

# 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 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`.

## 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

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- 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

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- 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

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- **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

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- 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)