Dr. Michael J. Henehan

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Education

PhD, Geochemistry and Palaeoclimate, University of Southampton **2009 - 2013**
Title: "Ground-truthing the boron-based proxies". *Project Supervisors:* Prof. Gavin L. Foster, Prof. Paul A. Wilson, Prof. Jonathan Erez. *Examiners*: Prof. James C. Zachos and Prof. Martin R. Palmer.

M/Sci, Palaeontology and Evolution, University of Bristol **2005-2009**
First Class Honours. *Tutor:* Prof. Michael J. Benton, FRS.

Research Interests

- Development and application of palaeoclimate proxies (geochemical and micropalaeontological), towards better understanding past climate, climate sensitivity, chemical weathering regimes and carbon-cycle perturbations.
- Understanding biogeochemical and geochemical cycles and feedbacks on Earth's climate, leveraging isotope geochemistry.
- The ecology, physiology and evolutionary history of foraminifera, coccolithophores and radiolarians.

Grants and Awards

Grants pending: ERC Consolidator Grant *PETRARCH* (€2M) successfully **progressed to Step 2** (Interviews January 2022); Royal Society University Research Fellowship (€860k) currently on the stand-by list for funding.

Grants awarded:

DFG Research Grant (Co-proponent, €204,792) **2022-2025**
This grant *"STRESS"* will develop laser ablation B isotope and trace element measurement at GFZ to track bleaching events and environmental stress in corals. *[PI: Juan Pablo D'Olivo (FU Berlin), Co-Is: Michael Henehan, Daniel Frick]*

DFG Research Grant (Co-proponent, €243,535) **2022-2025**
This grant *"EOCENE"* will apply laser ablation B isotope and trace element measurement at GFZ to examine coping mechanisms of Eocene corals in the face of stress in greenhouse climates. *[PI: Thomas Brachert (U. Leipzig), Co-Is: Michael Henehan, Regina Mertz-Kraus]*

DFG Research Grant (PI, €252,000) **2021-2024**
This project, titled *"Investigating transient weakening of Earth's silicate weathering 'thermostat' as a possible driver of climate perturbations in the geological past: A middle Eocene case study"*, funds a PhD student to explore the idea that transient reductions in silicate weathering can drive global warming events, using the MECO as a test case. Investigations will apply Si isotopes in radiolaria and Li isotopes in foraminifera, and integrate them into global carbon cycle models. *[PI: Michael Henehan, Co-Is: Friedhelm von Blanckenburg, Patrick Frings, Don Penman]*

DFG Research Grant (PI, €215,000) **2021-2024**
This project, titled *"Towards a Mechanistic Model of the Evolution of the Boron Isotope Composition of Seawater",* funds a PhD student exploring isotopic fractionation associated with boron and lithium sorption onto clay minerals in different solution chemistries. Data will ground a new model of the boron isotope composition of seawater over the past 150 Myr. *[PI: Michael Henehan, Co-I: Friedhelm von Blanckenburg]*

GFZ Expedition fund (PI, €6,500) **2020**
Awarded funds for an expedition to Tanzania to sample mid-Cretaceous sediments for glassy foraminifera (for boron isotopes) and organic geochemistry (TEX86, leaf wax δD, phytane $\delta^{13}C$ and MBT/CBT). Intended as a seed grant for my ERC Consolidator Grant application (subm. April 2021), but impossible due to CoVID. *[PI: Michael Henehan, Co-Is: Dirk Sachse, Kai Mangelsdorf]*

BIOS Grant-in-aid (Co-proponent $6,350) **2016**
Awarded a seed grant to take 2 Yale researchers to BIOS, Bermuda for 3 weeks. We set up foraminiferal culturing facilities for future proposals, cultured planktic foraminifera for Li isotope and trace metal geochemistry, and forged lasting collaborative relations with PIs such as Amy Maas at BIOS. *[Co-Is: Michael Henehan, Pincelli Hull, Janet Burke, Leanne Elder]*

EU FP7 ASSEMBLE Marine Science Grant (Project author) **2013**
Awarded funding to take 4 University of Southampton researchers to the Interuniversity Institute of Eilat, Israel, for 3 weeks. Led culturing of planktic foraminifera to test the environmental controls on $\delta^{11}B$ and B/Ca ratios in foraminiferal shells. *[Project Leader and Author: Michael Henehan, PI: Gavin Foster]*

2011: Awarded a **UK-IODP Student Bursary (€1,000)** to attend the ECORD Urbino Summer School in Palaeoclimatology.

2008: Awarded a **Nuffield Foundation Student Research Bursary (£1,400)** bursary for a summer research project in palaeoceanographic research at the University of Bristol using IODP sediment core material.

2007: Awarded a **BMSS-funded summer studentship** to undertake carbon and oxygen isotope analysis of soil and biological samples via GC-IRMS at IGER (now North Wyke Research).

Research Publications (peer reviewed, in chronological order) *[n=24, citations = 965 (as of 27.12.21)]*

Henehan, Michael J., Klein Gebbinck, Christa D., Wyman, Jillian V. B., Hain, Mathis P., Rae, James W. B., Hönisch, Bärbel, Foster, Gavin L. and Kim, Sang-Tae. **in press.** *No ion is an island: Multiple ions influence boron incorporation into $CaCO_3$.* Geochimica et Cosmochimica Acta, doi:10.1016/j.gca.2021.12.011.

Golla, Jon K., Küßner, Marie L., **Henehan, Michael J.**, Bouchez, Julien, Rempe, Daniella M. and Druhan, Jennifer L. **2021**. *The evolution of lithium isotope signatures in fluids draining actively weathering hillslopes.* Earth and Planetary Science Letters, 567, 116988.

Zhang, Xu Yvon, Saldi, Giuseppe D., Schott, Jacques, Bouchez, Julien, Kuessner, Marie, Montouillout, Valérie, **Henehan, Michael J.,** and Gaillardet, Jérôme. **2021**. *Experimental constraints on Li isotope fractionation during the interaction between detrital material and seawater.* Geochimica et Cosmochimica Acta, 292, 333-347.

Stewart, Joseph A., Day, Russell D., Christopher, Steven J., Kucklick, John R., Bordier, Louise, Chalk, Thomas B., Dapoigny, Arnaud, Douville, Eric, Foster, Gavin L., Gray, William R., Greenop, Rosanna, Gutjahr, Marcus, Hemsing, Freya, **Henehan, Michael J.** & 10 others. **2020**. *New Carbonate Reference Material for Boron Isotope and Trace Element Geochemistry: NIST RM8301 Boron Isotopes in Marine Carbonate (Simulated Coral and Foraminifera Solutions) Inter-laboratory Comparison Exercise.* Geostandards & Geoanalytical Res., 45(1), 77-96.

Barnet, James S. K., Harper, Dustin T., LeVay, Leah J., Edgar, Kirsty M., **Henehan, Michael J.**, Babila, Tali L., Ullmann, Clemens V., Leng, Melanie J., Kroon, Dick, Zachos, James C. and Littler, Kate. **2020**. *Coupled evolution of temperature and carbonate chemistry during the Paleocene–Eocene; new trace element records from the low latitude Indian Ocean.* Earth and Planetary Science Letters, 545, 116414.

Hull, Pincelli M., Bornemann, André, Penman, Donald E., **Henehan, Michael J.** and 33 others. **2020**. *On impact and volcanism across the Cretaceous-Paleogene boundary.* Science, 367(6475), 266-272.

Henehan, Michael J., Edgar, Kirsty M., Foster, Gavin L., Penman, Donald E., Hull, Pincelli M., Greenop, Rosanna, Anagnostou, Eleni and Pearson, Paul N. **2020**. *Revisiting the Middle Eocene Climatic Optimum 'Carbon Cycle Conundrum' with new estimates of atmospheric pCO_2 from boron isotopes.* Paleoceanography and Paleoclimatology, 35(6), e2019PA003713.

Henehan, Michael J., Ridgwell, Andy, Thomas, Ellen, Zhang, Shuang, Alegret, Laia, Schmidt, Daniela N., Rae, James W. B., Witts, James D., Landman, Neil H., Greene, Sarah E., Huber, Brian T., Super, James, Planavsky, Noah, and Hull, Pincelli M. **2019**. *Rapid ocean acidification and phased biogeochemical recovery following the end-Cretaceous Chicxulub impact.* Proceedings of the National Academy of Sciences, 116 (45), 22500-22504.

Tatzel, Michael, Vogl, Jochen, Rosner, Martin, **Henehan, Michael J.**, and Tütken, Thomas. **2019**. *Triple Isotope Fractionation Exponents of Elements Measured by MC-ICP-MS—An Example of Mg.* Analytical Chemistry, 91(22), 14314-14322.

Hsiang, Allison Y., Brombacher, Anieke, Costa Rillo, Marina, Mleneck-Vautravers, Maryline J., Conn, Stephen, Lordsmith, Sian, Jentzen, Anna, **Henehan, Michael J.** and 15 others. **2019**. *Endless Forams: >34,000 modern planktonic foraminiferal images for taxonomic training and automated species recognition using convolutional neural networks.* Paleoceanography and Paleoclimatology, 34(7), 1157-1177.

Greenop, Rosanna, Sosdian, Sindia, **Henehan**, **Michael J.,** Wilson, Paul A., Lear, Caroline H. and Foster, Gavin L. **2019**. *Orbital forcing, ice-volume and CO_2 across the Oligocene-Miocene Transition.* Paleoceanography and Paleoclimatology, 34(3), 316-328

Burke, Janet E., Renema, Willem, **Henehan, Michael J.,** Elder, Leanne E., Davis, Catherine V., Maas, Amy E., Foster, Gavin L., Schiebel, Ralf and Hull, Pincelli M. **2018.** *Factors Influencing Porosity in Planktonic Foraminifera.* Biogeosciences, 15(21), 6607-6619.

Evans, David, Badger, Marcus P. S., Foster, Gavin L., **Henehan, Michael J.**, Lear, Caroline H. and Zachos, James C. **2018**. *No substantial long-term bias in the Cenozoic benthic foraminifera oxygen-isotope record.* Nature Communications, 9, 2875.

Henehan, Michael J., Evans, David, Shankle, Madison, Burke, Jana E., Foster, Gavin L., Anagnostou, Eleni, Chalk, Thomas B., Stewart, Joseph A., Alt, Claudia S., Durrant, Joseph and Hull, Pincelli M. **2017**. *Size-dependent response of foraminiferal calcification to seawater carbonate chemistry*. Biogeosciences, 14, 3287-3308.

Zhang, Shuang, **Henehan, Michael J.**, Hull, Pincelli M., Reid, R. Pamela, Hardisty, Dalton S., Hood, Ashleigh and Planavsky, Noah J. **2017**. *On the reliability of ocean pH estimates derived from boron isotopes in shallow marine inorganic carbonates.* Earth and Planetary Science Letters, 458, 380-393.

Wang, Xiangli, Planavsky, Noah J., Hull, Pincelli M., Tripati, Aradhna, Zou, Huijuan, Elder, Leanne and **Henehan, Michael J. 2017.** *Assessing the utility of foraminifera as an archive of seawater $\delta^{53}Cr$.* Geobiology, 15 (1), 51-64.

Henehan, Michael J., Foster, Gavin L., Bostock, Helen C., Greenop, Rosanna, Marshall, Brittney J., and Wilson, Paul A. **2016.** *A new boron isotope-pH calibration for Orbulina universa, with implications for understanding and accounting for 'vital effects'.* Earth and Planetary Science Letters, 454, 282-292.

Henehan, Michael J., Hull, Pincelli M., Penman, Donald E., Rae, James W. B and Schmidt, Daniela N. **2016**. *Biogeochemical Significance of Pelagic Ecosystem Function: An end-Cretaceous Case Study.* Philosophical Transactions of the Royal Society B, 371: 20150510.

Evans, David, Wade, Bridget S., **Henehan, Michael J**., Erez, Jonathan and Müller, Wolfgang. **2016**. *Revisiting carbonate chemistry controls on planktic foraminifera Mg/Ca: Implications for sea surface temperature and hydrology shifts over the Paleocene-Eocene Thermal Maximum and Eocene-Oligocene Transition.* Climate of the Past, 12, 819-835.

Martínez-Botí, Miguel. -A., Marino, Gianluca, Foster, Gavin L., Ziveri, Patrizia, **Henehan, Michael J.**, Mortyn, P. Graham, and Vance, Derek, **2015**. *The role of the ocean in deglacial atmospheric CO_2 rise.* Nature, 518 (7538) 219-222.

Henehan, Michael J., Foster, Gavin L., Rae, James W.B., Bostock, Helen C., Marshall, Brittney J., Erez, Jonathan, Kucera, Michal, and Wilson, Paul A., **2015** *Evaluating the utility of B/Ca ratios in planktic foraminifera as a proxy for the carbonate system: A case study of Globigerinoides ruber.* Geochemistry, Geophysics, Geosystems 16 (4), 1052-1069.

Marshall, Brittney J., Thunell, Robert C., Spero, Howard J. **Henehan, Michael J.** and Astor, Yrene. **2015.** *Morphometric and stable isotopic differentiation in Orbulina universa morphotypes from the Cariaco Basin, Venezuela.* Marine Micropalaeontology 120, 46-64.

Henehan, Michael J., Rae, James W.B., Foster, Gavin L., Erez, Jonathan, Prentice, Katherine C., Kucera, Michal, Bostock, Helen C., Martínez-Botí, Miguel A., Milton, J. Andy, Wilson, Paul A., Marshall, Brittney J. and Elliott, Tim. **2013**. C*alibration of the boron isotope proxy in the planktonic foraminifera Globigerinoides ruber for use in palaeo-CO_2 reconstruction.* Earth and Planetary Science Letters, 364, 111-122.

Marshall, Brittney J., Thunell, Robert C., **Henehan, Michael J.**, Astor, Yrene & Wejnert, Katherine **2013**. *Planktonic foraminiferal area density as a proxy for carbonate ion concentration: A calibration study using the Cariaco Basin Ocean Time Series.* Paleoceanography, 28(2), 363-376.

Other publications

Raitzsch, M., Hain, M. P., **Henehan, M. J.** & Gattuso, J.-P. **2021.** *seacarbx - seacarb extension for deep-time carbonate system calculations* (R package). http://doi.org/10.5281/zenodo.4432170.

Henehan, M. J. & Jurikova, H. **2019.** *Boron in $CaCO_3$ as a record of past seawater carbonate chemistry.* PAGES Magazine, 27(2), 58-59.

Publications in review

Gray, William R.., Evans, David, **Henehan, Michael J.**, Weldeab, Syee, Lea, David W., Webb, Paul, Müller, Wolfgang, and Rosenthal, Yair. *Sodium incorporation in foraminiferal calcite: Evidence for multiple chemical phases.* (in revision, GCA).

Cai, Di, **Henehan, Michael J.**, Uhlig, David and von Blanckenburg, Friedhelm. *Mg isotopic composition of runoff is buffered by the regolith exchangeable pool.* (in revision, GCA).

Chapela Lara, María, Buss, Heather, **Henehan, Michael J.**, Schuessler, Jan and McDowell, William H. *Secondary minerals drive extreme lithium isotope fractionation during tropical weathering.* (in revision, JGR Earth Surface).

Selected Recent Conference Abstracts

Henehan, M. J., Kalderon-Asael, B., Barnet, J., Witts, J., Rae, J., Planavsky, N., Hull, P. and von Blanckenburg, F. **2021**. *Interrogating the Cretaceous-Palaeogene Li isotope crash with new records of foraminiferal δ^7Li.* Goldschmidt, Abstract #7845.

Gerrits, R., **Henehan, M. J**., Feldmann, I., Radnik, J., Agudo Jácome, L., Lisec, J., Schott, J., Schumacher, J., Gorbushina, A. and von Blanckenburg, F., **2021**. *The effect of fungal iron uptake on olivine weathering studied by genetic approaches in the rock-inhabiting fungus Knufia petricola.* Goldschmidt, Abstract #7124

Nambiar, R., Hauzer, H., Erez, J., Kniest, J., Raddatz, J., Renema, W., Gray, W., **Henehan, M. J.,** Cotton, L., Müller, W. and Evans, D. **2021**. *Evaluating the utility of K/Ca in marine carbonates as a recorder of seawater chemistry.* Goldschmidt, Abstract #6884

van Dijk, J., Sepúlveda, J., Alegret, L., Birch, H., Bralower, T., Jones, H., **Henehan, M. J.**, and 9 others **2021**. *The recovery of the biological pump across the K/Pg boundary in the GSSP of El Kef, Tunisia.* Goldschmidt, Abstract #6378, & vEGU, Abstract #EGU21-8200.

Henehan, M. J., Klein Gebbinck, C., Wymans, J., Hain, M., Rae, J., Hönisch, B., Foster, G. L. and Kim, S. **2021**. *No ion is an island: Multiple ions influence boron incorporation into $CaCO_3$.* vEGU, Abstract #EGU21-10652.

Henehan, M. J., Evans, D., Müller, W., and Hull, P. M. **2020.** *Latest Cretaceous foraminiferal ecology and palaeoceanographic inferences from chamber-specific LA-ICPMS analysis.* EGU General Assembly, Abstract #19424.

Jurikova, H., Neugebauer, I., Plessen, B., **Henehan, M. J.**, Tjallingii, R., Schwab, M. J., Brauer, A., and Blanchet, C. **2020.** *Boron isotope systematics of lacustrine carbonates: a new approach for tracing the palaeo-hydroclimatic evolution of the Dead Sea.* vEGU, Abstract #16623.

Community Contributions

- **Reviewer** for *Science, Proceedings of the National Academy of Sciences, Geology, Nature Geoscience, Nature Scientific Reports, Geochimica et Cosmochimica Acta*, *Paleoceanography (& Paleoclimatology), Earth and Planetary Science Letters, Chemical Geology, Geophysical Research Letters, Marine Micropalaeontology, Mass Spectrometry Reviews, Palaeo³, Geoscientific Model Development, Biogeosciences, Global and Planetary Change, GSA Books, Marine Chemistry*.
- **Associate Editor** of a current special issue of *Paleoceanography and Paleoclimatology* entitled "Hothouse Earth: late Paleocene – early Eocene Climates and their lessons for the future."
- **Proposal reviewer** for NSF (USA), Natural Environmental Research Council (UK), the Royal Society of New Zealand, French National Research Agency and Narudowe Centrum Nauki (Poland)
- **Named collaborator** on the *SWEET* (Super-Warm Early Eocene Temperatures and climate: understanding the response of the Earth system to high CO_2 through integrated modelling and data) NERC large grant (www.deepmip.org/sweet)
- **Active member** of the NSF and Heising-Simons Foundation Research Coordination Network "*Improving Reconstructions of Cenozoic pCO_2 change*" (www.paleo-CO2.org), currently building a community-curated multiproxy database of Cenozoic pCO_2.

Convenor: vEGU Session "*Advances in geochemical proxy development and application",* 2021; AGU Fall Meeting Session "*Global Climate Events and Ocean Chemistry of the Palaeogene and K-Pg Transition"*, 2014.

Invited Speaker: the forthcoming International Conference of Palaeoceanography 2022 in Bergen, Lamont-Doherty Earth Observatory, University of Cambridge, University of Tübingen, Yale University, NIWA, Cardiff University, University of Oviedo, University of Birmingham, University of Southampton, University of Bristol, BIOS, Max Planck Institute for Solar System Research in Göttingen, Goethe University Frankfurt & the Interuniversity Institute of Eilat, Israel.

Research Experience

Research Scientist, GFZ Potsdam **August 2017-Present (PI: Prof. Dr. Friedhelm von Blanckenburg)**

I work within the *Earth Surface Geochemistry* group on all aspects of the interaction between CO_2, climate, biota and the critical zone. I am responsible for the HELGES trace metal clean laboratory and supervising associated technical staff and visiting researchers. At GFZ I have secured €0.5M in funding, with applications pending for a further €2.8M, and have set up the methodology to generate high-precision B and Li isotope data on minute sample quantities. Ongoing projects include reconstructing pCO_2 and carbon cycling through the Paleocene, investigating cycling of Mg and Li isotopes in the critical zone (with PhD Student Di Cai, María Chapela Lara & Friedhelm v. Blanckenburg), the trace metal and isotope geochemistry of radiolaria (w/Patrick Frings), the development of laser ablation B isotope analysis in carbonates (w/Daniel Frick), using Fe isotopes to track accelerated weathering by fungi (with Ruben Gerrits) and using Nd and B isotopes to track Holocene precipitation in the Levant (w/Cécile Blanchet & Hana Jurikova).

Post-Doctoral Research Associate, Yale University **April 2014-August 2017 (PI: Dr. Pincelli Hull)**

During 3.5 years at Yale, my main focus was investigating carbon cycle perturbations around the Cretaceous-Palaeogene (K-Pg) boundary. I set up the required methodology for high-quality boron isotope measurements at Yale, and generated records of $\delta^{11}B$ in fossil foraminifera across the K-Pg, published in *PNAS* in 2019.

Post-Doctoral Research Associate, University of Southampton **August 2013 - February 2014 (PI: Dr. Gavin Foster)**

Over a 6-month post-doc I led an ERC-funded foraminiferal culturing expedition to Eilat, Israel, and generated boron isotope and trace elements proxy records over the MECO (Middle-Eocene Climatic Optimum), which I later coupled with carbon cycle modelling at Yale, and published last year in *Paleoceanography & Paleoclimatology*.

Teaching and Outreach Experience

GFZ Potsdam **2017-Present**

- I co-teach the annual summer course '*Metal Isotope Geochemistry*' (through the Freie Universität Berlin) with Friedhelm von Blanckenburg and Daniel Frick, covering *ab initio* theory, measurement hardware, uncertainty quantification, practical applications, and a hands-on Fe isotope measurement exercise.
- Contributed to the Masters-level course '*Palaeoindicators of climate and environmental change in marine calcifiers*' at FU Berlin (course coordinator Juan Pablo D'Olivo, lecturing on the evolutionary history, physiology and practical applications of foraminifera.

Yale University **2014- 2017**

- Lectured on Greenhouse and Icehouse Climates, and their relevance to macroevolutionary history, as part of the undergraduate '*History of Life'* course, led by Pincelli Hull and Lidya Tarhan.
- Lectured on boron isotopes as part of the mixed undergraduate/graduate '*Paleoenvironments'* course, led by Noah Planavsky.
- Co-taught in the graduate level course '*Advanced Critiques of Paleoceanographic Methodologies'* for Mark Pagani.

Bestival Science Tent and Bestiversity **2011-2013**

- At *Bestival* Music Festival (Isle of Wight, UK) I lectured to festival-goers on the science behind climate change, and co-ordinated and staffed the National Oceanography Centre's interactive exhibits in the Science tent. The science tent continues to exhibit at this and other festivals in the UK, including Glastonbury Music Festival and the Cheltenham Science Festival.

Teaching Assistant, University of Southampton **2010-2012**

- Helped teach practical classes in Geochemistry, Maths, and Palaeobiology (the latter including two field trips).

Outreach: I have delivered many talks on climate science to diverse public audiences in the US, UK and Ireland. At Yale, I participated in the Climate Voices initiative, pairing climate scientists with local schools and community organisations. I contribute to Climate Feedback, which fact-checks coverage of climate science in the media (climatefeedback.org). I have given numerous newspaper, magazine, radio and television interviews about my research, which have featured in the Guardian, the Atlantic, the New York Times, Der Spiegel among others, as well as national TV and radio in Germany, Switzerland and Malaysia.

Student Mentoring

At GFZ, I supervise two DFG-funded PhD students (*Simon Ring* & *Ruchi*, both of whom began this summer- see 'Grants and Awards'). I co-supervise another, *Di Cai*, looking at cycling and fractionation of Li and Mg isotopes in the Critical Zone. I have also supervised two BSc dissertations on K-Pg foraminiferal fragmentation and radiolarian geochemistry. At Yale, I co-supervised five undergraduate and graduate student research projects: investigating controls on foraminiferal shell weight (output published in *Biogeosciences*), developing foraminiferal fragmentation as a proxy (manuscript in prep.), assessing foraminiferal diversity and disparity in the run up to the K-Pg Boundary (student presented a poster at AGU), applying paired Li and B isotope measurements in foraminifera (manuscript in prep.) and applying boron isotopes to shallow marine $CaCO_3$ (output published in *EPSL).* At Southampton, I supervised a Masters project investigating the controls on foraminiferal shell weight (feeding into a paper in *Biogeosciences*).

Professional/Academic Development

Courses attended: *Leadership & Career Development Skills for PostDocs* (GFZ Potsdam, 2020), *PALEOGENiE / ECOGEM modelling summer school* (U. Bristol, 2016), *Storytelling in Science* (U. Southampton, 2013), *Communicating Climate Change* (Union of Concerned Scientists, San Francisco, 2012)*, NERC Life & the Planet Spring School* (NERC, U. Southampton, 2012), *Nuts & Bolts of Mass Spectrometry Short Course* (EAG, U. Bristol, 2012), *Urbino Summer School in Palaeoclimatology* (ECORD/NSF, U. Urbino, 2011), *Media Handling Skills* (U. Southampton, 2011), *Postgraduate Introduction to Learning & Teaching* (U. Southampton, 2010).

Professional Affiliations:

European Assoc. of Geochemistry, EGU, The Micropalaeontological Soc., The Cushman Foundation, Deutsche Mineralogische Gesellschaft