

Josef Bisits

Biological, Earth and Environmental Sciences,
University of New South Wales.

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EDUCATION

- **Doctor of Philosophy**, The University of New South Wales Sydney
School of Mathematics and Statistics 2022–2025
 - 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
School of Mathematics and Statistics 2016–2021
 - 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
Sydney Conservatorium of Music 2007–2010
 - 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](https://doi.org/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](https://doi.org/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](https://doi.org/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

- **Postdoctoral research associate, UNSW** Sydney
Diagnosing numerical mixing in finite volume models of fluid flow. 2025-current
- **Research assistant, UNSW** Sydney
Numerical modeling and analysis of tracer release experiments in turbulent flows. 2022
- **Research assistant, UNSW** Sydney
Historical water quality data processing and analysis to develop a predictive water quality model. 2022

PROFESSIONAL ACTIVITIES

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

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 visualisation.

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

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