Leanne Adele Melbourne

Research interests

My interests align with the link between environmental change, organismic growth, and the structural integrity of marine organisms. I am using highly interdisciplinary techniques and research methods to assess how changes to the internal structure and mineral chemistry of marine calcifiers affects their structural integrity and function. I also use morphological and molecular taxonomy to uncover diversity within corallines.

Education

University of Bristol (2013-2017)
PhD
NERC case studentship titled 'The effect of environmental change on the structure, composition and subsequently the structural integrity of un-attached corallines.' Supervisors: Professor Daniela Schmidt (UoB); Professor Emily Rayfield (UoB) and Professor Juliet Brodie (NHM, London) NERC case studentship

University of Bristol (2009-2013)
MSci Chemistry with a year industrial experience
First class Honours. Modules included: Environmental Chemistry

Park High School, Stanmore, London (2003-2009)
A Levels: Biology A, Chemistry A, Maths A, Free-standing Maths A
GCSEs: 13 including Biology, German, French, Latin and Drama, (All A*-C)

Employment and Work experience

Master's in Art and Teaching Postdoctoral Fellow, American Museum of Natural History (AMNH) (Jun 2021-present)

- Researching on the impact of industrialisation on marine ecosystems
- Leading projects on local environmental impacts on marine organisms and field teaching with trainee earth science teachers as part of the Master's in Art and Teaching program
- Engaging with the wider public and schools through research and career talks

Lecturer in Marine Palaeontology, University of Bristol (UoB) (Mar 2020-May 2021)

- Organised and delivered the Marine Micropalaeontology course (3rd yr) and the Micropalaeontology course (MSc)
- Supervised MSci and MSc students in research projects on marine paleontology and structural integrity analysis
- Created the Earth Sciences student Network for minority students of color

Scientific Associate, Natural History Museum, London (NHM) (Sep 2018- Mar 2020)

- Explored coralline algal diversity using DNA barcoding and phylogenetic methods

Events and Communications Manager, The Linnean Society of London (LSL) (Nov 2017- Mar 2020)

- Organised and delivered the events programme, including creating the first ever Student conference
- Promoted the Society's collections and researchers through social media and the website, including highlight underrepresented scientists and hidden stories within natural history
- Created and developed conferences to focus on women and people of color within natural history

Customer Services Assistant, City of Westminster College, London (Aug-Nov 2017)

- Reception duties
- Provided course information to potential students

NERC Policy Internship, Centre for Science and Policy, Cambridge (Apr-Jun 2015)
Writing blog posts, managing websites and general shadowing

Junior Scientist, MedPharm, Surrey (2011-2012)

- Developed topical formulations (cream, gels and ointments)
- Analysing drug efficacy using liquid chromatography
- Created a business plan to expand the business into the cosmetics industry

RESEARCH

Publications

LA. Melbourne, G. Farfan and N. Goodkin. The impact of microstructural changes on the mechanical properties in mussels (*Mytilus edulis*). 2023, in preparation.

LA. Melbourne and N. Goodkin. Using Museum collections to assess the impact of industrialization on mussel (*Mytilus edulis*) calcification. 2023, in preparation.

S. Sarkar, **LA. Melbourne** and DN. Schmidt. Sustained habitat function of coralline algae during the Palaeocene-Eocene hyperthermal, 2023, in preparation.

LA. Melbourne, J. Brodie, EJ. Rayfield, D. Titelboim, O.T. Lord and DN. Schmidt. Environmental impacts on structural integrity of British rhodoliths – the strength of a habitat former, 2023, *Scientific Reports*, 13 Article number:13473. https://doi.org/10.1038/s41598-023-40292-5

J. Brodie**, LA. Melbourne**, R. Mrowicki, P. Brickle, S.Russell and S. Scott (2020). Biodiversity of *Corallina* species from Tristan da Cunha and the Falkland Islands, including *C. chamberlainiae* sp. nov.: implications for South Atlantic biogeography. *European Journal of Phycology*. doi.org/10.1080/09670262.2020.1780635

L. Chaves Torres, G. Kaur, **LA. Melbourne**, RD. Pancost (2019). Selective chemical degradation of silica sinters of the Taupo Volcanic Zone (New Zealand). Implications for early Earth and Astrobiology. *Geobiology*, Vol 17, 449-464, doi-org.bris.idm.oclc.org/10.1111/gbi.12340

LA. Melbourne, M. Denny, R. Harniman, EJ. Rayfield and DN. Schmidt (2018). The importance of wave exposure on the structural integrity of rhodoliths. *Journal of Experimental Marine Biology and Ecology*, Vol 503, 109-119, doi: 10.1016/j.jembe.2017.11.007

L. Chaves Torres, **LA. Melbourne**, M.T. Hernandez-Sanchez, GN. Inglis, RD. Pancost (2017) Insoluble prokaryotic membrane lipids in continental shelf sediments offshore Cape Town: Implications for organic matter preservation, *Marine Chemistry*, Vol 197, 38-51, doi.org/10.1016/j.marchem.2017.10.003

LA. Melbourne, JJ. Hernandez-Kantun, S. Russel and J. Brodie (2017). There is more to maerl than meets the eye: DNA barcoding reveals a new species in Britain, *Lithothamnion erinaceum sp.* nov. (Hapalidiales, Rhodophyta), *European Journal of Phycology*, Vol 52, 166-1678, doi:10.1080/09670262.2016.1269953

LA. Melbourne, J. Griffin, DN. Schmidt, and EJ. Rayfield (2015). Potential and limitations of finite element modelling in assessing structural integrity of coralline algae under future global change. *Biogeosciences*, Vol 12, 5871-5883, doi:10.5194/bg-12-5871-2015

LA. Melbourne, J. Pilczynska, S. Chaabane, AK. Mishra (2014) Abundance and morphology of *Ellisolandia elongata* from Palmaria Island (Natural Regional Park of Porto Venere, La Spezia, Italy), NW Mediterranean Sea. *In:* C. Lombardi, F. Ragazzola. (2014) Expert Training Course on the Effects of Ocean Acidification and Global Warming on Mediterranean selected marine organisms (Polychaetes and Coralline algae) - in situ and laboratories study for monitoring Future Oceans. For-Mare Technical Report, 19-26.

Conference Presentations

- To Break or not to Break: assessing the structural integrity of corallines (Aug 2023), Coralline Algal Meeting, Umeå, Sweden **(talk)**

- Surprisingly Sturdy: Coralline algae habitat function shows structural resilience across the Paleocene-Eocene Thermal Maximum (Aug 2022), International conference on Palaeoceanography, Bern, Norway **(conference poster)**
- To break or not to break: the impacts of climate change on skeletal function of marine calcifiers (Oct 2020), Geological Society of America conference, virtual conference **(talk)**
- Living on the edge: How does the environment affect the structural integrity of coralline algae? (Jul 2016), Ocean Global Change Biology, Gordon Research Conference, New Hampshire, US **(poster/invited flash talk)**
- Living on the edge: Is the structural integrity of rhodoliths (Corallinales, Rhodophyta) affected by climate change? (Jun 2016), British Phycological Society annual meeting, Bournemouth, UK **(talk)**
- The Future of the UK coastline (May 2016), Research without Borders conference, Bristol, UK **(poster)**
- Assessing the structural integrity of rhodoliths and understanding the importance of their cryptic diversity (Mar 2016), Natural History Museum Student Conference, London, UK **(talk)**
    - **Awarded Best Student Talk**
- Assessing the structural integrity of rhodoliths and understanding the importance of their cryptic diversity (Aug 2015), the 6th European Phycological Congress, London, UK **(talk)**
- Assessing the structural integrity of coralline algae (Jun 2014), British Phycological society annual conference, Galway, Ireland, **(runner-up poster)**

Invited Talks

- To break or not to break: the impacts of climate change on skeletal function of marine calcifiers (Nov 2021), Lamont Doherty Earth Observatory, Columbia University **(talk)**
- To break or not to break: engineering approaches to coastal ecosystems (Feb 2021), University of Leeds **(talk)**
- Assessing the structural integrity of coralline algae (Aug 2020), University of Cambridge **(talk)**
- The Future of Coralline Algae (Dec 2018), The Linnean Society of London **(talk)**
- The impact of climate change on the structural integrity of habitat forming coralline algae (Nov 2014), University of Bristol **(talk)**
- The Future of UK Shelf Ecosystems (Nov 2013), Falmouth Harbour, Falmouth **(talk)**
- The Future of UK Shelf Ecosystems (Nov 2013), Natural History Museum London (case funder), **(talk)**

Funding

- Bristol alumni grant (£500); Gordon Research Conference: Ocean Global Change
- NERC facility for scientific diving; 5 days, Oban, UK, coralline algae bed sampling

Awards

- Bristol Inspirational Scientist (Oct 2019)
- Linnean Society 2019 Irene Manton Prize for best PhD thesis in Botany (May 2019)

Workshop participation

- Natural England Maerl policy workshop, Marine Biological Association, Plymouth (Dec 2015)
- The effect of ocean acidification on Mediterranean benthic organisms, Portovenere, Italy (Sep 2014

Technical skills

- Imaging: Scanning Electron Microscopy; Electron Microprobe; Atomic Force Microscopy and Nano-indentation
- Computed Tomography (CT): Micro-CT and x-ray tomography (Swiss Light Source, SLS, Paul Scherer Institute ETH, Zurich).
- Finite Element Analysis: Software packages Aviso, Hypermesh and Abaqus.

- Taxonomy: Morphological identification; DNA sequencing (CO1 and *psb*A); phylogenetics and species delimitation.
- IT skills: Word processing (Word); Spreadsheets (Excel); Presentation software (Powerpoint; Adobe Illustrator); statistical analysis (Minitab; R); Video editing software (Adobe Rush); Design Software (Adobe Indesign); Photo-editing software (Adobe Photoshop, Serif Photoplus); CMS software

Collaborations

- Dr Gabriela Farfan (Smithsonian National Museum of Natural History); Raman Spectroscopy on marine calcifiers
- Professor Jeffrey Kysar (Columbia University); nanoindentation on mussels
- Professor Mark Denny (Hopkins Marine Laboratory, Stanford University); the impact of wave exposure on rhodoliths, co-author.
- Dr Robert Harniman (UoB); material properties of coralline algae, co-author
- Dr Martin Sayer (Tritonia Scientific Ltd); the ecology of maerl
- Dr Suman Sarkar (UoB): Structural integrity of corallines across the PETM
- Dr Danna Titelboim (UoB): Structural integrity of Benthic Foraminifera
- Dr Maryory Julieth Sarria Dulcey (UoB): Structural Integrity of Bivalves

TEACHING

Masters Project Supervision

- Cohort 10, MAT students, AMNH, the impact of local environment on the structural integrity of oysters, 4 students
- Cohort 9, MAT students, AMNH, the impact of local environment on the structural integrity of New York oysters, 5 students
- Sam Bulmer (MSc student, 2021) UoB, The impact of shape on the structural integrity of Southern Ocean and K/Pg boundary bivalves, co-supervises with Prof Daniela N Schmidt and Dr James Witts
- Robyn Lennox (MSc student, 2021) UoB, Impact of long-term environmental changes on the structural integrity of coralline algae during the Palaeogene, co-supervised with Dr Suman Sarkar
- Nikita Rothwell (MSc student, 2021) UoB, The Impact of Warming on Large Benthic Foraminifera as Carbonate Producers and Ecosystem Engineers, co supervised with Dr Danna Titelboim; currently doing a PhD at the University of Bristol.
- James Mulqueeney (MSci student, 2021) UoB, Using Finite Element Analysis to assess structural integrity within benthic foraminifera, co-supervised with Dr Danna Titelboim; currently doing a PhD at the University of Southampton
- Clio Hall (internship), Living on the edge: Documenting the rhodolith community in a subtidal sea loch (Apr–Jul 2017) NHM; Currently on a PhD studentship University of Helsinki titled *Impact of temperature and salinity change on food web interactions in marine plankton communities*
- Jacob Powell (MSci student, 2017) UoB, The effects of environmental change on maerl; Currently working as Clean Air Zone Transport and Travel Advisor at Bath & North East Somerset Council
- Julia Griffin (MSci student, 2014) UoB, Assessing simple models of coralline algae, *Lithothamnion glaciale*, through finite element analysis; Currently a GEO Environment Engineer for the RSK group

Lecturing and tutoring

- The impact of different coastal environments on community compositions, cohort 10 MAT (Aug 2022)
- Marine Micropalaeontology, UoB, 3rd and 4th year (Oct 2020)
- MSc Palaeobiology Research Methods (2020)
- Tutoring: GCSE Science and Maths (Oct 2019–Mar 2020)
- 1-day Course: How to effectively communicate your research (Dec 2018)

- Tutoring: A level Chemistry (The Access Project) (Dec 2017–May 2018)
- Lecture: Intro to chemistry lecture (MSc and 1st year PhD Students; UoB) (Sep 2015)
- Demonstrating: UoB Micropalaeontology (Oct–Dec 2015); Chemistry for Earth Scientists (Oct–Dec 2013; 2014; 2015); Geochemistry (Oct–Dec 2013)

SCIENTIFIC SERVICE

Reviewing

- Annals of Botany
- Philosophical Transactions of the Royal Society B
- Marine Ecological Progress Series
- European Journal of Phycology
- Marine Micropalaeontology

Seminar and conference organisation

- Department of Earth and Planetary Sciences, American Museum of Natural History (Sep 2022–**)**
- Earth2Earth Seminar series, organising committee (Jul 2020–Nov 2020)
- 'The Linnean Society Conference: Diversity within Natural History' (conference organiser), this conference focused on ethnic minorities contributions to Natural History (March 2019)
- '230th Anniversary of the Linnean Society: A Celebration of our First Female Fellows' (conference organiser) this conference focused on women in STEM (March 2018)

Service to the wider community

- Vice president of the Black in Natural History Museums network that looks to promote and support black people working within natural history
- Co-developed an exhibition at the Florida Museum of Natural History on Black peoples contribution to natural history
- Consultant for the Guinness World Book of Records

Service to AMNH

- Being on the interview panel for the MAT postdoctoral fellow (Sep 2022)
- Being on the admissions committee for MAT cohort 11 (Jan–May 2022)

Service to UoB

- Member of the Equality, Diversity and Inclusivity committee (Oct 2020-May 2021)
- Set up a network for students within Earth Sciences from minority backgrounds (Oct 2020-May 2021)
- Filmed interview with the new Chancellor of the University of Bristol, Sir Paul Nurse (Feb 2017)
- Spoke at the launch of the 'Researcher Inauguration Event' UoB (Feb 2017)
- Hosted the University of Bristol's launch night for the new vision strategy (Nov 2016)

OUTREACH

Schools/ Universities

- Talk: Hot and Sour: How Ocean Warming and Acidification Affects Marine Organisms, Midwood High School scientist speaker series (Nov 2022)
- Talk: Hot and Sour: How Ocean Warming and Acidification Affects Marine Organisms, AMNH scientist speaker series (Nov 2022)
- Talk: Panel on being black in natural history research, Arizona State University (Jun 2022)
- Talk: Video answering questions on marine life, Primary School (Feb 2022)
- Talk: Impact of climate change on marine ecosystems, New York Public High Schools (Jun 2021 and Jan 2022)
- Talk: Science Careers, Geological Society of London (Oct 2020)

- Talk: Science Communication, UoB (Aug 2020)
- Talk: Science careers, Stemmettes and Linnean Society (Aug 2020)
- Talk: Coralline algae, Secondary schools (Jul 2020)
- Talks: Science Communication, UoB, Linnean Society and Secondary Schools (2018)
- Workshops: Natural History and Science careers, Primary and Secondary (2018 as part of the Linnean Society; 2017)
- Blog: 'Why you should apply for the Research without Border's event.' UoB (Feb 2017)
- Talk: why do a PhD? Bristol Doctoral College (Nov 2016)
- Talk: The Future of the UK coastline, Three-minute thesis final, UoB (May 2016)
- Talk: The impact of climate change on the structural integrity of habitat forming coralline algae, Université Pierre et Marie Curie (UPMC) - an invited speaker to a workshop on communicating science effectively for Paris MSc students (Dec 2014)

Media

- Video: Talking about the climate change and marine organisms, AMNH website (Feb 2022)
- Article: Dr Leanne Melbourne: inspiring young women to study ocean science, NHM, London (Oct, 2020)
- Article: Diversity in STEM: a conversation with Dr Leanne Melbourne, Epigram Newspaper, UoB (Oct 2020)
- Article: PuLSe, Fellow's magazine for the Linnean Society (Aug 2018)
- Interview: Linnean Society Podcast, Climate change threatens beds (coralline algae) of biodiversity (Feb 2018)
- Article: A local view helps fight the effects of climate change on the ocean, The Conversation, (Jan 2017)
- Article: 'Experts call on international climate change panel to better reflect ocean variability in their projections' UoB Press release (Nov 2016)

Public events

- Talk: Being a Black in STEM, Black: STEAM festival (Birmingham Think Tank) (Oct 2019)
- Talk: The Future of Coralline algae, LSL, (Dec 2018)
- Outreach: Green Man Festival with Linnean Society (Aug 2018)
- Talk: Blue Planet Lates event, NHM (Jan 2018)
- Talk: 'The Future of UK rhodoliths', Festival of Nature (Jun 2017)
- Volunteer: Festival of Nature and Soapbox science event (2015)

TRAINING/ SKILLS/ MEMBERSHIP

Other skills

- PADI level 1 open water
- Full current clean driving license

Courses attended

3D slicer; Hypermesh Training Course; R Course; Electron Microscopy course; NERC public engagement course; EPMA course; NERC Short course on taxonomic principles and tools in botanical research; Build Your Advanced Social Media Strategy to Boost Engagement and Motivate Action; Do More with Less: Key Steps for Maximising the Effectiveness of your Marketing Content; Utilising Data Across the Voluntary Sector

Professional societies

Palaeontological Association (Oct 2020)
The Paleontological Society (July 2020)
The Linnean Society of London (since May 2018)