cabbeling shape the thermohaline structure of high-latitude oceans?" In: *Gordon Research Seminar on Ocean Mixing*. Oral presentation.

Bisits, Josef I. Feb. 2024. "Does cabbeling shape the thermohaline structure of high-latitude oceans?" In: *Australian Meteorological and Oceanographic Society annual conference*. Oral presentation.

Bisits, Josef I. June 2024. "The effect of non-linear processes on mixing". In: *Gordon Research Conference on Ocean Mixing*. Poster presentation.

Bisits, Josef I. Nov. 2024. "The effects of cabbeling on mixing and energetics in polar oceans". In: *Australian Antarctic Research Conference*. Poster presentation.

Bisits, Josef I. July 2023. "Can we accurately quantify a lateral diffusivity from a single tracer release?" In: *XVIII General Assembly of the International Union of Geodesy and Geophysics (IUGG*. Oral presentation.

Bisits, Josef I. July 2023. "Does cabbeling shape the thermohaline structure of high-latitude oceans?" In: *Physics of the Ocean Summer School*. Poster presentation.

Bisits, Josef I. Nov. 2022. "Can we accurately quantify a lateral diffusivity from a single tracer release?" In: *Australian Centre for Excellence in Antarctic Science workshop*. Poster presentation.

Bisits, Josef I. Nov. 2022. "Can we accurately quantify a lateral diffusivity from a single tracer release?" In: *Australian Meteorological and Oceanographic Society annual conference*. Oral presentation.

Research experience

- **Research assistant, UNSW** — Sydney, 2022
  Numerical modeling and analysis of tracer release experiments in turbulent flows.
- **Research assistant, UNSW** — Sydney, 2022
  Historical water quality data processing and analysis to develop a predictive water quality model.

Professional activities

- **Peer review**
  Journal of Geophysical Research: Oceans. 2023-current
- **Conference session chair** — Sydney, 2024
  UNSW School of Mathematics and Statistics Postgraduate conference

Programming Skills

I have a wide experience in programming which includes:

- using High Performance Computing systems to run models on both CPU's and GPU's;
- building models for ocean and fluid dynamics simulations; and
- data visualistion.

My programming language of choice is julia. Some packages I am involved with are:

- Author `StaircaseShenanigans.jl`, `TwoLayerDirectNumericalShenanigans.jl`, `RasterHistograms.jl`;
- Developer `PassiveTracerFlows.jl`; and
- Contributor `FourierFlows.jl`, `GeophysicalFlows.jl`, `Oceananigans.jl` amongst others.

I am also fluent with R, , , LaTeX and git.

Teaching

Mathematics — UNSW
Tertiary mathematics tutoring: 2021–current

- Mathematics Drop in Centre;
- Mathematics 1A (MATH1131/1141);
- Mathematics 1B (MATH1231/1241);
- Numerical Methods and Statistics (MATH2089);
- Introduction to Atmosphere and Ocean Dynamics (MATH2241); and
- Fluids, Oceans, and Climate (MATH3261-5285).

Double bass
Private and ensemble tuition in Sydney. 2017–2022

Orchestral Experience

- **Sydney Symphony Orchestra** — Sydney, 2009–current
  Regular casual double bassist, full time contract musician in 2014, 2015 and September 2017–September 2018.
- **Australian Chamber Orchestra** — Sydney, 2013–current
  Regular casual double bassist.
- **Opera Australia Orchestra** — Sydney, 2016–current
  Regular casual double bassist.
- **Tasmanian Symphony Orchestra** — Tasmania, 2013–2018
  Casual double bassist.
- **Ulster Orchestra** — Belfast, Winter 2012
  Held a trial for double bass section leader.
- **Southbank Sinfonia** — London, 2011-2012
  Principal double bassist, twice appeared as a soloist.

Orchestral Training

- Australian Chamber Orchestra — 2013
  Emerging Artist, mentor: Maxime Bibeau.
- Sydney Symphony Orchestra — 2008–2010
  Double bass section player with Sydney Sinfonia, double bass Fellow in 2010.
- Australian youth orchestra — 2007–2008
  Double bass section player.
- Sydney youth orchestra — 2006–2008
  Principal double bassist, appeared as double bass soloist in 2006.

Scholarships and Awards

- Best applied mathematics talk at UNSW School of Mathematics and Statistics postgraduate conference. — 2024
- Michael Tallis Research travel award. — 2023
- Australian Government Research Training Program Scholarship. — 2022–2025
- School of Mathematics and Statistics research scholarship top-up. — 2022–2025
- Australian Centre for Excellence in Antarctic Research PhD student. — 2022–2025
- Michael Bannigan scholarship for academic achievement. — 2010
- Corina d'Hage string scholarship. — 2008–2010
- Winner of Sydney Youth Orchestra concerto competition. — 2006

Outreach

- **Helper for Girls do the Maths!**, *University of New South Wales.* — 2022, 2023
- **Helper for Experience UNSW Science day**, *University of New South Wales.* — 2022
- **Climate @ maths display for UNSW open day**, *University of New South Wales.* — 2022, 2023, 2024
- **Helper for uDASH work experience workshop**, *University of New South Wales.* — 2022

References

- **Associate Professor Jan Zika,** *University of New South Wales, Sydney.* — Email: j.zika@unsw.edu.au
- **Dr Taimoor Sohail,** *Research Fellow, University of Melbourne.* — Email: taimoor.sohail@unimelb.edu.au
- **Emeritus Professor Trevor McDougall,** *University of New South Wales, Sydney.* — Email: trevor.mcdougall@unsw.edu.au
- **Dr Geoff Stanley,** *Banting Postdoctoral Fellow, University of Victoria, Canada.* — Email: gstanley@uvic.ca
- **Associate Lecturer Simon Lloyd,** *University of New South Wales, Sydney.* — Email: s.lloyd@unsw.edu.au
- **Benjamin Ward**, *Tutti double bass, Sydney Symphony Orchestra.* — Email: 2benward@gmail.com
- **Edmund Bastian**, *Tutti double bass, Opera Australia Orchestra.* — Email: tanya.ed@bigpond.com