CURRICULUM VITAE
Marilyn Louise Fogel

Wilbur W. Mayhew Chair of Geoecology
Director of the EDGE Institute
Depts. of Earth Science and Environmental Science
University of California Riverside
900 University Ave., Riverside, CA 92521
Phone: 209-205-6743 (cell and office);
Email: mfogel@ucmerced.edu; marilyn.fogel@ucr.edu

PROFESSIONAL PREPARATION

B.S. Biology with honors, The Pennsylvania State University, 1970-1973.

Ph. D. Botany and Marine Sciences, The University of Texas at Austin, Marine Science Institute, Port Aransas Marine Laboratory, 1974-1977, Drs. Chase Van Baalen, Patrick Parker, and F. Robert Tabita, Advisors.
Dissertation title: "Carbon isotope fractionation by ribulose 1,5-bisphosphate carboxylase from various organisms."

Carnegie Corporation Postdoctoral Fellowship, Geophysical Laboratory, Carnegie Institution of Washington, 1977- 1979, Dr. Thomas C. Hoering, Advisor.

PROFESSIONAL APPOINTMENTS

Professor, Earth and Environmental Sciences Department, UC Riverside- Sept. 1 to present.
Director, EDGE Institute (Environmental Dynamics and Geo-Ecology Institute), Sept. 1 to present.
Chair, Life and Environmental Sciences Unit, School of Natural Sciences, UC Merced-July 2013-August 2016.
Professor, School of Natural Sciences, University of California, Merced-January 2013-August 31, 2016.
Staff Member, Geophysical Laboratory-July 1979 to December 2012. Adjunct Staff Member-January 2013 to December 2013.
Adjunct Professor, University of Delaware College of Marine Studies-1989 to 2014.
Visiting Staff Member, Department of Plant Biology, Carnegie Institution of Washington, 1985-1986.
Visiting Researcher, Conservation Analytical Laboratory, Smithsonian Institution-1994 to 1999.
Visiting Professor, Dept. of Earth Sciences, Dartmouth College-1995.
Research Professor, George Washington University, Dept. of Anthropology-April 1999 to July 2004.
Research Fellow, Smithsonian Institution, Environmental Research Center, 2003-2009.
Visiting Professor, Dept. of Geology, University of Maryland, 2003-2005.

Director, National Science Foundation, Geobiology and Low-Temperature Geochemistry Program, Sept. 2009-Dec. 2010.

ADMINISTRATIVE, LEADERSHIP, AND TEAM EXPERIENCE:

- As Director of the newly established EDGE Institute, I am building a coalition between faculty, researchers, and graduate students from multiple academic departments. My goal is to create a research, education, and outreach program that integrates earth, environmental, and biological sciences.
- As Professor at UC Merced, built a new stable isotope ecology laboratory funded by the University of California. Starting in July 2013, I became Chair of my academic unit that consists of 13 faculty in an interdisciplinary group that supports majors in Ecology and Evolutionary Biology and Earth System Science. I also am the Faculty Director of the campus's Environmental Analytical Laboratory, which serves students and faculty at Merced.
- As Senior Scientist at the Geophysical Lab, I have over 35 years of experience in independent Research Administration and Management. My laboratory group typically included 5-8 members, including postdoctoral associates, graduate and undergraduate students, and technical support personnel. In a typical year, I managed a budget between $300,000-$500,000.
- As Program Director at the National Science Foundation, I was responsible for long-range planning and budget development, coordination of proposal merit review, and ensuring a rich, diverse research program in Geobiology. The budget for this program was approximately $6.0 Million in fiscal 2010.
- NASA Astrobiology Institute 1998-2010: As a Team Member, I worked with internal planning committees, on workshops, and in cross-collaborative research projects.
- Management Team (2004-2008) and Chief Scientist (2008) of Arctic Mars Analogue Svalbard Expedition (AMASE). I helped coordinate and plan the scientific and logistical activities of a group of 20-30 international scientists.

AWARDS AND HONORS

Wilbur W. Mayhew Endowed Professor of Geo-Ecology, University of California Riverside, Sept. 2016.

President, Biogeosciences Section (approx. 3,000 members and 5,000 secondary members), AGU, 2015-2016

Alfred Treibs Medal, Organic Geochemistry Division, Geochemical Society, 2013. *The Treibs Award recognizes major achievements, over a career, in organic geochemistry.*

Sigma Xi Distinguished Scientist Award, UC Merced Chapter, February 2013.

Fellow, American Association for the Advancement Science, elected 2013.

Jubilee Medal of the Geological Society of South Africa, 2006.

Fulbright Scholar, Norway, 2006.

Fellow, Geochemical Society and European Association of Geochemistry, elected 2003.

Mellon Fellowship, Smithsonian Institution, Environmental Research Center, July 2001-October 2003

Loeb Fellowship, Smithsonian Institution, Environmental Research Center, July 1999 to July 2001.

Speaker, Carnegie Evening, Carnegie Institution of Washington, *Chemical Clues to the Signature of Life*, May 2000.

Keynote Speaker, *The Marriage of Stables Isotopes and Molecular Biology for Ecological Studies,* 1st International Conference on Stable Isotope in Ecology, 1998.

Bradley Prize for Best Paper at Geological Society of Washington, 1982.

Carnegie Corporation Fellow, 1977-1979.

RECENT SYNERGISTIC ACTIVITIES

CONFERENCES AND WORKSHOPS:

Keynote Speaker, Marilyn Madness "Past, Present, and Future of Stable Isotopes" Workshop, Washington, DC, Oct. 24-26, 2016

Participant, National Science Foundation Workshop, Feeding the World in the 21st Century: Grand Challenges in the Nitrogen Cycle, Arlington, VA, Nov. 2015.

Attendee, HERS (Higher Education Resource Services) Workshop to train future University Leadership, July 2014.

Keynote speaker, ASITA (Advances in Stable Isotope Techniques and Applications) workshop, UC Davis, June 2014.

Keynote speaker, European Geosciences Union, Vienna, Austria, May 2014.

Keynote speaker, Women in Science and Engineering Conference, MacMaster University, Canada, April 2013.

Convener, Sessions at AGU (James H. Scott Memorial Session, Dec. 2011) and ASLO (Compound Specific Amino Acid Session, Feb. 2012)

Participant, Work-Life Balance Workshop, AGU, December 2012.

Organizer, Workshop on Future Directions in Geobiology and Low-Temperature Geochemistry, August 2010.

Convener, Town Hall meetings for Geobiology and Low-Temperature Geochemistry, AbSciCon 2010 and Goldschmidt 2010.

Convener, Earth Science Women's Network sponsored Workshop on Early Career Planning with the National Science Foundation, AGU Fall 2009

Panelist, ADVANCE Workshop Rice University, Negotiating the Ideal Faculty Position, October 2007.

Chair, Scientific Organizing Committee, Astrobiology Science Conference 2006 (*AbSciCon 2006*).

Member, Scientific Organizing Committee, NASA Astrobiology Institute Conference, Boulder, CO, 2005.

Speaker, Capital Science Lecture Series, Carnegie Institution of Washington, *Untangling Complex Ecosystems*, 2002.

Chair, Interdisciplinary Science Conference in honor of Thomas C. Hoering (*HoeringFest*), Virginia, 1995.

Chair, Conference on *Organic Matter in Ore Deposits*, Airlie House Conference Center, 1981.

Session Chair, Gordon Conferences on Origins of Life (2005), Organic Geochemistry (2000), Chemistry and Physics of Isotopes (1986).
Speaker, Gordon Research Conferences on Chemistry and Physics of Isotopes (1984, 1988, 2006), Organic Geochemistry (1982, 2000).
Invited Speaker, Geological Society of Washington, Geological Society of America, American Chemical Society, American Geophysical Union, Estuarine Research Federation, Society for American Archaeology, International Society of Wetland Scientists, American Society of Limnologists and Oceanographers, NASA Astrobiology Institute

ADVISORY BOARDS AND COMMITTEES:

President, Biogeosciences Section, AGU, January 2015-January 2017
President Elect, Biogeosciences Section, American Geophysical Union, 2013-2014.
Chair, AGU Biogeosciences Fellows Selection Committee, 2013 and 2014.
Board of Directors, Geochemical Society, 2007-2009.
Member, Committee on Advanced Research Instrumentation, Committee for Science, Engineering and Public Policy, National Research Council, 2004-2005.
Member and Chair, Geochemical Society-Treibs Medal Committee: 1997-1999; Chair-1999. Nominating Committee: 1998-1999; Fellows Selection Committee, 2003-2005.
Member, Advisory Committee Carnegie Institution Dept. of Global Ecology, 2003-2005.
Member, Space Studies Board, National Research Council, 1997-2000; Executive Committee, 1998-2000.
Chair, Review Committee for NRC Space Studies Board, 2004.
Member, Committee on Origin and Evolution of Life, Space Studies Board, NRC, 2000-2002.
Member, Scientific Advisory Committee, Jug Bay Wetlands Sanctuary, 1992-2005.
Member and Chair, Best Paper Committee for Organic Geochemistry Division of the Geochemical Society, 1992-1994.
Member, Review Committee for Environmental Chemistry Laboratory, U. S. Dept. of Agriculture, Beltsville Research Station, 1994.
2nd Vice President, Geological Society of Washington, 1983; Corresponding Secretary, 1982, Meetings Secretary, 1981.

EDITORIAL AND REVIEW ACTIVITIES:

Member, Editor in Chief Search Committee for *JGR-Biogeosciences*, Spring 2014.
ELEMENTS Magazine, issue on Nitrogen and its BioGeoCosmo Chemical Cycling, October 2013
Panelist, NASA, Office of Space Science, Planetary Instrument Development Program, 1999; Exobiology, 2004.
Associate Editor, Editorial Board for *Astrobiology* (2003-2006).
Panelist, NSF for the Division of Earth Sciences & Behavioral Science: Environmental Geochemistry & Biogeochemistry, 1995; Professional Opportunities for Women panel, 1997; Life in Extreme Environments (LExEn), 2000; Archaeometry, 2003-2005; DUSEL subcommittee for Advisory Committee to GEO Directorate 2011.
Co-Editor, *Perspectives of Amino Acid Geochemistry*, 1998-2000.
Associate Editor, *Ancient Biomolecules*, 1996-1998.

EDUCATION AND OUTREACH:

Professor, Biogeochemsitry and Sustainability, Spring Quarter, UC Riverside, 2017.
Professor, Stable Isotope Ecology, Co-convened graduate and undergraduate class (ESS 192/ES 292), Spring 2014. Co-convened graduate and undergraduate class (ESS 105/ES 205) on Biogeochemistry, Fall 2014.
Mentored 28 postdoctoral fellows; mentored and/or served on University academic committees for 34 graduate students; trained undergraduates from more than 16 universities; supervised 18 high school students in research projects.
Professor, Fundamentals of Ecology, BIO/ESS 148, Spring 2013/2014, UC Merced.
Co-Organizer, Short Course on Stable Isotope Ecology, CADIC, Tierra del Fuego, Argentina, May 2013.
Co-Organizer, Short Course on Stable Isotope Ecology, CICIMAR, Mexico, February 2012.
Developed an educational website targeted at middle and high school students to learn about GIS and the paleoclimate of Australia: http://www.australiamegafauna.org/ The website features data collected in a study on the Paleoclimate of Australia (1994-2009) and used GIS technology to examine ecosystem changes over time.
Nifty Fifty Science Program organized by Lockheed Martin, October 2010, Spring 2012, and Winter 2014. http://www.usasciencefestival.org/theniftyfiftybios
Lecturer, Tracy Farmer Institute for Sustainability and the Environment, Univ. of Kentucky, Sept. 2010
Lecturer, Short Course in Geobiology, Univ. of Southern California, July 2010.
Co-Organizer, Short Course on Stable Isotope Ecology, University de la Plata, Argentina, March 2009.
Mentorship Program, Association for Women Geoscientists, 2008-present.
Member, Biology Curriculum Working Group for revising high school curriculum in Biology, Montgomery Country Public Schools, 2003-2004.
President, Rolling Terrace Elementary School PTA, 2001-2002.
Lecturer, Dartmouth College, Taught course on *Organic and Biogeochemistry*, November 1995.
Organizer and Lecturer, 1st Workshop on *Stable Isotopes in Ecology*, Marine Biological Laboratory, Woods Hole, MA, 1987.
Organizer and Lecturer, Short Course in *Organic Geochemistry*, sponsored by AGU, 1982.
Seminar Speaker: Univ. of Leeds, University of British Columbia, Johns Hopkins, Univ. of Maryland, Univ. of Virginia, Univ. of Delaware, Temple University, Dartmouth College, SUNY Syracuse, Woods Hole Oceanographic Institution, Marine Biological Lab, Univ. of Texas, UC Berkeley, UC Irvine, UC Davis, MacMaster Univ., Stanford, Northwestern Univ., Scripps Institution of Oceanography, Univ. of North Carolina, Univ. of South Carolina, Univ. of Colorado, RPI, SUNY Stony Brook, USGS, George Washington Univ., CIW Dept. of Plant Biology, Princeton, Yale, Texas A&M, DTM, Univ. of Maryland Horn Point Marine Lab, University of Maryland Solomons Marine Lab, JPL, Univ. of Southern California, Smithsonian Institution's SERC, Natural History Museum, and SCMRE, MD-

Dept. of Natural Resources, National Institutes of Health, University of Oslo, Rice University, Memorial University, Goddard Space Flight Center, Jug Bay Wetlands Sanctuary, University of Alaska, University of Minnesota-Duluth, Curtin University (Perth, Australia), East Carolina University, Arizona State University, UCLA, UC Riverside.

Volunteer, Special Olympics of D.C., Jug Bay Wetlands Sanctuary, Rolling Terrace Elementary School, Silver Spring International Middle School, Friends of Sligo Creek, 1993-present.

INTERNATIONAL EXPERIENCE:

- **Australia (1994-2010):** Collaboration with scientists from Australian National University. Fieldwork in ecology and paleo-ecology in Northern Territory, Western Australia, and Southern Australia. This project has been supported by four different NSF proposals.
- **Belize (1999-2011):** Collaboration with United States researchers from Smithsonian Institution, Univ. of Southern California, Univ. of Illinois, and University of Alaska on mangrove ecology and paleo-ecology. This work was supported by two NSF proposals.
- **Argentina (2009-2013):** Collaboration with graduate students from CONICET, Centro Austral de Investigaciones Cientificas. Two Ph.D. students have traveled to my laboratory to conduct research on dolphins and trout from Argentine coasts and rivers. In 2009 and 2013, I taught workshops on Stable Isotope Ecology at the National University.
- **Svalbard, Norway (2004-2015):** Collaboration with an team of scientists from Norway, Great Britain, Spain, Italy, and the United States to study Svalbard's ecosystems and geology as a Mars analogue environment. This study has been funded by NASA and includes scientists flying instruments on Mars Science Laboratory (MSL), and we work with the European space agency funded team for ExoMars.
- **India (2008-2010):** Collaborative research with scientists from M. L. Sukadia University in Udiapur, Rajasthan, India. In 2009, Fieldwork was conducted to study Precambrian formations of phosphorite.
- **Canada (2008-2011):** Collaborative work scientists at Memorial University of Newfoundland. Fieldwork to study ecosystem ecology of boreal forests, peatlands, and streams. Field work in Northern Quebec with Inuit guides.
- **Ethiopia (2015):** Collaborative work with team of archeologists, fire ecologists, soil scientists, and organic geochemists to under how human civilizations in the Horn of Africa were affected by climate change over the past 10,000 years.

CITATION METRICS (DECEMBER 2016; GOOGLE SCHOLAR)

All Fogel Citations: 13,343; h-index: 60; i10-index: 148

UNIVERSITY SERVICE (JANUARY 2013 TO 2016)

Member, Scoring Committee for UC Merced's 2020 Project, April-May 2016.

Member, Search Committee for Associate Vice Chancellor for Physical Operations, Planning, and Develoment, February-April 2016.
Undergraduate Chair, Earth System Science Major, January-June 2016.
Director, Environmental Analytical Laboratory, January 2013-August 2016.
Member, CAPRA (Committee on Personnel and Resource Allocation), AY 2013-2016.
Chair, Academic Unit, Life and Environmental Science Unit, AY July 2013-August 2016.
Co-Chair, Life Science Curriculum Committee, AY 2013-2016.
Member, Faculty Search Committee, Ecological Theory/Modeling and Evolutionary Biology searches, Spring 2014.
Member, Search Committee, University of California Extension UC Merced Scientist in Global Change research, Spring-Summer 2014.
Lecturer, ASCEND program for incoming freshman interested in Earth System Science Major, August 2013 and 2014.
Member, Executive Committee, Environmental Systems Graduate Group, AY 2013-2015.
Chair, Undergraduate Biology major (approx.. 1,200 students), January 2015-June 2016.

UNIVERSITY ACCOMPLISHMENTS (JANUARY 2013 TO PRESENT)

- Hired six new faculty for the Life and Environmental Sciences Academic Unit from July 2013 to June 2016.
- Co-authored a plan for strategic academic growth in the area of Sustainability in the Anthropocene.
- Built a state-of-the art laboratory for stable isotope analyses that is currently being used by UC Merced graduate and undergraduate students and faculty from all three schools.
- Retained two LES Faculty members and expedited their tenure review committees resulting in both positive tenure actions.
- Organized faculty at the Castle Research facility to help coordinate their move to the main campus.
- Wrote a strategic plan with bylaw unit faculty and graduate faculty to begin planning for a College of the Anthropocene (The time period when humans have inhabited the Earth).
- Started planning to increase enrollment in the Earth System Science and Ecology and Evolutionary Biology majors by speaking to incoming freshman, hosting informational sessions, and creating LES identity with a T-shirt and graduate reception.

PROPOSALS FUNDED SINCE 1995

Co-Investigator: California Dept. of Fish and Wildlife, *Informing and quantifying benefits of restoration in the Northern Delta Landscape: linking physical processes and food web dynamics*, Joshua Viers, PI. Amount & Period: $577,775 FY 16-18.

UCOP ILTI award to develop ESS 1 as online hybrid course. Piloted in fall with 50 students; ran in Spring with 90 students with online course materials and 2-hour labs, $135,000 with P. O'Day and M. Beman. Sept. 2014-June 2015.

Collaborator: NSF Critical Zone Observatory, Geobiology and Low Temperature Geochemistry Program, EAR: *Southern Sierra Critical Zone Observatory*: 1/9/2013-31/8/2018.

Principal Investigator: NSF Community and Population Ecology, BIO: *Collaborative Research: Extending the potential for hydrogen isotope tracers in ecology: experiments, biochemistry and field studies; 10/1/11-9/30/14,* Award Amount: $156,500.

Principal-Investigator with Weifu Guo (CIW), NAI Director's Discretionary Fund, *Multiple Sulfur Isotope Analysis of Organic Materials of Astrobiological Interest,* 09/1/10-08/31/12, NASA, Award amount: $38,000.

Co-Investigator with George Cody (CIW), NASA Astrobiology, *Astrobiological Pathways: From the Interstellar Medium through Planetary Systems, to the Emergence of Life*, 02/1/09-01/31/14. NASA, Award amount: $4,500,000

Co-Investigator with Andrew Steele (CIW), NASA ASTEP, *Arctic Mars Analog Svalbard Expedition Sample Return (AMASE), phase II,* 10/1/08-10/31/11. Award Amount $3,500,000

Carnegie of Canada Research Grant, *Food Web Dynamics in Boreal and Subarctic Watersheds of Newfoundland and Labrador*, 5/30/08-6/1/09. Award Amount: $6,500.

Principal Investigator, W. M. Keck Foundation, *Investigating the Biosphere's Roots in Deep Earth Geochemistry*, 9/1/07-8/31/10. Award Amount: $1.3 million.

Loewy Family Foundation, Support for an *Imaging Laboratory for Astrobiology*, 4/1/08 to 3/31/10. Award Amount: $49,000.

Co-Investigator with Jennifer Eigenbrode (Goddard Space Flight Center), NASA Mars Fundamental Research Program *Signatures of Life in Ice (SLIce): A Mars-analog investigation of the molecular signatures of life in surficial glacial ice*. $56K, FY 05-08.

Co-Investigator with George Cody. NASA Origins of the Solar System Program. *Investigating the chemical evolution of the early Solar System as recorded in extraterrestrial organic matter*. 9/1/07-8/31/09.

Co-Investigator with Daniel Glavin (NASA Goddard) NASA Exobiology, *Investigating the Distribution and Isotopic Composition of Purines and Pyrimidines in Carbonaceous Meteorites:* 6/1/07 to 5/31/09.

Co-Investigator with Eric Roden (PI, Univ. of Wisconsin), NAI Director's Discretionary Fund: *Biogeochemical Forensics of Fe-based Microbial Systems: Defining Mission*

Targets and Tactics for Life Detection on Mars, 7/1/07 to 6/30/08. Award Amount: $30K.

Co-Investigator with Hiroshi Ohmoto (PI, Penn State Univ.), NAI Director's Discretionary Fund: *Field Workshop on Biosignatures in Ancient Rocks* 7/1/07 to 6/30/08.

Principal Investigator: NSF Biocomplexity
Biocomplexity of Mangrove Ecosystems and the Effects of Fertilization: $1,205,000, FY 00-05.

Principal Investigator: NSF Earth System History
Collaborative Research: Identifying the Footprints of Human Colonization on Australian Ecosystems and Climate; $359K (total), FY 05-08.

Co-Investigator with Sean Solomon (PI): NASA Astrobiology Institute
Astrobiological Pathways: From the Interstellar Medium through Planetary Systems, to the Emergence of Life: $4,500,000, FY 03-08.

Co- Investigator with Andrew Steele (PI): NASA ASTEP
AMASE: Arctic Mars Analogue Svalbard Expedition: $3,100,000, FY 05-08.

Co-Investigator with Thomas Fischer (PI): USDA CREPS
Effects of Agricultural Conservation Practices on Nitrate Losses from Croplands of the Choptank River Basin: $90K (total), FY 05-07.

Co-Principal Investigator with Matthew Wooller (PI): NSF Ecosystems
Mangrove Paleoecological Responses During Holocene Sea Level Changes: A Multiproxy Approach: $56K (CIW portion), FY 05-08.

Principal Investigator: Smithsonian Institution Mellon Foundation
Anthropogenic nitrogen impact and cycling at the terrestrial-estuarine interface: $125,000, FY 01-03.

Principal Investigator: NSF Human Dimensions of Global Change
Megafauna Extinction, Ecosystem Disruption, and Climate Change in Australia: Assessing the Human Factor, $158,000, FY 00-03.

Principal Investigator: Special Research Initiative from the Office of the President, Carnegie Institution of Washington
Development of molecular recognition technology to search for life in the solar system: $25,000, FY 99.

Co-Investigator with Kenneth Nealson (PI, JPL): NASA Astrobiology Institute
Coevolution of Planets and Biospheres: Lessons from Earth and Mars: $415,000 (CIW), FY 98-03.

Co-Investigator with Sean Solomon (PI): NASA Astrobiology Institute
Hydrothermal systems: physical, chemical, and biological evolution and cosmic environments: $3,200,000, FY 98-03.

Co-Investigator with Wes Huntress (PI): Jet Propulsion Laboratory Grand Challenge
Development of sulfur isotope biosignatures: $100,000, FY 00-01.

Co-Investigator with Bernard Wood (PI, GWU): NSF IGERT
Integrative Human Evolutionary Biology, Graduate Research Training Program, FY 00-05.

Principal Investigator: NAI Augmentation Award
Acquisition of Laser-based Protein Detection Instrument and Development for Astrobiological Applications: $75,000, FY 00-03.

Principal Investigator: NSF Geology and Paleontology
Diagenetic Transformation of Plant Macromolecules: $25,000, FY 97-99.

Co-Investigator with George Cody (PI): NSF Instrumentation
Acquisition of an NMR spectrometer for Earth Science research: $285,000, FY 98-99.

Principal Investigator NSF Human Dimensions of Global Change
Drought in the Australian Outback: Milankovitch and Anthropogenic Forcing of the Australian Monsoon: $250,000, FY 97-00.

Principal Investigator Marine Ecosystem Research Program Delaware Sea Grant
Tracing Larval Blue Crab Development with Stable Isotope: $15,000 (CIW), FY 97-99.

Principal Investigator NSF Archaeometry
Light Stable Isotope Tracers of Paleobiochemistry: Moving Forward Conceptually and Backwards Temporally: $150,000, FY 95-98.

Principal Investigator NSF Human Dimensions of Global Change
Drought in the Australian Outback: Milankovitch and Anthropogenic Forcing of the Australian Monsoon: $75,000, FY 94-96.

PUBLICATIONS BY DATE (CITATIONS FROM GOOGLE SCHOLAR AS OF JULY 2016)

Estep (Fogel), M. L., J. E. Armstrong, and C. Van Baalen, 1975. Evidence for the occurrence of specific iron (III)-binding compounds in nearshore marine ecosystems. *Appl. Microbiol. 39*: 186-188. (54 Citations)

Estep, M. Fogel, F. R. Tabita, P. L. Parker, and C. Van Baalen, 1978. Carbon isotope fractionation by ribulose 1,5-bisphosphate carboxylase from various organisms. *Plant Physiology 61*: 680-687. (79 Citations)

Estep, M. Fogel, F. R. Tabita, and C. Van Baalen, 1978. Purification of ribulose 1,5-bisphosphate carboxylase and carbon isotope fractionation by whole cells and carboxylase from *Cylindrotheca* sp. (Bacillariophyceae). *J. of Phycology 14:* 183-188. (27 Citations)

Estep, M. Fogel and T. C. Hoering, 1979. Stable hydrogen isotope fractionation by microalgae. *Carnegie Institution of Washington Year Book 1977-1978*.

Estep, M. Fogel and H. Dabrowski, 1980. Tracing food webs with stable hydrogen isotopes. *Science 209*: 1537-1538. (105 Citations)

Estep, M. Fogel and T. C. Hoering, 1980. The stability of organically bonded hydrogen atoms in microalgae towards isotopic exchange with water. *Carnegie Institution of Washington Year Book 1978-1979*.

Estep, M. Fogel, 1980. Stable hydrogen isotope fractionation during mixotrophic growth of *Chlorella*, a unicellular green alga. *Carnegie Institution of Washington Year Book 1978-1979*.

Estep, M. Fogel and T. C. Hoering, 1980. Biogeochemistry of the stable hydrogen isotopes. *Geochim. Cosmochim. Acta 44*: 1197-1206. (157 Citations)

Estep, M. Fogel and T. C. Hoering, 1981. Stable hydrogen isotope fractionation during autotrophic and mixotrophic growth of microalgae. *Plant Physiology 67*: 474-477. (58 Citations)

Estep, M. Fogel, 1982. Isotopic composition of hydrogen and carbon in mat-forming, thermophilic algae and bacteria. *Carnegie Institution of Washington Year Book 1980-1981*.

Macko, S. A., M. Fogel Estep, and T. C. Hoering, 1982. Stable nitrogen isotopic composition of the nitrogen-fixing blue-green alga *Anabaena sp*. cultured on N_2 and nitrate. *Carnegie Institution of Washington Year Book 1981-1982*. (13 Citations)

Hoering, T. C. and M. Fogel Estep, 1982. Evaluation of a method for measuring the isotopic composition of oxygen in organic matter. *Carnegie Institution of Washington Year Book 1980-1981*.

Hare, P. E. and M. Fogel Estep, 1983. Carbon and nitrogen isotopic composition of amino acids in modern and fossil collagens. *Carnegie Institution of Washington Year Book 1982-1983*.

Macko, S. A., M. L. Fogel Estep, and W.-Y. Lee, 1983. Stable hydrogen isotope analysis of foodwebs on laboratory and field populations of marine amphipods. *J. Exp. Mar. Bio. Ecol. 72*: 243-249. (29 Citations)

Estep, M. L. Fogel, 1984. Carbon and hydrogen isotopic compositions of algae and bacteria from hydrothermal environments, Yellowstone National Park. *Geochim. Cosmochim. Acta 48*: 591-599. (37 Citations)

Estep, M. L. Fogel and S. A. Macko. 1985. Nitrogen isotope biogeochemistry of thermal springs. *Organic Geochemistry 6*: 779-785. (20 Citations)

Macko, S. A. and M. L. Fogel Estep, 1985. Microbial alteration of stable nitrogen and carbon isotopic compositions of organic matter. *Organic Geochemistry 6*: 787-790. (277 Citations)

Estep, M. L. Fogel and S. Vigg, 1985. Stable carbon and nitrogen isotope tracers of trophic dynamics in natural populations and fisheries of the Lahontan Lake System, Nevada. *Can. J. Fish. Aquat. Sci. 42:* 1712-1719. (123 Citations)

Macko, S. A., M. L. Fogel Estep, M. H. Engel, and P. E. Hare, 1986. Kinetic fractionation of stable nitrogen isotopes during amino acid transamination. *Geochim. Cosmochim. Acta 50*: 2143-2146. (313 Citations)

Macko, S. A., M. L. Fogel (Estep), P. E. Hare, and T. C. Hoering, 1987. Isotope fractionation of nitrogen and carbon in the synthesis of amino acids by microorganisms. *Chemical Geology 65:* 79-92. (439 Citations)

Guy, R. D., M. L. Fogel, J. A. Berry, and T. C. Hoering, 1987. Isotope fractionation during oxygen production and consumption by plants. *Progress in Photosynthesis Research III 9:* 597-600. (63 Citations)

Benner, R., M. L. Fogel, E. K. Sprague, and R. E. Hodson, l987. Depletion of ^{13}C in lignin and its implications for stable carbon isotope studies. *Nature 329:* 708-710. (856 Citations)

Cifuentes, L. A., M. L. Fogel, J. R. Pennock, J. H. Sharp, 1988. Seasonal variations in the stable nitrogen isotope ratio of ammonium in the Delaware Estuary. Ann. Rev. Dir., Geophys. Lab., Carnegie Inst. Washington Geophys. Lab., 114-122. (7 Citations)

Tuross, N., M. L. Fogel, and P. E. Hare, 1988. Variability in the preservation of the stable carbon and nitrogen isotope ratios of collagen in fossil bone. *Geochim. Cosmochim. Acta 52*: 929-935. (188 Citations)

Cifuentes, L. A., J. H. Sharp, and M. L. Fogel, 1988. Stable carbon and nitrogen isotope biogeochemistry of the Delaware estuary. *Limnol. Oceanogr. 33*: 1102-1115. (381 Citations)

Fogel, M. L., E. K. Sprague, A. P. Gize, and R. W. Frey, 1989. Diagenesis of organic matter in Georgia salt marshes. *Estuarine, Coastal Shelf Sci. 28*: 211-230. (70 Citations)

Fogel, M. L., Tuross, N, and Owsley, D. W., 1989. Nitrogen isotope tracers of human lactation in modern and archaeological populations. Annual Report of the Director of the Geophysical Laboratory, Carnegie Instn. Washington, 1990: 111-117. (281 Citations)

Koch, P. L., A. K. Behrensmeyer, N. Tuross, and M. L. Fogel, 1989. The fidelity of isotopic preservation during bone weathering and burial. Annual Report of the Director, Geophysical Laboratory, Carnegie Institution of Washington 1990: 105-110. (13 Citations)

Velinsky, D. J., L. A. Cifuentes, J. R. Pennock, J. H. Sharp, and M. L. Fogel, l989. Determination of the isotopic composition of ammonium-nitrogen at the natural abundance level from estuarine waters. *Marine Chemistry, 26:* 351-361. (104 Citations)

Cifuentes, L. A., M. L. Fogel, J. R. Pennock, and J. H. Sharp, 1989. Biogeochemical factors that influence the stable nitrogen isotopic ratio of dissolved ammonium in the Delaware Estuary. *Geochim. Cosmochim. Acta 23*: 2713-2721. (158 Citations)

Guy, R. D., J. A. Berry, M. L. Fogel, and T. C. Hoering, 1989. Differential fractionation of oxygen isotopes by cyanide-resistant and cyanide-sensitive respiration in plants. *Planta 177:* 483-491. (182 Citations)

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FIELD EXPERIENCE

2015: Aksum, Northern Ethiopia; Vernal Pool and Grassland Ecosystem, UC Merced; Svalbard, Norway
2013 and 2014: University of California, Vernal Pool and Grassland Ecosystem, UC Merced
2012-2013: Santeetlah Creek Watershed, North Carolina
2011: Belcher Islands and Richmond Gulf, Northern Quebec, Canada; Carrie Bow Cay Marine Sanctuary and Twin Cayes, Belize.
2010: Paleodunes, N. of Carnarvon-Exmouth, Western Australia; Svalbard, Norway.
2009: San Jacinto Wilderness Area, California; Aravalli Supergroup Phosphorite Deposits, Rajasthan, India.
2008: Spanish Cay, Belize; Boreal Forests and Stream, Western Newfoundland, Canada; **Chief Scientist**, R/V Lance, Norwegian Polar Institute, AMASE Expedition, August 2008.
2007: AMASE Expedition, Svalbard, Norway; South Australia, Northern Territory, Australia; Sudbury Impact Crater and Precambrian Formations, Canada
2006: AMASE Expedition, Svalbard, Norway; Lake Frome region, NSW Australia
2005: AMASE Expedition, Svalbard, Norway; Spanish Cay, Belize
2004: Twin Cays and Associated Islands, Belize; Svalbard, Norway (AMASE Expedition: Arctic Mars Analog Svalbard Expedition)
2003: Twin Cays and Associated Islands, Belize; Agricultural lands, Eastern Shore, Delaware & Maryland
2002: South Western New South Wales, Paleolakes, Australia; KC-135 Reduced Gravity Flight Program, Johnson Space Center.
2000, 2001, 2002: Nanticoke River and Eastern Shore of Chesapeake Bay Watershed.
2001: Wolfe Creek Meteorite Crater, Western Australia
2000, 2002: Twin Cays, mangrove islands, Belize.
1994, 1998, and 1999: Outback Australia, Northern Territory and West Australia.
1993, 1994, and 1995: Research Cruises, **Chief Scientist**, R/V Cape Hatteras, Sargasso Sea.

STUDENTS AND POSTDOCTORATES SUPERVISED OR ADVISED

POSTDOCTORAL FELLOWS OR ASSOCIATES:

Stephen Macko (1980-1982)
Topic: Stable nitrogen isotopes in geochemical systems.
Currently **Professor, Univ. of Virginia**.

Thomas Stafford (1983-1986)
Topic: Stable and radioactive tracers in bones.
Currently **President, Stafford Research Laboratories, Colorado**.

Luis Cifuentes (1987-1990)
Topic: Nitrogen isotope biogeochemistry of estuaries.
Currently **Vice President for Research, Texas A.& M. University Corpus Christi**.

David Velinsky (1988-1991)
Topic: Nitrogen isotope biogeochemistry of estuaries.
Currently **Dept. Head and Professor, Drexel University.**

Paul Koch (1989-1993)
Topic: Stable isotope tracers in archaeology and paleontology.
Currently **Dean of Science and Professor, Univ. of California, Santa Cruz.**

Gray Bebout (1989-1992)
Topic: Nitrogen isotope systematics in metamorphic rocks.
Currently **Professor, Leigh University.**

Carmen Aguilar (1992-1995)
Topic: Stable nitrogen isotope tracers of atmospheric deposition
Currently a **Research Associate Professor at University of Wisconsin**.

Herve Bocherens (1992-1994)
Topic: Isotopic tracers in archeology and paleontology
Currently **Professor, University of Tubingen, Germany**.

Alesandra Barelli (1994-1996)
Topic: Microcarbon in snow from the Arctic
Currently a **Director of Chemistry, Rehau Corporation, Virginia.**

Beverly Johnson (1995-1996)
Topic: Australian paleoclimate studies.
Currently **Chair and Associate Professor at Bates College, Maine**.

Mark A. Teece (1995-1999)
Topic: Organic geochemistry and compound specific isotope analysis.
Currently an **Associate Professor at SUNY-Syracuse**.

Jay Brandes (1996-1998)
Topic: Prebiotic chemistry and astrobiology
Currently an **Associate Professor at Skidaway Institute of Marine Science**.

James H. Scott (1999-2001) Deceased 2010.
Topic: Astrobiology and microbial metabolism
Assistant Professor at Dartmouth College, August 2006.

Albert Colman (2002-2004)
Topic: Oxygen isotopes in phosphates and other biosignatures.
Currently **Assistant Professor University of Chicago.**

Matthew McCarthy (2000-20001)
Topic: Dissolved organic matter in the ocean.

Currently an **Associate Professor at UC, Santa Cruz.**

Diane O'Brien (2000-2002)
Topic: Isotopic tracers in insects
Currently **Assoc. Professor at University of Alaska.**

Susan E. Ziegler (1998-1999)
Topic: Stable isotope tracers of microbial ecology
Currently **Canadian Chair in Earth Sciences, Memorial University, Canada**.

Matthew Wooller (2000-2002)
Topic: Stable isotopes in ecology and paleoecology
Currently **Professor, University of Alaska** and **Director of Alaska Stable Isotope Facility.**

Timothy Filley (2000-2002)
Topic: Organic geochemistry, stable isotope fractionation by fungi
Currently **Professor, Purdue University**.

Jennifer Eigenbrode (2004-2006)
Topic: Biomarkers in rocks and biological material.
Ph. D. from Penn State University.
Currently **Space Scientist, Goddard Space Flight Center**.

Shuhei Ono (2003-2007)
Topic: Mass Independent Sulfur and Carbon Cycling in Precambrian Rocks.
Currently: **Assoc. Professor MIT Earth, Planetary and Atmospheric Sciences**

Penny Morrill (2005-2007)
Topic: Distinguishing biotic from abiotic carbon.
Ph. D. from University of Toron
Currently **Asst. Professor, Memorial University**

Seth Newsome (2006-2009)
Topic: Stable isotope ecology of mammals and birds.
Ph. D. from University of California at Santa Cruz.
Currently **Asst. Professor, University of New Mexico.**

Dominic Papineau (2006-2009)
Topic: Nitrogen, Carbon, Phosphorus cycles in the Precambrian.
Ph. D. from University of Colorado.

Weifu Guo (2009-2010)
Topic: Mass independent sulfur isotope fractionation in SO_2
Ph. D. from Caltech.
Currently **Asst. Scientist, Woods Hole Oceanographic Institution.**

Ying Wang (2009-2011)
Topic: Intramolecular Hydrogen Isotope Fractionation in Lipids
Ph. D. from Caltech.
Currently **Research Scientist, Georgia Tech.**

David Baker (2010-2013)
Topic: Biogeochemistry of Corals
Ph. D. from Cornell University.
Currently **Asst. Professor, Hong Kong University.**

Hillary Christensen (2012-2013)
Topic: Stable carbon and oxygen isotopes in fossil teeth
Ph. D. from University of Chicago.
Currently **Asst. Professor, Gustavas Adlophus Univ.**

Christina Bradley (2013-present)
Topic: Compound specific stable isotopes in amino acids
Ph.D. from University of Hawaii
Currently (August 2016): **Asst. Professor Salisbury University, Maryland**

Elizabeth Williams (2015-present)
Topic: Stable isotopes in soil organic matter
Ph.D. from Tulane University

GRADUATE STUDENTS:

Kent Sprague, M. S. Advised, University of Georgia, 1984-1986.
Topic: Diagenesis of organic matter in Georgia salt marshes.

Kevin Mandernack, Ph.D. Committee, University of California, Scripps Institution of Oceanography, 1988-1993;
Topic: Oxygen isotope fractionation during manganese oxide mineral formation by bacteria and non-biological processes.
Currently **Chair and Professor, Indiana University at Indianapolis.**

Matthew Hoch, Ph.D. Committee, University of Delaware, College of Marine Studies, 1988-1992,
Topic: Isotope fractionation of ammonium by microbes in the Delaware estuary.
Currently **Associate Professor, Lamar University.**

Beverly Johnson, Ph. D. Committee, University of Colorado, 1991-1995;
Topic: Ostrich eggshells: isotopic compositions reflect paleoecology and climate.

James Shores, M. S. Committee, University of North Carolina, 1993-1995,

Topic: Study of Zooplankton and how their growth is affected by atmospheric deposition into Coastal North Carolina.
Currently **Instructor of Environmental Science, Montreat College, NC**.

Susan Ziegler, Ph.D. Committee, University of Texas, Marine Science Institute, 1995-1998;
Topic: Cyling of Dissolved Organic Matter in estuarine environments.

Herve Bocherns, Ph. D. Committee, University of Paris, 1992;
Topic: Carbon and Nitrogen isotope tracers of fossil human animals from Europe.

Katherine Shawl, M. S. Advised, Northwestern University, Dept. of Chemistry, 1997-1998.
Topic: Isotope fractionation during collagen and apatite formation in human bone cell cultures.

Matthew McCarthy, Ph. D. Advised, University of Washington, Dept. of Oceanography, 1997-1998;
Topic: Dissolved organic matter cycling in the Ocean.

Matthew Fantle, Advised, Dartmouth College, 1997-1998,
Topic: Isotopic fractionation studies of the blue crab.
Currently **Assistant Professor at Penn State** with Ph. D. from UC Berkeley.

Erika Clesceri, Ph. D. Committee, University of North Carolina, Institute of Marine Sciences, 1999-2003;
Topic: Nitrogen isotope fractionation during hurricanes on the North Carolina Coast
Cuurently **Environmental Protection Specialist, USAID/DCHA/FFP/PTD, Washington, D.C**.

Felicitas Weidemann, Ph. D. Committee, George Washington University, Dept. of Anthropology, 1999-2003;
Topic: Temporal resolution of stable isotope values in mammalian teeth.
Currently **Research Fellow at Forsyth Institute of Dental Science.**

Sean Pack, M. S. Committee, University of Colorado, INSTAAR, 1999-2000;
Topic: Stable carbon isotopes in carbonates and organic matter from Lake Gregory, Western Australia.
Currently a **Professional Scientist, INSTAAR, University of Colorado.**

Kevin Boyce, Ph. D. Advised, Harvard University, Dept. of Organismal and Evolutionary Biology, 1999-2000;
Topic: Paleobiology of earliest land plants.
Currently an **Associate Professor University of Chicago**.

Albert Colman, Ph. D. Advised, Yale University, Dept. of Earth Sciences, 1999-2002

Topic: Oxygen isotopes of phosphate in marine and riverine systems.

Simon Clarke, Ph. D. Committee, Woollangong University, Australia, 2000-2003;
Topic: Studies of paleoecology and climate in ratites and other birds using amino acid racemization and stable isotopes.

Dominic Papineau, Ph. D. Committee, University of Colorado, 2003-2006;
Topic: Nitrogen and Sulfur isotope studies of the Precambrian.

Katherine Cooney, M. S. Committee, University of Maryland, 2003-2005;
Topic: Nitrogen and oxygen isotope tracers in nitrates from precipitation.

Maia Schweizer, D. Phil. Advised, Oxford University, 2004-2006;
Topic: Studies on the earth's earliest embryos.

David Johnston, Ph. D. Committee, University of Maryland, 2004-2007;
Topic: Mass Independent Sulfur isotope fractionation by microbes.
Currently a **Asst. Professor at Harvard University**.

Paula Zelanko, Advised, University of Maryland, 2005,
Currently a **Mass Spectrometer Technician Philadelphia Academy of Natural Sciences.**.

Stephanie Gudeman, M. S. Committee & Advisor, Texas A & M University, 2004-2006;
Topic: Nitrogen cycling in decomposing mangrove trees.

Rachel Schelbe, Ph. D. Advised, Univ. of Southern California, 2005-2006;
Topic: Carbon cycling in manganese deposits from the Precambrian.
Currently **Research Geochemist, Exxon.**

Isabel Romero, Ph. D. Committee, Univ. of Southern California, 2004-2009.
Topic: Carbon and nitrogen cycling in mangrove sediments as mediated by roots.
Currently Postdoctoral Researcher University of South Florida.

Brett Murphy, Ph. D. External Reviewer, Charles Darwin University, 2006-2007.
Topic: Stable isotopic compositions of plants and kangaroos as they relate to climate on the Australian continent.

Amanda Henry, Ph. D. visiting student. George Washington University, 2007.
Topic: Carbon and oxygen isotopes in tooth enamel.

Bianca Mislowk Silver, Ph. D. Committee and Reader, Princeton University, 2004-2008.
Topic: The Nutritional and Energetic Constraints on Life in the Deep Biosphere of the South African Gold Mines. Currently, **Research Scientist, Exxon Mobil**.

Kelton McMahan, Ph. D. Committee, Woods Hole Oceanographic Inst., 2007-2010.

Topic: Compound Specific Isotope analysis of Amino acids in fish ootoliths.

Christoper Florian, M.S. Committee. University of Colorado, 2009-2011.
Topic: Paleoclimate of Arctic Lakes.

Ana Laura Liberoff, Ph. D. visiting student, Grupo de Estudios de Samónidos Anádromos, Centro Nacional Patagónico – CONICET, Argentina, 2009-2010.
Topic: Trophic studies of trout in Argentinian rivers

Charlotte Oskam, Ph.D. visiting student, Murdoch University, Perth, Australia, 2010.
Topic: Stable isotopic compositions of moa from archeological sites in New Zealand

Patrick Griffin, M.S., Student, Johns Hopkins University, 2009.
Now at Indiana Univ.
Topic: High pressure microbiology and stable isotopes in amino acids.

Derek Smith, Ph.D. Student, Dartmouth College, 2010-2013.
Topic: Geomicrobiology of purple sulfur bacteria.
Currently **Postdoc at Washington Univ. St. Louis.**

Nicole DeBond, M.S. Student, Memorial University, Newfoundland, Canada, 2010-2012.
Topic: Hydrogen isotope exchange in environmental samples.

Joy McDermot, M. S. Student, UC Merced, 2014 to present.
Topic: Stable isotope studies of American Kestrels on California grasslands

Jonathan Nye, Ph.D. Student, UC Merced, 2014 to present.
Topic: Paleoecology of marine mammals in Patagonia, Argentina

Daniel Toews, M. S. Student, UC Merced, 2015
Topic: Vernal Pools plants and biogeochemistry

Bobby Nakamoto: Ph.D. Student, UC Merced, 2016.
Topic: Stable isotope biogeochemistry of amino acids

UC MERCED UNDERGRADUATE AND POSTGRADUATE INTERNS AND ASSISTANTS:

David Araiza (B.S. UC Merced, July 2013-present)
Bobby Nakamoto (Student Assistant, Sept. 2013-present)
Maria C. Vega (B.S. UC Merced, Sept. 2014-Nov. 2014)
Daniel Toews (Intern, Independent Study, Fall 2014)
Adrian Garibay, Margarita Morelos, and Sam Huscher (Interns, Fall 2014)
Peter Nguyen (Intern, Spring-Fall 2015)
Isabel Lawrence (Summer 2015)
Samuel Lopez and Vanessa Avalos (Spring 2016-Summer 2016)

UC MERCED GRADUATE STUDENT COMMITTEES: (2013-2016)

Rebecca Lever, Ph. D. Soil Biogeochemistry
Kimber Moreland, Ph.D., Soil Biogeochemistry
Nathaniel Fox, Ph.D., Paleontology
Holly Swift, Ph.D., Scyphozoan Biology
Sarah Aboud, M.S., Scyphozoan Biology
Liza Gomez-Daglio, Ph.D., Scyphozoan Biology
Elisabet Perez Coronel, Ph.D., Microbiology
James Stinecipher, Ph.D., Global Biogeochemistry
Danaan DeNeve Weeks, Ph.D., Quantitative Systems Biology
Nathaniel Bogie, Ph.D., Agricultural Hydrology
James Kupihea, PhD., Microbial Biogeochemistry

RESEARCH INTERNS AT CARNEGIE INSTITUTION:

18 HIGH SCHOOL INTERNS:
2008-2009: Brendan O'Connor (Univ. of Rhode Island); Evan Swarth (Graduated UConn 2013; Now at Whitman Walker Health, Washington, DC), and Nick Smith-Herman (Now at Gettysburg College)
2009-2010: Hannah Moore, Albert Einstein High School, (Univ. of Texas 2010)
2012-2013: Emily Bertot (Matriculating Univ. of Maryland, Sept. 2013)

UNDERGRADUATE INTERNS from the following colleges and universities:
Haverford College, Northwestern University, Dartmouth College,
Yale University, University of Chicago, St. Mary's College,
Univ. of South Carolina, Western Maryland College, University of Maryland,
Princeton University, UC Berkeley and Caesar Chavez High School Faculty,
Carleton College, Wellesley College, American University, Brandeis University,
Lafayette University, Emory University, UC Merced, Univ. of Connecticut

CURRENT/RECENT EXTERNAL COLLABORATORS:

Gary Graves, Smithsonian Institution; Gifford Miller, University of Colorado, INSTARR; John Magee, Australian National University; Christopher Swarth, UC Merced; Valery Terwilliger, Univ. of Kansas; Noreen Tuross, Harvard University; Daniel Glavin, Pamela Conrad and Jen Stern, Goddard Space Flight Center; Liane Benning, University of Leeds; Susan Ziegler and Penny Morrill, Memorial Univeristy; Jennifer Eigenbrode, Goddard Space Flight Center; Matthew Wooller, University of Alaska; Seth Newsome, University of New Mexico; Michael Bunce, Murdoch University, Australia; Nathan Wolf, University of Alaska; Andrew Steele, George Cody, Dionysis Foustoukos, Bjorn Mysen, Roxane Bowden, Geophysical Laboratory, Carnegie Institution of Washington; Luciana Riccialdelli, Danielle Fernandez, CADIC, Argentina; Ana Liberoff, CENPAT, Argentina; Joshua Viers, UC Merced.