Oscar Branson

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Research Interests

Biomineralisation, Proxy Development and Application, Climate Change, Geochemistry

- To develop and apply novel geochemical proxies, based on a fundamental mechanistic understanding of biomineralisation mechanisms.
- To explore and elucidate the mechanisms behind current palaeoproxies.
- To understand biomineralisation processes, in context of anthropogenic ocean acidification.

Academic Background

July 2014 - Present — **PostDoc UC Davis / University of Washington**
Applying cutting-edge spectroscopic and imaging techniques to answer outstanding questions in biomineralisation research.

Oct 2010 – June 2014 — **PhD Earth Sciences**
Dept. Earth Sciences, University of Cambridge
Godwin Palaeoclimate Research group and the Mineral Physics group
Supervisors: Harry Elderfield and Simon Redfern

Jun 2010 - Sep 2010 — **MSc Oceanography (Distinction)**
National Oceanography Centre, Southampton
MSc Dissertation Supervisor: Debora Iglesias-Rodriguez

Jan 2009 – Jul 2009 — **BSc Biology (1st Class, Hons)**
Dept. Biological Sciences, University of Bristol
BSc Dissertation Supervisors: Daniela Schmidt and Marian Yallop

Publications

Branson, O., Redfern, S. A. T., Tyliszczak, T., Sadekov, A., Langer, G., Kimoto, K. & Elderfield, H. (in press). The coordination of Mg in foraminiferal calcite.

Rouco, M., **Branson, O.**, Lebrato, M., & Iglesias-Rodríguez, M. D. (2013). The effect of nitrate and phosphate availability on Emiliania huxleyi (NZEH) physiology under different CO2 scenarios. *Frontiers in microbiology*, *4*.

Conference and Meeting Contributions

Conference Presentations

Branson, O., Redfern, S., Kaczmarek, K., Tyliszczak, T. & Elderfield, H. (2013). The coordination of B in foraminiferal calcite. Mineralogical Magazine, 77(5) 762 (presented at Goldschmidt 2013)

Redfern, S. A. T., **Branson, O.**, Elderfield, H., Tylisczak, T. & Rau, C. (2013). Geochemical Proxy Nanostructure of Foraminifera by X-Ray Imaging: STXM and Tomography Mineralogical Magazine, 77(5) 2035 (presented at Goldschmidt 2013)

Branson, O., Redfern, S. A. T., Tyliszczak, T., Sadekov, A., Langer, G. & Elderfield, H. (2012). The Coordination of Mg in Foraminiferal Calcite, Abstract B14B-02 presented at 2012 Fall Meeting, AGU, San Francisco, Calif., 3-7 Dec.

Branson, O., Redfern, S. A. T. , Elderfield, H., & Tyliszczak, T. (2012). Mg incorporation modes in foraminifera: STXM of biogenic calcite, Abstract 12-270-2 presented at 2012 EMC Conference, Frankfurt.

Branson, O., Rouco, M., Lebrato, M., & Iglesias-Rodríguez, M. D. (2010). The combined effects of nutrient limitation and CO_2 variation on *Emiliania huxleyi* growth and calcification. Presented at EPOCA, BIOACID and UKOARP joint conference, 2010.

Posters

Branson, O., Redfern, S. A. T., Rau, C. & Elderfield, H. (2013). Revisiting foraminiferal crusts: A synchrotron tomography and LA-ICPMS study. Poster P-015 at ICP2013 conference.

Teaching and Mentoring Experience

Project Supervision — - Supervised a 4th year Earth Sciences undergraduate project on the synchrotron tomography and LA-ICPMS analysis of foraminiferal crusts (Cam, 2014).
- Supervised two 4th year Math students for 6-week summer projects (Cam, 2014).

Tutoring — - Taught 1st and 2nd year undergraduate lab classes for three years (Cam, 2010-13)

	- Small group tutorials with 1st and 2nd year undergraduates on palaeoclimate and geochemistry (Cam, 2011-13).
Field Trips	- Taught 1st year Cambridge geology field trips, including a week-long trip to Arran.

Key Research Skills

Laboratory

General	Comfortable with wet and dry laboratory practices (in axenic conditions), operating fume and positive-pressure hoods, various types of microscope and most common laboratory apparatus.
Biology	Preparing and maintaining culture experiments, measurement of biological parameters, understanding of anatomy and cellular processes. Experience culturing foraminifera
Mineralogy	Lab and synchrotron X-ray absorption, fluorescence and diffraction techniques. FTIR and Raman spectroscopy. FIB and thin-section sample preparation techniques.
Geochemistry	Sample preparation and analysis of foraminiferal trace elements using ICP-OES, ICP-MS and LA-ICP-MS instruments. Electron Probe elemental mapping, SEM imaging and analysis techniques.

Computing

General	Comfortable with Mac, Linux and Windows platforms, and all common word processing, database and presentation software, LaTeX typesetting, and various image processing and analysis packages.
Statistics	Trained in the rigorous analysis of statistical data, using various packages.
Programming	Advanced knowledge of R and Python languages, familiar with Matlab (/Octave), bash, html and css. I have written R and Python packages for processing and analysing various data types.

Field Work

Diving	AAUS Scientific Diver with >120 logged dives (2014).
Sea Survival	Sea survival course. Southampton, 2010.
Boats	Powerboat Level 2. Southampton, 2010.
First Aid	Field Safety and First Aid course. Cambridge, 2012.
Driving	Full clean UK driving license, clean California Driving License.

Communication	Preparation of scientific manuscripts for publication, articles for news websites (Naked Scientists), periodicals (Marine Quarterly) and student-run magazines.

Grants, Prizes and Positions of Responsibility

Funding Secured

PhD Funding	NERC PhD studentship
Synchrotrons	I have been awarded 12 of 14 synchrotron experiments I applied for in open competitions, at four institutes in three countries.
Travel Awards	4 travel grants from Jesus college (£750 each), 2 from the Cambridge Philosophical Society (£200 and 500).
MSc Funding	- Awarded a fees-only studentship from the university. - Awarded the Richard Newitt Bursary maintenance grant by the department.

Prizes

Sept 2010	John Raymont Memorial Prize for top mark in MSc Oceanography

Positions of Responsibility	- PhD Graduate Representative (2010-2013) - Jesus College Boat Club Secretary (2010-2012) - MSc Graduate Representative (2009-2010) - BSc Student Representative (2007-2009)

Extra-curricular

Sports: Rowing, Squash, Rugby.

Other: Photography, Music ('Cello in orchestra, Bass Guitar in band), Writing (science communication).

Referees

Prof Simon Redfern	satr@cam.ac.uk	Tel: +44 (0)1223 333475

Prof Harry Elderfield he101@cam.ac.uk Tel: +44 (0)1223 333406

Further information

Lab and Analytical Techniques

PhD	- Lab-source X-ray powder diffraction - Synchrotron X-ray absorption, fluorescence, and diffraction techniques (STXM, NEXAFS, PEEM, SXCT, Total-Scattering PDF, Ptychography) - FTIR and Raman Spectroscopy - TGA Analysis - Crystal Precipitation - FIB Sample Preparation - SEM Imaging and Analysis - ICP-OES - ICP-MS - LA-ICPMS
MSc	- Axenic Culturing methods - Carbonate chemistry and nutrient manipulation of artificial seawater. - Solution Nutrient Analysis (N and P) - FIRe Photosynthetic analysis - VINDTA Carbonate Chemistry analysis - POC, PON elemental analysis - POP analysis - PIC analysis (ICP-OES) - Automated SEM imaging and analysis. - Coulter Counter cell analysis. - Enzyme assays.
BSc	- SEM imaging and analysis - Foram picking

Fieldwork Experience

Researcher on a 2-month foraminifera culturing season on Catalina island. Tasks included setting up a lab, designing experiments, diving to collect specimens, sorting and culturing specimens.

Research Assistant to PhD student Tim Cockerill (Dept. Zoology, University of Cambridge) at the Royal Society SEARRP Research Centre in Danum Valley, Borneo, Malaysia. Physically and mentally challenging fieldwork, lots of carrying heavy equipment through dense jungle at 3am to reach sampling sites before dawn.