

CURRICULUM VITAE

SALLY A. KEITH

Date of birth: 22nd March 1983

Lancaster Environment Centre, Lancaster University, Lancaster, UK. Tel: +447465998884, Email: sally.keith@lancaster.ac.uk / sally.a.keith@gmail.com,

Website: sallykeith.weebly.com, **ORCID number:** 0000-0002-9634-2763

EDUCATION

- **Postgraduate Certificate in Academic Practice**, 2017 - 2018 Lancaster University, UK
- **PhD in Ecology** 2007 – 2010. *Impacts of environmental change on ecological communities*, Bournemouth University, UK.
- MSc in Primate Conservation 2004 - 2005. *Vocal diversity of Kloss's gibbons (*Hylobates klossii*) in the Mentawai Islands, Indonesia*, Oxford Brookes University, UK.
- BSc (Hons) in Zoology 2001 – 2004, University of Southampton, UK.

RESEARCH FUNDING (total received **£1,482,246 approx. after exchange rate**)

- **Newton International Fellowship:** *Impacts of habitat degradation on competitive networks of coral reef predators*. Co-I/Host **£100,092** Oct 2020 – Sept 2022.
- **Envision DTP Studentship 2020** for 3.5 years PhD funding with contribution from CASE partner x 2 (1 x PI, 1 x Co-I) **£180,000**.
- **NERC Standard Grant** (New Investigator): *Behaviourally-mediated shifts in reef fish communities following severe disturbance*. **Sole PI £548,979**, Nov 2019-Oct 2022.
- Maternity / Adoption Research Support (MARS) Fund to hire Postdoctoral Researcher **£9,444**.
- **Envision DTP Studentship 2018** for 3.5 years PhD funding **£78,000**.
- **VILLUM Foundation** Young Investigator Programme: *Revealing the role for species interactions in biogeography*. **Sole PI 3,962,678 DKK (~£466,000)**, Aug 2015 – July 2018 (ended in Feb 2017 because took up UK Lectureship position).
- **Carlsberg Foundation Conference Grant**, *Med-finansiering af den første Internationale Makroøkologiske Konference i Europe*. **45,300 DKK (~£5,325)**, 2015.
- **Postdoctoral Research Fellowship:** *Modelling coral reef biodiversity*. **3 years salary & \$30,000 AUD (~£126,470) research expenses**, ARC Center of Excellence for Coral Reef Studies. 2010 - 2013.
- Travel Bursary, UK Resource Center for Women in SET. **£800**, Apr 2010.
- Travel Grant, Bournemouth University International Research & Conference Award. **£500**, Mar 2010.
- Competitive Research Studentship. Bournemouth University, UK. 2007-2010.
- License Award, Cornell Lab. of Ornithology Award for Raven Sound Analysis Software. 2005.

EMPLOYMENT

- **Senior Lecturer**, Lancaster Environment Centre, Lancaster University, UK. Aug 2019 – current.
- **Lecturer**, Lancaster Environment Centre, Lancaster University, UK. March 2017 – July 2019.
- **Assistant Professor**, Center for Macroecology, Evolution & Climate (CMEC), Natural History Museum of Denmark, University of Copenhagen (UCPH), Denmark. Nov 2013 – Feb 2017.

- **Postdoctoral Research Fellow**, ARC Centre of Excellence for Coral Reef Studies, James Cook University, Australia. Jan 2011 – Nov 2013. Independent research fellow within Programme 2: Coral Reef Biodiversity.
- Research Development Officer, Bournemouth University, UK. 2006 – 2007.
- Assistant Manager (Acting Manager: July 2006), Cat Ba Langur Conservation Project (CBLCP), Viet Nam. 2006.

SERVICE & LEADERSHIP

- **Special Advisory Board** for 4D-REEF Marie Skłodowska-Curie Innovative Training Network (ITN)
- **Co-Lead on Biodiversity Theme**, Centre of Excellence for Environmental Data Science 2019 onwards
- **Expert Member** UN Convention on Migratory Species (CMS) Advisory Group on *Conservation Implications of Animal Culture and Sociality*
- **Editor** for *Global Ecology & Biogeography* (2015 onwards), *PeerJ* (2014-2016), *Ecography* (2013 - 2015), Coral Traits database (coraltraits.org, responsible for biogeographic traits, 2014 onwards) & **Book Reviews Editor** for *Frontiers in Biogeography* (2017-2019).
- **Lead Organiser of international conference on macroecology**. Joint between the British Ecological Society (BES), German, Swiss & Austrian Ecological Society (GfO), and CMEC. UCPH, Copenhagen, June 2015. ~125 attendees from 18 different countries.
- **Co-founder of BES Special Interest Group in Macroecology**, 2011 onwards
- Challenges in Science Leadership course, Barefoot Thinking Company, Plymouth University, UK, June 2015
- Young Investigator workshop, VILLUM Foundation, Copenhagen, April 2015
- Co-organiser of inaugural conference for BES Special Interest Group in Macroecology, London, UK, 2012
- **R User Group Leader**: CMEC 2014 - 2017; ARC CoE Coral Reef Studies 2010 – 2013

TEACHING EXPERIENCE

Curriculum development & exam design

- Coral reef ecology 3rd year BSc module, Lancaster University, UK, 2017
- Vertebrate Biology 2nd year BSc module, Lancaster University, UK, 2017
- Macroecology & Community Ecology MSc course, UCPH, Denmark 2015
- Process-based modelling. Modelling Species Distribution Under Climate Change, intensive international PhD summer course, UCPH, Denmark, 2014-2016; CMEC internal course, Denmark, May 2015
- Introduction to R. CMEC internal course, Denmark, Nov 2014; ARC CoE Coral Reef Studies internal course, May 2012

Teaching experience

- Coral reef ecology 3rd year BSc module, Lancaster University, UK, 2018 onwards
- Vertebrate Biology 2nd year BSc module, Lancaster University, UK, 2017-2018
- Global Change Biology 1st year BSc module, LEC, UK 2017 onwards
- International Nature Conservation PhD course, UCPH, Denmark 2016
- Biodiversity and Climate Change MSc course, UCPH, Denmark 2016
- Macroecology & Community Ecology MSc course, UCPH, Denmark 2014-2016
- Process-based modelling. Modelling Species Distribution Under Climate Change, intensive international PhD summer course, UCPH, Denmark, 2014-2016; CMEC internal course, Denmark, May 2015

- Introduction to R. CMEC internal course, Denmark, Nov 2014; ARC CoE Coral Reef Studies internal course, May 2012
- Macroecology and Biogeography (Bachelors), James Cook University, Australia, 2011 – 2013
- Conservation and Connectivity (Bachelors), Bournemouth University, UK, 2009 – 2010
- Various practical sessions including protected areas, statistics, geographical information systems (GIS), laboratory exercises & fieldwork (Bachelors), Bournemouth University, UK, 2008-2010

Teaching training

- Introduction to University Pedagogy course, UCPH, Denmark, Mar 2015
- Research Supervisors course, James Cook University, Australia, June 2011
- Introduction to Learning & Teaching, Bournemouth University, Jan 2009
- Environmental Education module, Oxford Brookes University, 2004-2005

MENTORSHIP EXPERIENCE

Supervision of **seven Masters** students

- Masters students (or equivalent): Jacob Brown (2020-2021) LU; Amy Clayton (2017-2019) LU; Neil Maginnis (2016), UCPH; Theophilus Zhi En Teo (2015), James Cook University; Ida Marie Weldnigh Pedersen (2015), UCPH

Supervision of **ten PhD** students

- Javier Gonzalez Barrios (2022 - 2025); James Boon (2020-2024); Catherine Sheppard (2020-2024); Rachel Gunn (2018-2022); Robert Semmler (2017-2020), Lancaster University; Neil Maginnis (2017-2020), DTU, Denmark; Jamile de Souza (2015-2017), University of São Paulo State & UCPH; Erika Woolsey (completed 2014), James Cook University.
- Visiting international PhD students: Alex White, University of Chicago; Ed Roberts, James Cook University & Australian Institute of Marine Science

Examiner on one PhD thesis (University of Sheffield 2018), one Masters thesis (UCPH 2016). Invited to examine PhD thesis April 2020 (University of Nottingham, declined).

INVITED WORKSHOPS

- SCORE-REEF, CESAB, Montpellier, France, 2019-2023 (5 workshops over 3 years)
- Synthesising traits across fish, Center for Ocean Life, DTU Aqua, Denmark, 2016
- Standards for model evaluation, EC COST Action Harmonizing Biodiversity Modelling (HarmBio), Portugal, 2016
- Unifying marine and terrestrial biodiversity at the interplay of macroecology, macrophysiology and macroevolution SDiv, Germany, Dec 2014
- Coral Traits Workshop MacQuarie University, Sydney, Australia, June 2014

INVITED TALKS

- **Keynote**, Symposium on the Biogeography of Behaviour, University of Oklahoma, US, April 2023
- **Keynote**, BES Macroecology Annual Conference, July 2022
- **Keynote**, Annual ATHENA Swan Lecture, Bournemouth University, May 2020 (postponed due to Covid-19)
- Invited to talk in Departmental Seminar Series: University of Cambridge, University of Liverpool, National Oceanography Centre Southampton 2019-2020 (declined due to family commitments)
- Sheffield University Departmental Seminar Series, UK, Feb 2018

- Symposium on “Reef research at the model-data boundary”, European Conference on Reef Science, Oxford, Dec 2017
- Nottingham University Departmental Seminar Series, UK, Oct 2017
- Exeter University Departmental Seminar Series, UK, Oct 2017
- Discussion group leader, BES Macro 2017, London, UK, July 2017
- **Keynote**, Tropical Ecology Group of the BES, Lancaster, UK, March 2017 (meeting cancelled)
- **Plenary**, Association of Tropical Conservation Biology – Asia Pacific, China, March 2017 (declined)
- Symposium on “Process-based approaches to macroecology”, International Biogeography Society (IBS) Conference, USA, Jan 2017
- Symposium on “Causes and consequences of non-equilibrium in species distributions”, IBS Conference, USA, Jan 2017
- University of St. Andrews, Scottish Oceans Institute, Feb 2016
- Center for Ocean Life, DTU Aqua, Copenhagen, Denmark, Oct 2015
- Danish National Research Foundation site visit to the Center for Macroecology, Evolution & Climate, Copenhagen, Denmark, May 2015
- Unifying Ecology Across Scales, Gordon Research Conference, Maine, US, July 2014
- Public forum, ARC Centre of Excellence for Coral Reef Studies Annual Symposium, Fremantle, Australia. 2011
- International seminar series e.g., ARC Centre of Excellence for Coral Reef Studies, Australia; Centre for Ecology & Hydrology, UK; University of Reading, UK; Aarhus University, Denmark; University of QLD, Australia; University of the Philippines, Philippines

PUBLIC OUTREACH

Selected activities

- **Blue Planet II** Episode 3 Coral Reefs, Review on *Nature Ecology & Evolution* Community (>3,750 views, online: <https://tinyurl.com/ydgdvqt7>)
- **BES Science Slam** (invited participant), British Ecological Society, Edinburgh, UK. Dec 2015 (~150 attendees)
- **Science on Wheels**, 140 high school students, Natural History Museum of Denmark, Denmark. Oct 2015
- **Science Night** at the Natural History Museum of Denmark, Denmark. April 2015
- Scientists in Schools, Australia. 2012 – 2013
- Public Forum Invited speaker at ARC CoE Coral Reef Studies Symposium 2011 (~250 attendees, available online at tinyurl.com/BurstingBiodiv)
- Winner of “My research in 3 minutes” competition at ARC CoE Coral Reef Studies 2011

Formal science communication courses

- **Media Communication**, EConnect, James Cook University, Australia, Oct 2012
- Introduction to the Media, Science Media Centre, London, UK, Nov 2009

OTHER PROFESSIONAL ACTIVITIES

- **Early Career Researcher Mentor** for the BES Macroecology Group 2020
- Peer reviewer for journals including: *Nature*, *Science*, *Ecology*, *Global Ecology & Biogeography*, *Proceedings of the Royal Society B*, *Oikos*, *Methods in Ecology & Evolution*
- **Oral presentations** at scientific conferences including the Annual Meeting of the BES (2007 - 2015), International Biogeography Society (2015), International Coral Reef Society (2012, 2016), BES Macroecology Group conference (2012, 2014, 2015), European Ecological Federation (2012)

- **Undergraduate Admissions Team**, Lancaster Environment Centre (2017-current)
- Centre for Macroecology, Evolution and Climate, University of Copenhagen, **Outreach Committee** (2015-2017)
- **Professional societies:** International Society for Reef Studies, International Biogeography Society, British Ecological Society, Association for the Study of Animal Behaviour
- CMEC Twitter account administrator 2015 - 2017
- Seminar series organiser for ARC CoE Coral Reef Studies Weekly 2012
- Postdoc committee to organise “Postdoc Day” at 2012 ARC CoE Symposium

KEY RESEARCH SKILLS

- **Analytical:** spatially-explicit statistical analysis, mixed effects modelling, process-based simulation modelling, model confrontation with empirical data, geographical information systems, network analysis and graph theory, hydrodynamic modelling with particle tracking, spectrographic analysis
- **Programming:** R software for statistical computing, MATLAB
- **Software:** R software for statistical computing, MATLAB, ArcGIS, IDRISI, MIKE (hydrodynamic modelling), Raven (acoustic analysis), Primer, Community Analysis Package, SPSS, Fragstats
- **Fieldwork & museum:** coral reef surveys (PADI Divemaster); intertidal rocky shore surveys; collection and processing of marine soft sediment samples; temperate water sub-tidal surveys (Seasearch observer); temperate vascular plant field surveys; electrofishing survey; bat box survey; tropical vegetation sampling; orang-utan nest surveys; primate vocalisation recording; behavioural observation and tracking of primates; curation of bird sterna and primate skin collections

PUBLICATION LIST

PEER REVIEWED JOURNALS

Published

32. Roberts, T.E., **Keith, S.A.**, Rahbek, C., Bridge, T.C.L., Caley, M.J. & Baird, A.H. (2019) Testing biodiversity theory using species richness of reef-building corals across a depth gradient. [Biology Letters](#) 10.1098/rsbl.2019.0493
31. McClanahan, T.R., Darling, E.S., Maina, J.M., Muthiga, N.A., D'agata, S., Jupiter, S.D., Arthur, R., Wilson, S.K., Mangibhai, S., Nand, Y., Ussi, A.M., Humphries, A.T., Patankar, V.J., Guillaume, M.M.M., **Keith, S.A.**, Shedrawi, G., Julius, P., Grimsditch, G., Ndagala, J. & Leblond, J. (2019) Evaluating temperature patterns and mechanisms influencing coral bleaching during the 2016 El Niño. [Nature Climate Change](#)
30. Queiroz, J.*, **Keith, S.A.**, David, G.S., Brandão, H., Nobile, A.B., Paes, J.K., Souto, A.C., Lima, F.P., Silva, R.J., Henry, R. & Richardson, K.R. (2019) Community structure of freshwater fish in relation to environmental variables in a dammed Brazilian waterway. *Fish & Fisheries*
29. Cameron, E., Sundqvist, M.K., **Keith, S.A.**, CaraDonna, P., Mousing, E., Nilsson, K., Metcalfe, D., Classen, A. (2019) Uneven global distribution of food web studies under climate change. [Ecosphere](#) **10**(3):e02645
28. Brakes, P., Dall, S.R.X., Aplin, L.M., Bearhop, S., Carroll, E.L., Ciucci, P., Fishlock, V., Ford, J.K.B., Garland, E.C., **Keith, S.A.**, McGregor, P.K., Mesnick, S.L., Noad, M.J., di Sciara, G.N., Robbins, M.M., Simmonds, M.P., Spina, F., Thornton, A., Wade, P.R., Whiting, M.J., Williams, J., Rendell, L., Whitehead, H., Whiten, A. & Rutz, C. (2019) Animal culture matters for conservation. [Science](#) **363** (6431):1032-1034
27. Early, R. & **Keith, S.A.** (2019) Geographically variable biotic interactions and implications for species ranges. [Global Ecology & Biogeography](#) **28**(1):42-53
26. **Keith, S.A.**, Baird, A.H., Hobbs, J-P.A., Naruse, T., Trono, R., Fadli, N., Sanders, N.J. (2018) Synchronous behavioural shifts in reef fishes linked to mass coral bleaching. [Nature Climate Change](#) **8**:986-991
25. Connolly, S.R., **Keith, S.A.**, Colwell, R.K. & Rahbek, C. (2018) Mechanism, process, and causation in ecological models: a reply to McGill and Potochnik. *Trends in Ecology & Evolution* **33**(5):305-306
24. Pearse, W.D., Barbosa, A.M., Fritz, S.A., **Keith, S.A.**, Harmon, L.J., Harte, J., Silvestro, D., Xiao, X., & Davies, T.J. (2018) Building up biogeography: pattern to process. *Journal of Biogeography* **45**(6):1223-1230
23. Baird, A.H., **Keith S.A.**, Woolsey, E.S., Yoshida, R., & Naruse, T. (2018) Rapid high coral mortality in response to the doldrums on Iriomote, Japan. *F1000 Research* **6**:1728
22. Bennett, J.M., Algar A.C., Araújo, M.B., Calosi, P., Clusella-Trullas, S., Hawkins, B.A., **Keith, S.A.**, Kühn, I., Martínez, B., Rahbek, C., Rodríguez, L., Singer, A., Sunday, J., Villalobos, F., Olalla-Tárraga, M.A., Morales-Castilla, I. (2018) GlobTherm a global database on thermal tolerances for aquatic and terrestrial organisms. *Scientific Data* **5**:180022
21. Connolly, S.R., **Keith, S.A.**, Colwell, R.K. & Rahbek, C. (2017) Process, mechanism and modelling in macroecology. *Trends in Ecology & Evolution* **32**(11):835-844

20. **Keith, S.A.** & Bull, J.W. (2017) Animal culture impact species' response to climate change driven range shifts. *Ecography* **40**:296-304
19. **Keith, S.A.**, Maynard, J.A., Edwards, A.J., Guest, J.R., Bauman, A.G., van Hooidek, R., Heron, S.F., Berumen, M., Bouwmeester, J., Piromvaragorn, S., Rahbek, C. & Baird, A.H. (2016) Coral spawning predicted by rapid seasonal rise in ocean temperature. *Proceedings of the Royal Society B* **283**:20160011 [citations 1]
18. Madin, J.S., Hoogenboom, M.O., Connolly, S.R., Darling, E., Falster, D., Huang, D., **Keith, S.A.**, Mizerek, T., Pandolfi, J.M., Putnam, H., & Baird, A.H. (2016) A trait-based approach to advance coral reef science. *Trends in Ecology & Evolution* **31**:419-428 [citations 1]
17. Madin, J.S., Andreasen, M.H.* , Bridge, T., Connolly, S.R., Darling, E., Diaz, M., Falster, D., Franklin, E.C., Gates, R.D., Hoogenboom, M.O., Huang, D., **Keith, S.A.**, Kosnik, M.A., Kuo, C-Y., Lovelock, C.E., Luiz, O., Martinelli, J., Mizerek, T., Pandolfi, J.M., Pochon, X., Putnam, H., Roberts, T.E., Stat, M., & Baird, A.H. (2016) The Coral Trait Database, a curated database of trait information for coral species from the global oceans. *Scientific Data* **3**:160017 [citations 1]
16. Jønsson, K.A., Tøttrup, A.P., Borregaard, M.K., **Keith, S.A.**, Rahbek, C., & Thorup, K. (2016) Tracking dispersal: from individual movement to community assembly and global range dynamics. *Trends in Ecology & Evolution* **31**:204-214 [citations 0]
15. Baird, A.H., Cumbo, V.R., Gudge, S., **Keith, S.A.**, Maynard, J.A., Tan, C-H. & Woolsey, E.S.* (2015) Coral reproduction on the world's southern-most reef at Lord Howe Island, Australia. *Aquatic Biology* **23**:275-284 [citations 3]
14. **Keith, S.A.**, Woolsey, E.S.* Madin, J.S., Byrne, M. & Baird, A.H. (2015) Differential establishment potential of species predicts a shift in coral assemblage structure across a biogeographic barrier. *Ecography* **38**(12):1225-1234 [Cover Article] [citations 9]
13. Woolsey, E.S.* , **Keith, S.A.**, Byrne, M., Baird, A.H. (2015) Latitudinal variation in thermal tolerance breadth of early life stages of corals. *Coral Reefs* **34**(2):471-478 [citations 9]
12. **Keith, S.A.**, Kerswell, A., & Connolly, S.R. (2014) Global diversity of marine macroalgae: environmental conditions explain less variation in the tropics. *Global Ecology & Biogeography* **23**(5):517-529 [Cover Article] [citations 17]
11. Diaz, A, **Keith, S.A.**, Newton, A.C., Bullock, J.M. (2013) Conservation implications of long-term change detected in the flora of lowland heaths. *Biological Conservation* **167**:325-333 [citations 9]
10. Hughes, T.P., Connolly, S.R. & **Keith, S.A.** (2013) Geographic range extents for Indo-Pacific scleractinian coral species. *Ecology* **94**(7):1659 [Data Paper] [citations 10]
9. **Keith, S.A.**, Baird, A.H., Madin, J.S., Hughes, T.P. & Connolly, S.R. (2013) Faunal breaks and species composition of Indo-Pacific corals: potential influence of plate tectonics, environment, and habitat distribution. *Proceedings of the Royal Society B: Biological Sciences* **280**(1763):20130818 [citations 35]
8. **Keith, S.A.** & Connolly (2013) Effects of diversity-dependent colonization-extinction dynamics on mid-domain effects. *Global Ecology and Biogeography*. **22**(7):773-783 [Cover Article] [citations 0]
7. **Keith, S.A.** Webb, T.J., Böhning-Gaese, K., Connolly, S.R., Dulvy, N.K., Eigenbrod, F., Jones, K.E., Price, T., Redding, D.W., Owens, I.P.F. & Isaac, N.J.B. (2012) What is macroecology? *Biology Letters* **8**:904-906 [citations 25]

6. Newton, A.C., Walls, R.M., Golicher, D., **Keith, S.A.**, Diaz, A. & Bullock, J.M. (2012) Structure, composition and dynamics of a calcareous grassland metacommunity over a 70-year interval. *Journal of Ecology* **100**(1):196-209 [citations 27]
5. **Keith S.A.**, Herbert, R.J.H., Norton, P, Hawkins, S.J. & Newton A.C. (2011) Individualistic species limitations of climate-induced range expansions generated by meso-scale dispersal barriers. *Diversity and Distributions* **17**(2):275-286 [citations 29]
4. **Keith, S.A.**, Newton, A.C., Morecroft, M.D., Golicher, D.J. & Bullock, J.M. (2011) Plant metacommunity structure remains unchanged during biodiversity loss in English woodlands. *Oikos* **120**:302-310 [citations 29]
3. **Keith, S.A.**, Newton, A.C., Morecroft, M.D., Bealey, C.E. & Bullock, J.M. (2009) Taxonomic Homogenization of Woodland Plant Communities over 70 Years. *Proceedings of the Royal Society B*. **276**(1672):3539-3544 [citations 79]
2. **Keith, S.A.** Newton, A.C., Herbert, R.J.H., Morecroft, M.D., & Bealey, C.E. (2009) Non-Analogous Community Formation in Response to Climate Change. *Journal for Nature Conservation* **17**:228-235 [citations 22]
1. Diaz, A., Green, I. & **Keith, S.A.** (2009) Restoration in the Face of Climate Change: A Case Study from the Dorset Heaths. *Ecological Restoration* **27**(3) [citations 2]

BOOK CHAPTERS

2. Morecroft, M.D. & **Keith, S.A.** (2015) *Plant ecology as an indicator of climate and global change*. In: *Climate change: Observed impacts on planet Earth 2nd Edition* (ed. Letcher, T.). Elsevier. pp.297-306 [citations 5]
1. **Keith, S.A.**, Waller, M. S., & Geissmann, T. (2009). *Vocal diversity of Kloss's gibbons (Hylobates klossii) in the Mentawai Islands, Indonesia*. In Lappan, S. M. and Whittacker, D. (eds.), *The Gibbons: New Perspectives on Small Ape Socioecology and Population Biology (Developments in Primatology: Progress and Prospects)*. Springer, New York. p.51-72 [citations 7]

REPORTS

1. CMS Expert Working Group (2018) *Report of the CMS Workshop on Conservation Implications of Animal Culture and Social Complexity* UNEP/CMS/ScC-SC3/Inf.8. Parma, Italy. 29th May 2018