Professor David Schoeman

University of the Sunshine Coast Australia

Professor of Global-Change Ecology

Ocean Futures Research Cluster, School of Science, Technology and Engineering

University of the Sunshine Coast, Sippy Downs Queensland

Contact

Email: dschoema@usc.edu.au

Mobile: 0423 982898

Qualifications

- Bachelor of Science (Mathematical Statistics and Zoology) — *cum laude*
- Bachelor of Science (*Hons*) — *cum laude*
- Master of Science — *cum laude*
- PhD (Zoology — Ecological Modelling)

Summary statement

I am a numerical ecologist who has developed an international reputation for excellence in ecological analysis and synthesis. My research focuses on detecting, attributing, and projecting the impacts of climate change in the global ocean, and on seeking solutions that minimize the ecological impacts of climate change and other human impacts on marine systems. I am highly collaborative in my approach and have been a popular leader and member across a range of research networks. In this capacity, I have delivered high-quality outputs including papers in the world's top scientific journals, such as *Science* (4), *Nature* (1), *Nature Climate Change* (6), *PNAS* (1), and *Trends in Ecology and Evolution* (3). I have also led and provided oversight for major projects, including as a Coordinating Lead Author Intergovernmental Panel on Climate Change Sixth Assessment Report (Working Group II — Chapter 3) and as a Review Editor on the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC — Chapter 1). Either as a leader or as a team member, my approach is inclusive and facilitative, with an emphasis on delivering scientifically robust outcomes that have real-world impact.

Personal Ambitions for IPCC Seventh Assessment Report

I gained significant experience during IPCC Sixth Assessment cycle (see below). But in so doing, I spent almost as much time coming to terms with the tasks at hand — and the associated processes and procedures — as I did in delivering on my assignments. Had I worked through the development of the Summary for Policy Makers — and the subsequent negotiations at its Approval Session — before attending a Scoping Meeting or leading a Chapter, I would have approached several aspects of the work very differently. I would like to maximise the value of what I have learnt by contributing to the IPCC Seventh Assessment cycle in whatever ways I can.

IPCC Experience

Preparation for the IPCC Seventh Assessment Report

- Delegate at the AR7 ("pre-Scoping") Idea-Generation Workshop organised by the UK Department for Energy Security & Net Zero (DESNZ), under the auspices of the Climate Services for a Net-Zero Resilient World (CS-N0W) project (September 2023)

IPCC Sixth Assessment Report

- IPCC Scientific Representative at Approval Session for the Working Group II contribution to the Sixth Assessment Report (2022)
- Core writing team: Summary for Policymakers and Technical Summary, WGII (2020–2022)
- Coordinating Lead Author, Chapter 3: Oceans and Coastal Ecosystems and their Services, WGII (2019–2022)
- Contributing Author (WGII) for Cross-Chapter Papers and Cross-Chapter Boxes (2019–2022):
    - Chapter 2: Terrestrial and Freshwater Ecosystems and their Services
    - Chapter 11: Australasia
    - Cross-Chapter Box: Sea-level Rise

      Cross-Chapter Box: Ramifications of climatic extremes for marine, terrestrial, freshwater and polar natural systems
    - Cross-Chapter Box: Nature-Based Solutions for Climate Change Mitigation and Adaptation
    - Cross-Chapter Box: Infectious diseases, Biodiversity and Climate
    - Cross-Chapter Paper 1: Biodiversity Hotspots
- Review Editor, Special Report on Oceans and Cryosphere in a Changing Climate (SROCC); Chapter 1 (2017–2019)
- Delegate at the Scoping Meeting for the IPCC Sixth Assessment Report (2017)
- Delegate at the Scoping Meeting for the IPCC Sixth Assessment Synthesis Report (2019)
- Delegate at the IPCC Expert Meeting on Assessing Climate Information for the Regions (2018)

IPCC Fifth Assessment Report

- Contributing Author, Chapter 30: The Ocean, WGII (2011–2012)

Areas of Scientific Expertise

- Detecting, attributing and projecting the ecological impacts of climate change in the global ocean
- Developing indices of climate risk
- Climate-smart conservation planning
- Spatial modelling and mapping
- Ecological modelling and statistics

Bibliometrics

- Peer-reviewed papers: 145 (Google Scholar)
- Citations: 19,552 — 12,388 since 2019 (Google Scholar)
- h-index: 56 (Google Scholar)
- 10-year FWCI: 3.06 (SciVal)
- 31 of my papers have been cited >100 times (Google Scholar)
- Papers among the top 10% most-cited publications worldwide: 38.3% (SciVal)

Relevant academic papers in past 5 years

(reverse chronological order)

1. Bolin JA, Evans K, **Schoeman DS**, et al. (2024). A warming western boundary current increases the prevalence of commercially disruptive parasites in broadbill swordfish. *Fisheries Oceanography*, e12669. doi:10.1111/fog.12669
2. Lubitz N, …, **Schoeman DS**, et al. (2024). Climate change-driven cooling can kill marine megafauna at their distributional limits. *Nature Climate Change*, 1–10. doi:10.1038/s41558-024-01966-8
3. Arafeh-Dalmau N, …, **Schoeman DS**, et al. (2023). Integrating climate adaptation and transboundary management: Guidelines for designing climate-smart marine protected areas. *One Earth* **6**, 1523–1541. doi:10.1016/j.oneear.2023.10.002
4. Buenafe KCV, …, **Schoeman DS**, et al. (2023). A metric-based framework for climate-smart conservation planning. *Ecological Applications*, e2852. doi:10.1002/eap.2852
5. **Schoeman DS**, Gupta AS, Harrison CS, Everett JD, Brito-Morales I, Hannah L, Bopp L, Roehrdanz PR, Richardson AJ (2023). Demystifying global climate models for use in the life sciences. *Trends in Ecology & Evolution* **38**, 843–858. doi:10.1016/j.tree.2023.04.005
6. **Schoeman DS**, Bolin JA, Cooley SR (2023). Quantifying the ecological consequences of climate change in coastal ecosystems. *Cambridge Prisms: Coastal Futures* **1**, e39. doi:10.1017/cft.2023.27
7. Bolin JA, **Schoeman DS**, Evans KJ, Cummins SF, Scales KL (2021). Achieving sustainable and climate-resilient fisheries requires marine

ecosystem forecasts to include fish condition. *Fish and Fisheries* **22**, 1067–1084. doi:10.1111/faf.12569

8. Brito-Morales I, **Schoeman DS**, et al. (2022). Towards climate-smart, three-dimensional protected areas for biodiversity conservation in the high seas. *Nature Climate Change* **12**, 402–407. doi:10.1038/s41558-022-01323-7
9. Arafeh-Dalmau N, Brito-Morales I, **Schoeman DS**, Possingham HP, Klein CJ, Richardson AJ (2021). Incorporating climate velocity into the design of climate-smart networks of marine protected areas. *Methods in Ecology and Evolution* **12**, 1969–1983. doi:10.1111/2041-210x.13675
10. Chaudhary C, Richardson AJ, **Schoeman DS**, Costello MJ (2021). Global warming is causing a more pronounced dip in marine species richness around the equator. *Proceedings of the National Academy of Sciences* **118**, e2015094118. doi:10.1073/pnas.2015094118
11. Sydeman WJ, **Schoeman DS**, et al. (2021). Hemispheric asymmetry in ocean change and the productivity of ecosystem sentinels. *Science* **372**, 980–983. doi:10.1126/science.abf1772
12. Monaco CJ, …, **Schoeman DS**, et al. (2021). Natural and anthropogenic climate variability shape assemblages of range-extending coral-reef fishes. *Journal of Biogeography* **48**, 1063–1075. doi:10.1111/jbi.14058
13. Monaco CJ, …, **Schoeman DS**, et al. (2021). Opposing life stage-specific effects of ocean warming at source and sink populations of range-shifting coral-reef fishes. *Journal of Animal Ecology* **90**, 615–627. doi:10.1111/1365-2656.13394
14. Arafeh-Dalmau N, **Schoeman DS**, et al. (2020). Marine heat waves threaten kelp forests. *Science* **367**, 635. doi:10.1126/science.aba5244
15. Brito-Morales I, **Schoeman DS**, et al. (2020). Climate velocity reveals increasing exposure of deep-ocean biodiversity to future warming. *Nature Climate Change* **10**, 576–581. doi:10.1038/s41558-020-0773-5
16. Monaco CJ, …, **Schoeman DS**, et al. (2020). Dietary generalism accelerates arrival and persistence of coral-reef fishes in their novel ranges under climate change. *Global Change Biology* **26**, 5564–5573. doi:10.1111/gcb.15221

Selected key papers pre-2020 (reverse chronological order)

1. Arafeh-Dalmau N, …, **Schoeman DS**, et al. (2019). Extreme marine heatwaves alter kelp forest community near its equatorward distribution limit. *Frontiers in Marine Science* **6**, 499. doi:10.3389/fmars.2019.00499
2. Burrows MT, …, **Schoeman DS**, et al. (2019). Ocean community warming responses explained by thermal affinities and temperature gradients. *Nature Climate Change* **9**, 959–963. doi:10.1038/s41558-019-0631-5
3. Molinos JG, **Schoeman DS**, Brown CJ, Burrows MT (2019). VoCC: An R package for calculating the velocity of climate change and related climatic metrics Ed D Orme. *Methods in Ecology and Evolution*, 2041-210X.13295–8. doi:10.1111/2041-210x.13295
4. Richardson AJ, **Schoeman DS** (2019). Sea animals vulnerable to warming. *Nature* **569**, 50–51. Available at: https://www.nature.com/magazine-assets/d41586-019-01193-8/d41586-019-01193-8.pdf
5. Brito-Morales I, Molinos JG, …, **Schoeman DS**, et al. (2018). Climate velocity can inform conservation in a warming world. *Trends in Ecology & Evolution* **33**, 441–457. doi:10.1016/j.tree.2018.03.009
6. Yates KL, …, **Schoeman DS**, et al. (2018). Outstanding challenges in the transferability of ecological models. *Trends in Ecology & Evolution* **33**, 790–802. doi:10.1016/j.tree.2018.08.001
7. Brown CJ, …, **Schoeman DS**, et al. (2016). Ecological and methodological drivers of species' distribution and phenology responses to climate change. *Global Change Biology* **22**, 1548–1560. doi:10.1111/gcb.13184
8. Molinos JG, Halpern BS, …, **Schoeman DS**, et al. (2016). Climate velocity and the future global redistribution of marine biodiversity. *Nature Climate Change* **6**, 83–88. doi:10.1038/nclimate2769
9. Poloczanska ES, …, **Schoeman DS**, et al. (2016). Responses of marine organisms to climate change across oceans. *Frontiers in Marine Science* **3**, 515–21. doi:10.3389/fmars.2016.00062
10. O'Connor MI, …, **Schoeman DS**, et al. (2015). Strengthening confidence in climate change impact science. *Global Ecology and Biogeography* **24**, 64–76. doi:10.1111/geb.12218
11. Burrows MT, **Schoeman DS**, et al. (2014). Geographical limits to species-range shifts are suggested by climate velocity. *Nature* **507**, 492–495. doi:10.1038/nature12976
12. Sydeman WJ, García-Reyes M, **Schoeman DS**, et al. (2014). Climate change and wind intensification in coastal upwelling ecosystems. *Science* **345**, 77–80. doi:10.1126/science.1250830
13. Parmesan C, …, **Schoeman DS**, et al. (2013). Beyond climate change attribution in conservation and ecological research Ed H Regan. *Ecology Letters* **16**, 58–71. doi:10.1111/ele.12098
14. Poloczanska ES, …, **Schoeman DS**, et al. (2013). Global imprint of climate change on marine life. *Nature Climate Change* **3**, 919–925. doi:10.1038/nclimate1958

15. Brander K, Bruno J, Hobday A, **Schoeman D** (2011). The value of attribution. *Nature Climate Change* **1**, 70–71. doi:10.1093/icesjms/fsr007
16. Burrows MT, **Schoeman DS**, et al. (2011). The Pace of shifting climate in marine and terrestrial ecosystems. *Science* **334**, 652–655. doi:10.1126/science.1210288
17. Richardson AJ, **Schoeman DS** (2004). Climate impact on plankton ecosystems in the Northeast Atlantic. *Science* **305**, 1609–1612. doi:10.1126/science.1100958

A full list of papers (and their associated citations and metrics) is available at on Google Scholar [click here].

Recent relevant grants

DP230102359 (2024–2026)

Research Program: Zooplankton: the missing link in modelling the ocean carbon cycle
Involvement: Co-Investigator
Program Total: AUD 404,041

DP190102293 (2019–2022)

Research Program: Future fisheries under climate change: the missing role of zooplankton
Involvement: Co-Investigator
Program Total: AUD 493,000

DP170101722 (2017–2020)

Research Program: Do native invasions challenge Australian fisheries species?
Involvement: Co-Investigator
Program Total: AUD 374,500

Postgraduate student completions

- PhD: 15
- MSc: 9
- MPhil: 1
- Honours: 32

Recent relevant presentations, memberships and appointments

Invited and keynote presentations

- Keynote for the Australian Marine Science Association Annual Symposium (2023): *It takes a village: how we can all maximise the utility of our work to IPCC assessments*
- Keynote for the Australian Society for Fish Biology Annual Conference (2022): *Tropicalisation and the homogenisation of global marine biodiversity: observations, projections and implications*
- IPCC Expert Meeting on Assessing Climate Information for the Regions (2018): *Regional climate information needs for ecological studies and assessment* (with Rebecca Harris, University of Tasmania)

Roles and appointments

- National Steering Committee for Future Earth Australia (2023–)
- Co-Lead: Ocean Futures Research Cluster (2023–)
- Deputy Head of School and Chair of School Research Committee (2020–2021)

Appointment status for the duration of IPCC AR7

I have been appointed full-time as Professor of Global-Change Ecology in the School of Science, Technology and Engineering, University of the Sunshine Coast, since 2019. I do not envisage this changing for the duration of IPCC AR7.

The Dean of our School has agreed to budget workload for me to deliver on any IPCC AR7 duties for which I might be selected.

A full list of my academic qualifications and my appointment history is available via my ORCID: https://orcid.org/0000-0003-1258-0885

Referees (in the context of the IPCC)

Please feel free to approach WGII colleagues from the Sixth Assessment Report cycle for assessment of my performance.