

# Josef Bisits

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

Phone number: +61 400 348 389  
Email: [jbisits@gmail.com](mailto:jbisits@gmail.com)  
Website: [jbisits.github.io/](https://jbisits.github.io/)  
LinkedIn: [josef-bisits-066253123](https://www.linkedin.com/in/josef-bisits-066253123)  
GitHub: [github.com/jbisits](https://github.com/jbisits)  
ORCID: [0000-0002-6340-4470](https://orcid.org/0000-0002-6340-4470)

## EDUCATION

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- **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

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- 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

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- 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

- Postdoctoral research associate, UNSW**

Sydney

2025-current

Diagnosing numerical mixing in finite volume models of fluid flow.
- 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 reviewer**

2023-current

Carried out peer reviews of articles submitted to:
 
  - Journal of Geophysical Research: Oceans.
  - EGUSphere
- 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 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 , , , ,  $\text{\LaTeX}$  and `git`.

## TEACHING

**Mathematics**

UNSW

2021–current

Tertiary mathematics tutoring:

- 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

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<ul style="list-style-type: none"> <li>• <b>Sydney Symphony Orchestra</b> Regular casual double bassist, full time contract musician in 2014, 2015 and September 2017–September 2018.</li> </ul>	Sydney 2009–current
<ul style="list-style-type: none"> <li>• <b>Australian Chamber Orchestra</b> Regular casual double bassist.</li> </ul>	Sydney 2013–current
<ul style="list-style-type: none"> <li>• <b>Opera Australia Orchestra</b> Regular casual double bassist.</li> </ul>	Sydney 2016–current
<ul style="list-style-type: none"> <li>• <b>Tasmanian Symphony Orchestra</b> Casual double bassist.</li> </ul>	Tasmania 2013–2018
<ul style="list-style-type: none"> <li>• <b>Ulster Orchestra</b> Held a trial for double bass section leader.</li> </ul>	Belfast Winter 2012
<ul style="list-style-type: none"> <li>• <b>Southbank Sinfonia</b> Principal double bassist, twice appeared as a soloist.</li> </ul>	London 2011–2012

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## ORCHESTRAL TRAINING

<ul style="list-style-type: none"> <li>• Australian Chamber Orchestra <i>Emerging Artist, mentor: Maxime Bibeau.</i></li> </ul>	2013
<ul style="list-style-type: none"> <li>• Sydney Symphony Orchestra <i>Double bass section player with Sydney Sinfonia, double bass Fellow in 2010.</i></li> </ul>	2008–2010
<ul style="list-style-type: none"> <li>• Australian youth orchestra <i>Double bass section player.</i></li> </ul>	2007–2008
<ul style="list-style-type: none"> <li>• Sydney youth orchestra <i>Principal double bassist, appeared as double bass soloist in 2006.</i></li> </ul>	2006–2008

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## SCHOLARSHIPS AND AWARDS

<ul style="list-style-type: none"> <li>• Best applied mathematics talk at UNSW School of Mathematics and Statistics postgraduate conference.</li> </ul>	2024
<ul style="list-style-type: none"> <li>• Michael Tallis Research travel award.</li> </ul>	2023
<ul style="list-style-type: none"> <li>• Australian Government Research Training Program Scholarship.</li> </ul>	2022–2025
<ul style="list-style-type: none"> <li>• School of Mathematics and Statistics research scholarship top-up.</li> </ul>	2022–2025
<ul style="list-style-type: none"> <li>• Australian Centre for Excellence in Antarctic Research PhD student.</li> </ul>	2022–2025
<ul style="list-style-type: none"> <li>• Michael Bannigan scholarship for academic achievement.</li> </ul>	2010
<ul style="list-style-type: none"> <li>• Corina d'Hage string scholarship.</li> </ul>	2008–2010
<ul style="list-style-type: none"> <li>• Winner of Sydney Youth Orchestra concerto competition.</li> </ul>	2006

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## OUTREACH

<ul style="list-style-type: none"> <li>• <b>Helper for Girls do the Maths!</b>, <i>University of New South Wales.</i></li> </ul>	2022, 2023
<ul style="list-style-type: none"> <li>• <b>Helper for Experience UNSW Science day</b>, <i>University of New South Wales.</i></li> </ul>	2022
<ul style="list-style-type: none"> <li>• <b>Climate @ maths display for UNSW open day</b>, <i>University of New South Wales.</i></li> </ul>	2022, 2023, 2024
<ul style="list-style-type: none"> <li>• <b>Helper for uDASH work experience workshop</b>, <i>University of New South Wales.</i></li> </ul>	2022

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## REFERENCES

<ul style="list-style-type: none"> <li>• <b>Associate Professor Jan Zika</b>, <i>University of New South Wales, Sydney.</i></li> </ul>	Email: <a href="mailto:j.zika@unsw.edu.au">j.zika@unsw.edu.au</a>
<ul style="list-style-type: none"> <li>• <b>Dr Taimoor Sohail</b>, <i>Research Fellow, University of Melbourne.</i></li> </ul>	Email: <a href="mailto:taimoor.sohail@unimelb.edu.au">taimoor.sohail@unimelb.edu.au</a>
<ul style="list-style-type: none"> <li>• <b>Emeritus Professor Trevor McDougall</b>, <i>University of New South Wales, Sydney.</i></li> </ul>	Email: <a href="mailto:trevor.mcdougall@unsw.edu.au">trevor.mcdougall@unsw.edu.au</a>
<ul style="list-style-type: none"> <li>• <b>Dr Geoff Stanley</b>, <i>Banting Postdoctoral Fellow, University of Victoria, Canada.</i></li> </ul>	Email: <a href="mailto:gstanley@uvic.ca">gstanley@uvic.ca</a>

- **Associate Lecturer Simon Lloyd**, *University of New South Wales, Sydney*.
- **Benjamin Ward**, *Tutti double bass, Sydney Symphony Orchestra*.
- **Edmund Bastian**, *Tutti double bass, Opera Australia Orchestra*.

Email: [s.lloyd@unsw.edu.au](mailto:s.lloyd@unsw.edu.au)

Email: [2benward@gmail.com](mailto:2benward@gmail.com)

Email: [tanya.ed@bigpond.com](mailto:tanya.ed@bigpond.com)