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Education, honors and awards

2005-present Woods Hole Oceanographic Institution Woods Hole, Massachusetts
Postdoctoral Investigator

- Project: "A Continuous Flow Accelerator Mass Spectrometer." I am currently involved building a CO₂- gas accepting accelerator mass spectrometer for ¹⁴C measurement, a first of its kind. This instrument will be coupled to various peripheral instruments including GC, LC, automated carbonate preparation, and laser ablation. My specific interest is in adapting the system for rapid analysis of carbonates by laser decomposition to scan for the radiocarbon bomb curve and provide a first order age model. This type of advance will enable easy and rapid assessment of the age models of deep sea corals, zooxanthellate corals, sclerosponges and mollusks for use in marine paleoclimate studies.

1999-2005 University of Miami Miami, Florida

Ph.D., Marine Geology and Geophysics.

- Thesis: "An Investigation of the Use of Sclerosponges as High-Resolution Proxy Indicators of the Marine Paleoclimate." I worked validating the use of high-resolution geochemical proxies in the aragonite skeletons of sclerosponges to infer past salinities and temperatures of both surface and subsurface water masses in the Atlantic. This project incurred extensive laboratory work, field work, and modeling, and thus far has resulted in 4 (3 first author) publications and numerous abstracts. Two more first author manuscripts are in preparation.
- Outstanding Student of the Year, Marine Geology and Geophysics, 2000.
- Who's Who Among Students in American Universities and Colleges, 2004

1995-1999 University of Vermont Burlington, Vermont

B.S., Environmental Science, Honors Distinction.

- Thesis: "Freshwater Dilution Observed in the Stable Oxygen Isotope Record of the Scleractinian Coral *Montastraea annularis*: Roatan, Honduras." I used three lagoonal coral colonies adjacent to three different coastal land use zones and analyzed a short stable isotope record to ascertain the effects of land use on isotopic records in corals. The results of this project were published as an undergraduate honors thesis. One first author manuscript is in preparation and pending more data.
- Magna Cum Laude, 1999.
- Phi Beta Kappa, Alpha Chapter of Vermont, inducted 1999.
- John Dewey Scholar, 1997-1999.
- Charles C. Doll Award, 1998.
- Beard Family Scholarship, College of Arts and Sciences, 1995.

Related work experience

1997-1999 Severn Trent Laboratories Colchester, Vermont
Environmental Chemist

- Responsible for testing 14 different environmental parameters in an EPA-approved laboratory. I also participated in a screening test for high grade explosives in soil and groundwater from the vicinity of an army base. This position afforded experience with ICP-AES, various wet chemical/spectrophotometric techniques, cold vapor atomic absorption (Hg), and HPLC techniques. Tested samples from across the U.S.A. in accordance with EPA policies.

Publications
(Peer Reviewed)

- **Rosenheim, B.E.;** Swart, P.K.; Eisenhauer, A. (2007). "Constraining Initial ^{230}Th Activity in Incrementally-Deposited, Biogenic Aragonite from the Bahamas" Geochimica et Cosmochimica Acta. In press.
- **Rosenheim, B.E.;** Swart, P.K. (2007). "Caribbean sclerosponge radiocarbon measurements re-interpreted in terms of U/Th age models." Nuclear Instruments and Methods in Physics Research B. v. 259. pp 474-478. DOI 10.1016/j.nim.b2007.01.235.
- Moses, C.S.; **Rosenheim, B.E.;** Swart, P.K. (2006). "Evidence of multi-decadal salinity variability in the eastern tropical North Atlantic" Paleoceanography. v. 21, PA3010. DOI: 10.1029/2006PA001257.
- **Rosenheim, B.E.;** Swart, P.K.; Thorrold, S.R. (2005). "Minor and trace elements in sclerosponge *Ceratoporella nicholsoni*: Biogenic aragonite near the inorganic endmember?" Palaeogeography Palaeoclimatology Palaeoecology. v. 228, n. 1-2. pp. 109-129. DOI 10.1016/j.palaeo.2005.03.055.
- **Rosenheim, B.E.;** Swart, P.K.; Thorrold, S.R.; Willenz, P. (2005). "Salinity change in the subtropical Atlantic: Secular increase and teleconnections to the North Atlantic Oscillation." Geophysical Research Letters. v. 32, n. L02603. DOI: 10.1029/2004GL021499.
- **Rosenheim, B.E.;** Swart, P.K.; Thorrold, S.R.; Willenz, P.; Berry, L.; Latcozky, C. (2004). "High-resolution Sr/Ca records in sclerosponges calibrated to temperature in situ." Geology, v.32, n.2. p. 145-148. DOI 10.1130/G20117.1
- Swart, P.K.; Thorrold, S.; Rubenstone, J.; **Rosenheim, B.;** Harrison, C.G.A.; Grammer, M.; Latkoczy, C. (2002). "Intra-annual variation in stable oxygen and carbon and trace element composition of sclerosponges." Paleoceanography, v.17. 12p. doi:10.1029/2000PA000622
- Mehrtens, C.; **Rosenheim, B.E.;** Modley, M.; Young, R. (2001). "Reef morphology and sediment attributes, Roatan, Bay Islands, Honduras." Carbonates and Evaporites, v.16, n.2. p. 131-140.

Published
abstracts

- **Rosenheim, B.E.;** Swart, P.K.; Eisenhauer, A. (2006). "Realistic age models from Bahamas sclerosponges indicate elevated initial Th-230." Eos Transactions, AGU, v. 87(52), Fall Meeting Supplement, Abs. PP13D-03.
- McNichol, A.P.; **Rosenheim, B.E.;** Gerlach, D.S.; Hayes J.M. (2006). "The stable and radiocarbon isotopic content of labile and refractory carbon in atmospheric particulate matter." Eos Transactions, AGU, v. 87(52), Fall Meeting Supplement, Abs. A12C-02.
- McNichol, A.P.; **Rosenheim, B.E.;** Gerlach, D.S.; Edgerton, E.S.; Hayes, J.M. (2006), "Measuring the radiocarbon content of labile and refractory carbon in the same sample to constrain the natural carbon cycle." 19th International Radiocarbon Conference, Oxford, United Kingdom. 3-7April 2006.
- McNichol, A.P.; Gerlach, D.S.; Edgerton, E.S.; **Rosenheim, B.E.;** Hayes, J.M. (2006). "Directly measuring the radiocarbon content of organic and black carbon in atmospheric and marine samples." Eos Transactions, AGU, v.87(36), Ocean Science Meeting Supplement, Abs. OS12K-01.
- **Rosenheim, B.E.;** Moses, C.S.; Swart, P.K. (2005). "Decadal scale variation in the subtropical

N. Atlantic Shallow thermohaline circulation." Eos Transactions, AGU, v.86(52), Fall Meeting Supplement, Abs. PP54A-02 Invited.

- **Rosenheim, B.E.**; Swart, P.K. (2005). "Shallow subsurface marine radiocarbon records from Bahamas sclerosponge skeletons." Eos Transactions, AGU, v.86(52), Fall Meeting Supplement, Abs. PP31B-1531
- **Rosenheim, B.E.**; Swart, P.K.; Thorrold, S.R. (2004). "N. Atlantic salinity change during the last century: Surface forcing at the salinity maximum propagated to the central Caribbean by subsurface waters." Eos Transactions, AGU, v. 85(46), Fall Meeting Supplement, Abs. PP51C-1346.
- Moses, C.S.; Swart, P.K.; **Rosenheim, B.E.**; Thorrold, S.; Zhang, D. (2004). "Centennial-scale changes in tropical North Atlantic Salinity inferred from scleractinian corals." Eos Transactions, AGU, v. 85(46), Fall Meeting Supplement, Abs. PP51C-1347.
- **Rosenheim, B.E.**; Swart, P.K.; Thorrold, S.R.; Latkoczy, C.; Eisenhauer, A. (2004). "Significant changes in temperature and salinity of the Caribbean Sea indicated by Sr/cA ratios and $\delta^{18}\text{O}$ in the aragonite skeletons of sclerosponges." Eos Transactions, AGU, v. 84(52), Ocean Science Meeting Supplement, Abs. OS51I-03.
- Swart, P.K.; Dodge, R.E.; Quinn, T.; Moses, C.; **Rosenheim, B.E.**; Helmle, K.; Mackenzie, G.; Clement, A. (2004). "A long term history of salinity changes in the Caribbean using stable isotopes in coral skeletons." Eos Transactions, AGU, v. 84(52), Ocean Science Meeting Supplement, Abs. OS41A-04.
- **Rosenheim, B.E.**; Swart, P.K.; Willenz, P.; Thorrold, S.; Eisenhauer, A. (2002). "Calibration of Caribbean sclerosponges to their ambient environment: Indirect and direct methods." Eos Transactions, AGU, v. 83(47), Fall Meeting Supplement, Abs. PP52B-06.
- Swart, P.K.; **Rosenheim, B.**; Thorrold, S.; Eisenhauer, T. (2002). "Uranium, barium, lead, and lead isotopes in sclerosponges: New proxies in sclerosponges." Eos Transactions, AGU, v. 83(47), Fall Meeting Supplement, Abs. PP51A-0286.
- Swart, P.K.; **Rosenheim, B.**; Thorrold, S.; Rubenstone, J. (2001). "Annual variation in the chemical composition of sclerosponges." Eos Transactions, AGU, v. 82(47), Fall Meeting Supplement, Abs. OS31C-0446.
- **Rosenheim, B.E.**; Swart, P.K.; Thorrold, S.R. (2001). "Calibration of Sr/Ca with temperature in sclerosponges." Eos Transactions, AGU, v. 82(47), Fall Meeting Supplement, Abs. OS31C-0447.
- **Rosenheim, B.**; Swart, P.; Thorrold, S.; Rubenstone, J. (2001). "Annual cyclicity in high resolution Sr records from sclerosponges." Geological Society of America Abstracts with Programs, v. 33.
- Mehrrens, C.; Modley, M.; **Rosenheim, B.E.**; Newberry, R.; Young, R.S. (2000). "Sedimentation and water quality: Mesoamerican reef, Roatan, Honduras." Geological Society of America Abstracts with Programs, v. 32(7).
- **Rosenheim, B.E.**, Lini, A.; Mehrrens, C.; Young, R.S. (1999). Freshwater Dilution Observed in the Stable Oxygen Isotope Record of the Scleractinian Coral *Montastrea annularis*: Roatan, Honduras. Geological Society of America Abstracts with Programs, v. 31(2).
- Mehrrens, C.; Young, R.; Modley, M.; **Rosenheim, B.**; Duni, M.; Barnett, E.; Winchester, A. (1999). "Land use variation reflected in nearshore sediment: Roatan, Bay Islands, Honduras." AGU Spring Meeting. Eos Transactions, AGU, 80:S186.

Invited Talks

- **Revealing the spectrum of ages in bulk-dated organic material from Antarctic Peninsula sediment cores using programmed temperature pyrolysis**, University of Miami (RSMAS), Division of Marine Geology and Geophysics Geotopics Series, February 13, 2007
- **The Burning Question of Antarctic Sediment Chronology**, Brown University, Providence, Rhode Island, February 26, 2007

Laboratory qualifications

- **Laser Ablation/Decomposition.** I have used laser ablation as a fine scale subsampling tool for paleoceanographic studies. I am currently developing a technique to use CO₂ generated from laser decomposition of carbonate mineral surfaces for direct AMS determination of ¹⁴C.
- **Organic Chemistry.** I am currently working with a Programmed Temperature Combustion system (designed by John Hayes and Albert Benthien) and gas chromatographic systems in preparation to couple these instruments with the continuous flow accelerator mass spectrometer (CFAMS).
- **Isotope Ratio Mass Spectrometry.** I am able to operate a stable isotope laboratory with respect to both instrumentation and data management. I have more than 5 years experience using state of the art IRMS technology. I have used systems from VG Isogas, Thermo-Finnigan (Delta Plus), Finnigan MAT (251), Europa Geo (20/20) to analyze carbonates and waters. I have learned to prepare samples offline as well as to use automated carbonate devices such as the Fairbanks common acid bath and the Kiel III devices. I have developed standardized laboratory computation programs for correction of isotope data and I have performed standardization of the Thermo-Finnigan Delta Plus with Kiel III carbonate device to overcome heterogeneities associated with small sample size capabilities.
- **Minor and Trace Element Spectrometry.** I am able to fully operate an Inductively Coupled Plasma spectrometry laboratory from the instrumental standpoint. I have used ICP-AE and OE spectrometers in both industry and academia. Most recently, I was responsible for standardizing a newly acquired Varian Vista Pro ICP-OES axial spectrometer to analyze large carbonate samples for trace elements and small carbonate samples for minor elements. I have performed standardization with seawater samples of various strengths.
- **Microscopy.** I operated both epifluorescence and scanning electron microscopes for minor parts of my Ph.D. dissertation. I am familiar with the principles of these technologies and able to use them autonomously.

Teaching experience

2001-2005 University of Miami Miami, Florida

- **MSC 101: Introduction to Oceanography, Non-Science Majors.** I have assisted teaching several sections of this course, and it was one of the most challenging and rewarding tasks of my graduate career. This course gave me the opportunity to teach lectures on topics as broad as wave physics to coral physiology in a delivery suitable for all backgrounds. I have received excellent reviews from students in these classes and have succeeded in presenting both traditional blackboard lectures and multi-media presentations.

2000 Miami Museum of Science Impact Program Miami, Florida

- **Guest-lecturer, Global Climate Change.** I was a guest lecturer for the IMPACT program, a summer learning program for under-represented high-school students in the sciences. This program sought to take advantage of the local scientific program on Virginia Key, Florida, (RSMAS, AOML, NOAA) and I was invited to present material on global climate change.

2000-2004 Coral Gables Boy Scout Troop 7 Coral Gables, Florida

- **Oceanography and Auto Mechanics Merit Badges.** I taught merit badges to the Boy Scouts of Troop 7, Coral Gables, Florida as part of the Big Brother Big System mentoring program. The format

of these lessons was hands-on and outside of the classroom, however it was invaluable in giving me experience with a different age group and thereby aiding the development of teaching skills.

Field work experience

2005-2007 Woods Hole Oceanographic Institution Woods Hole, Massachusetts

- June, 2007: Submersible research cruise, Key West to Fort Lauderdale, Florida, in collaboration with the University of Miami and Harbor Branch Oceanographic Institution. Several submersible dives were made for collection of marine species living at depths less than 990m and of interest in paleoceanographic studies and pharmaceutical research.

1999-2005 University of Miami Miami, Florida

- May-Jun., 2003: Exploration of French Antilles for scuba-accessible sclerosponge specimens. Three week scuba exploration of all areas of the coast with either submarine grottoes or steep walls, both conducive to cryptic sclerosponge habitat.
- Oct.-Nov., 2002: Caribbean Atlantic Salinity Experiment (CASE-02) Cruise aboard the R/V Suncoaster. I participated in both legs of a month-long coral core collection expedition spanning the Bahamas to the St. Vincent Grenadines. Responsible for drilling corals by scuba using a hydraulic drill tethered to a small dinghy launched from the main vessel. Corals located using physical geography and existing literature to explore each island by snorkel.
- Aug., 2002: Sequence Stratigraphy of the Madison formation. Field Assistant for the Comparative Sedimentology Laboratory of the U. of Miami. Measured stratigraphic section of the Madison formation outcropping in Montana.
- May, 2002: Stage II of NSF-funded Sclerosponge Calibration Project, Discovery Bay, Jamaica. Sclerosponges were sampled after an incubation period of nearly 3 years. Other sclerosponges were re-stained with Calcein and thermistors were swapped and re-calibrated. Corals were also sampled to compare with proximal sclerosponge records.
- Sep., 2001: Geochemical Classification of Bahamas Bank Sediment cruise, R/V Bellows. This cruise gridded the NW Great Bahamas Bank, sampling sediment and water every 10km. Analysis for salinity, grain type, and skeletal makeup of waters and sediment performed on-board.
- May, 2001: Carbonate petrography class trip to Andros Island in the Bahamas. Studied Aeolian and shallow water carbonate deposits from the Pleistocene and Holocene as a class project. I took part in explorations of the supratidal mud flats of western Andros Island and sampled dolomite crusts forming in these unique environments.
- August, 2000: Exploration of the Commonwealth of Dominica for mature coral colonies. Explored the leeward coast of Dominica for large heads of *Siderastraea sideraea* suitable for climate records and potential sclerosponge environments by scuba. Several *S. Sideraea* colonies were drilled pneumatically and brought back to Miami. No sclerosponges were found. Also assisted in surveying reef to quantify and monitor corals with known diseases.
- Aug. 1999: Initiation of NSF funded Sclerosponge Calibration Project, Discovery Bay, Jamaica. Installed and calibrated temperature thermistors in submarine reef enclosure and stained sclerosponge surfaces using Calcein, a fluorochrome. Operations performed by scuba.

1998-1999 University of Vermont Burlington, Vermont

- Jun.-Jul. 2000: Relocation of sediment traps and levels, Roatan, Honduras. I took part in the final part of an abiotic reef survey, relocating sediment measuring devices and recording reef transects for changes since the project was started.
- Jul., 1999: Post-Hurricane Mitch abiotic reef assessment, Roatan, Honduras. This trip was planned to assess catastrophic changes to sections of reef due to the passing of Hurricane Mitch the previous year. Sedimentation measuring devices and coral transects were located by snorkel and scuba.
- Jul., 1998: Sampling of *Montastraea annularis* for my undergraduate honors thesis, Roatan, Honduras. Land use patterns of the island were assessed and corals were sampled from long-

disturbed area, recently-disturbed area, and pristine offshore control site.

Synergistic Activities

- NSF Proposal Reviewer, OCE Marine Geology and Geophysics
- Peer Review Journal Referee
 - Palaeogeography, Palaeoclimatology, Palaeoecology
 - Paleoceanography
 - Earth and Planetary Review Letters
 - Coral Reefs
 - Geochemistry, Geophysics, Geosystems
 - AGU Books
 - International Coral Reef Symposium
- Workshop Attendance
 - IODP Caribbean Gateway Workshop, Austin, Texas, 2006
 - CLIVAR Salinity Workshop, Woods Hole, Massachusetts, 2006
- Professional Memberships
 - American Geophysical Union