

# 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.**, McDougall, Trevor J., and Osmond, Jan D. Zika Paul. “Determining how non-linearities in the equation of state affect diffusive interfaces in the ocean”. In prep.
- Lloyd, Simon, **Bisits, Josef I.** et al. “Swimming in urban estuaries: understanding stormwater contamination events and recovery from historical data”. Submitted to: *Water Research*.
- Zika, Jan D., **Bisits, Josef I.** et al. “A simple formula to infer rates of numerical mixing in finite volume ocean models”. In prep.
- 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 AND SEMINARS

- Bisits, Josef I.** Oct. 2025. “Non-linear controls on ocean circulation and mixing in the high-latitude oceans”. In: *ACEAS seminar series*. Seminar.
- 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

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

## PROFESSIONAL ACTIVITIES

<b>Peer reviewer</b>	
Carried out peer reviews of articles submitted to:	2023-current
– Journal of Geophysical Research: Oceans.	
– EGUSphere	
<b>Conference session chair</b>	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 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      and `git`.

## ORCHESTRAL EXPERIENCE

## TEACHING

<b>Mathematics</b>	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

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

## ORCHESTRAL TRAINING

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

## 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](mailto:j.zika@unsw.edu.au)
  - **Dr Taimoor Sohail**, *Research Fellow, University of Melbourne.* Email: [taimoor.sohail@unimelb.edu.au](mailto:taimoor.sohail@unimelb.edu.au)
  - **Emeritus Professor Trevor McDougall**, *University of New South Wales, Sydney.* Email: [trevor.mcdougall@unsw.edu.au](mailto:trevor.mcdougall@unsw.edu.au)
  - **Dr Geoff Stanley**, *Banting Postdoctoral Fellow, University of Victoria, Canada.* Email: [gstanley@uvic.ca](mailto:gstanley@uvic.ca)

- Associate Lecturer **Simon Lloyd**, *University of New South Wales, Sydney.* Email: [s.lloyd@unsw.edu.au](mailto:s.lloyd@unsw.edu.au)
- Benjamin Ward, *Tutti double bass, Sydney Symphony Orchestra.* Email: [2benward@gmail.com](mailto:2benward@gmail.com)
- Edmund Bastian, *Tutti double bass, Opera Australia Orchestra.* Email: [tanya.ed@bigpond.com](mailto:tanya.ed@bigpond.com)