Ryan Mahony Holmes, Ph.D.

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Education

Doctor of Philosophy, *GPA: 4.08/4* **2011–2016**
Stanford University *Stanford, CA, United States*

Bachelor of Philosophy (Physics), *First class honours 95/100 with University medal* **2006–2010**
Australian National University (ANU) *Canberra, Australia*

Experience

Academic Positions

ARC Discovery Early Career Researcher Award (DECRA) Fellow **August 2021-present**
University of Sydney, School of Geosciences *Sydney, Australia*
Academic level B research fellow position funded by ARC DECRA award DE21010004, *"Mixing and air-sea coupling in the Pacific: Toward better El Niño forecasts"*. Independent research in physical climate science, oceanography and ocean/climate modelling. Mentoring and supervision of Ph.D., honours and undergraduate research students.

Senior Research Associate **2018-2021**
University of New South Wales (UNSW) *Sydney, Australia*
Academic level B postdoctoral position in the School of Mathematics and Statistics and the ARC Centre of Excellence for Climate Extremes. Led a series of international collaborative research projects on ocean heat transport, climate variability and numerical modelling. 23 (8 as first-author) peer-reviewed journal article publications.

Research Associate **2016–2017**
University of New South Wales *Sydney, Australia*
Academic level A postdoctoral position in the Climate Change Research Centre working with Professor Matthew England. Contributed to a high-impact study on Antarctic coastal warming (Spence, Holmes et al. 2017, *Nature Climate Change*).

Postdoctoral Fellow **2016**
University of New South Wales *Sydney, Australia*
Six-month postdoctoral position in the School of Mathematics and Statistics working with Professor Trevor McDougall. Contributed to a high-impact study on abyssal ocean circulation (de Lavergne et al. 2017, *Nature*).

Graduate Researcher **2011–2016**
Stanford University *Stanford, CA, United States*
Graduate thesis project on equatorial ocean dynamics and ocean modelling resulting in 5 (4 first-author) journal publications. Assisted in planning, data acquisition, data analysis and publication for a 5-week research cruise.

Research Student Supervision

Completions

- David Webb. **Ph.D. awarded 2020 UNSW**. Antarctic coastal circulation. 3 published papers.
- Maurice Huguenin. **Masters awarded 2018, ETH Zurich/UNSW**. 6.0/6.0 GPA.
- Matt Pudig. **Honours First Class awarded 2021, UNSW**. 1 paper submitted. Now a New York University Ph.D..
- Micheal Eabry. **Master's spin-off project, 2020-2021**. 1 published paper.
- Claire Yung, Gideon Kwok and David Webb. **Undergraduate/summer projects completed**.

In-progress

- Maurice Huguenin, **Ph.D. year 3 UNSW**. Ocean heat uptake under climate change. 2 published papers including a high-impact publication in *Nature Communications* (2022).
- Chris Bladwell, **Ph.D. year 3 UNSW**, Ocean salt transport in salinity coordinates. 1 published paper.
- Dhruv Bhagtani, **Ph.D. year 2 ANU**. Buoyancy driven ocean circulation.
- Claire Yung, 4-**month research assistant, University of Sydney**. Eddy-driven ocean heat transport.

University of Sydney Foundations of Research Supervision course and registry on the Supervisor Registry, 2022.

Teaching

Lecturer, University of Sydney **2022**

GEOS2115: Oceans, Coasts and Climate Change. Two weeks, including 4 hours of lectures and 2 practical/laboratory exercises, of teaching Ocean Circulation, Dynamics and Climate. Material and assessment development.

Associate Fellow of the Higher Education Academy (AdvanceHE, UK) **2020**

Completion of UNSW's intensive Foundations of University Learning and Teaching Program (FULT)

Lecturer, UNSW **2019 and 2020**

MSCI2001: Introductory Marine Science. Taught the first two weeks (six hours) of lectures in each year on an introduction to Physical Oceanography. Material and assessment development. Led four day field trip projects

Guest Lecturer, UNSW **2018-2020**

MATH5285-Fluids, Oceans & Climate (3 lectures/tutorials), *CLIM3001: Climate Systems Science* (6 lectures/tutorials) and *CLIM2001: Fundamentals of Atmos. Sci.* (1 lecture)

Teaching Assistant, Stanford University **2014**

Selected feedback on my teaching:

- *"Ryan knows how to teach. He explained concepts I dreaded before coming into this course in such a way that I could fully grasp them."* (UNSW 2020 MSCI2001 anonymous feedback)
- *"Ryan was the best. He was so clear in his lectures and gave students examples and practice questions to review while also "re-capping" previous lectures at the beginning of each new lecture."* (UNSW 2020 MSCI2001 anonymous feedback)

Academic Service and Outreach

- **Consortium for Ocean and Sea-Ice Modelling in Australia (COSIMA) leadership team member**, ARC Linkage grant CI and weekly seminar convenor.
- **CMIP6 Contributor** I performed the ACCESS-OM2-025 ocean simulation that comprised part of the Australian contribution to the the global climate model intercomparison program (CMIP6) organised by the IPCC.
- **Outreach research seminars** to Sydney Institute for Marine Science (SIMS) Masters students as part of MARS5009, 2022 and School of Geosciences undergraduate students as part of GEOS1003, 2021.
- **Academic Mentor**, University of Sydney Faculty of Science Mentoring program, 2021.
- **US CLIVAR Working group member** on tropical Pacific decadal climate variability, 2022.
- **Session convenor** for the tropical oceanography session (2019) and general oceanography session (2018) of the Australian Meteorological and Oceanographic Society Annual Meetings.
- **Early Career Researcher (ECR) representative** and annual workshop ECR day organiser, UNSW node of the ARC Centre of Excellence for Climate Extremes
- **Workshop co-organiser** for three ocean physics and climate workshops in 2019 and 2022.
- **Expert reviewer** for *ARC, CSIRO Marine National Facility and US National Science Foundation* research grant proposals and for over 30 articles in journals such as *Nature Climate Change*, *Geophysical Research Letters*, *Journal of Physical Oceanography*, *Journal of Advances in Modeling Earth Systems* and *AGU Books*.

Competitive Grants and Funding

ARC Discovery Early Career Research Award (DECRA) DE21010004 **2021-2023**

Australian Research Council *AUD$440,185*

R. Holmes. Mixing and air-sea coupling in the Pacific: Toward better El Niño forecasts

ARC Linkage Project LP200100406 **2021-2024**

Australian Research Council *AUD$1,161,512*

Hogg, A., England, M., Morrison, A., Spence, P., Bennetts, L., Babanin, A., **Holmes R.**, Hobbs, W., Shakespeare, C., Toffoli, A. and Evans, B. Building Australia's next-generation ocean-sea ice model

NOAA Climate Variability Program NOAA-OAR-CPO-2018-2005492 **2018-2020**

National Centre for Atmospheric Research, USA *USD$572,950 (AUD$832,000)*

D. Whitt, S. Bachman, R-C Lien, W. Large and **R. Holmes**. Simulations and analysis of mesoscale to turbulence scale process models to facilitate observational process deployments in the Equatorial Pacific Cold Tongue.

National Computational Merit Allocation Scheme **2018-2021**

Australian National Computational Institute (NCI) 12 *MSU (2019)*, 26 *MSU (2020)*, 18 *MSU (2021)*

Chief Investigator on Matthew England's project e14. I coordinated the 2020 and 2021 applications. These grants were supported by an additional $50-75\%$ in-kind support from UNSW valued at ∼AUD$10,000 per MSU.

Awards

Invited keynote talk, DRAKKAR annual workshop **2022**
DRAKKAR European ocean modelling consortium *Grenoble, France*

Most selfless contribution to COSIMA award **2020**
Consortium for Ocean and Sea Ice Modelling in Australia (COSIMA) *Canberra, Australia*

Nominee to attend the Lindau Nobel Laureates Meeting **2017**
Australian Academy of Science *Canberra, Australia*

Invited participant, Physical Oceanography Dissertation Symposium **2016**
National Science Foundation *Hawaii, United States*

Outstanding Student Paper Award, AGU Fall Meeting **2014**
American Geophysical Union (AGU) *California, United States*

Stanford University Graduate Fellowship **2012–2015**
Stanford University *California, United States*

Australian National University Medal in Physics **2010**
Australian National University *Canberra, Australia*

Journal Publications

I have published 38 peer-reviewed journal articles, including 16 as first-author and 7 as second-author, which have received 605 citations with a h-index of 13 (Google Scholar). I have published 15 articles (3 first-author) in 2021 and 2022 alone, and I currently have 2 articles under review. All except 1 of my papers are published in journals with Q1 quartile rankings (top 25% of journal in relevant subject category), including *Nature* (2021 Impact Factor, IF 69.5), *Nature Climate Change* (2021 IF 21.7), *Nature Communications* (2021 IF 17.7) and *Geophysical Research Letters* (2021 IF 4.7). Most of the rest of my work is published in the premier long-format technical journals of my field, the *Journal of Physical Oceanography* and the *Journal of Climate*. 3 of my papers were in the top 1% of cited papers in their field for their year (Web of Science).

Selected list of key publications

- Huguenin, M., **Holmes, R. M.** and England, M.E. (2022) Drivers and distribution of global ocean heat uptake over the last half century. *Nature Communications*, 13, 4921.
- **Holmes, R.M.**, Sohail, T. and Zika, J. (2022). Adiabatic and diabatic signatures of ocean temperature variability. *Journal of Climate*, 35 (5), 1459-1477.
- **Holmes, R. M.**, Zika, J.D., Griffies, S.M., Hogg, A. McC., Kiss, A.E. and England, M.H. (2021) The geography of numerical mixing in a suite of global ocean models. *Journal of Advances in Modeling Earth Systems*, 13 (7), e2020MS002333.
- Sohail, T., Irving, D., Zika, J., **Holmes, R. M.** and Church, J. (2021) Fifty year trends in global ocean heat content traced to surface heat fluxes in the sub-polar ocean. *Geophysical Research Letters*, 48, e202GLO91439.
- Kiss A. E. et al. (2020), ACCESS-OM2: A Global Ocean-Sea Ice Model at Three Resolutions. *Geophysical Model Development*, 13, 401-442.
- **Holmes, R.** et al. (2019) Atlantic ocean heat transport enabled by Indo-Pacific heat uptake and mixing, *Geophysical Research Letters*, 46, 13939-13949.
- **Holmes R.**, de Lavergne, C. and McDougall, T. (2019) Tracer transport within abyssal mixing layers, *J. Phys. Oceanogr.*, 49, 2669–2695.
- **Holmes R.**, Zika, J. D. and England M. H. (2019) Diathermal Heat Transport in a Global Ocean Model, *J. Phys. Oceanogr.*, **49**, 141-161. **[top 1% of cited papers in oceanography in 2019]**
- Santoso A. et al. (2019) Dynamics and predictability of the El Niño Southern Oscillation: An Australian perspective on progress and challenges, *Bulletin of the American Meteorological Society*, 100, 403-420.
- **Holmes R.**, McGregor, S., Santoso, A. and England, M.H. (2019) Contribution of Tropical Instability Waves to ENSO Irregularity, *Climate Dynamics*, 52, 1837-1855.

- de Lavergne, C., Madec, G., Roquet, F., **Holmes, R.** and McDougall, T. J. (2017) Abyssal ocean overturning shaped by seafloor distribution, *Nature*, **551**, 181-186. **[top 1% of cited papers in oceanography in 2017]**
- Spence, P., **Holmes R.**, Hogg A. McC., Griffies, S. M., Stewart K. D. and England, M.H. (2017) Localized rapid warming of West Antarctic subsurface waters by remote winds, *Nature Climate Change*, **7** (8), 595-603 **[top 1% of cited papers in environmental studies in 2017]**
- **Holmes R.**, Moum J. N. and Thomas L. N. (2016) Evidence for Seafloor-Intensified Mixing by Surface-Generated Equatorial Waves *Geophysical Research Letters* **43** (3), 1202-1210
- **Holmes R.** and Thomas L. N. (2015) The Modulation of Equatorial Turbulence by Tropical Instability Waves in a Regional Ocean Model *Journal of Physical Oceanography* **45** (4), 1155-1173

Conferences/Talks

I have given over 50 oral and poster presentations, as well as co-authoring many other presentations, at international conferences, institutions and workshops, including 3 invited talks.

Languages

English: Native

French: Fluent - DELF B2 Diploma

References

Available on request