

Christopher M. Fedo
McSween Chair of Earth and Planetary Sciences

Contact & Bio

Department of Earth & Planetary Sciences

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Google Scholar: <https://scholar.google.com/citations?user=9LoYUcwAAAAJ&hl=en&oi=ao>

Education

Ph.D. (1994), Virginia Polytechnic Institute and State University; major field: Geology; advisor: Dr. K.A. Eriksson; Degree conferred: 17 December 1994.

M.S. (1990), Vanderbilt University; major field: Geology; advisor: Dr. J.M.G. Miller; Degree conferred: 10 August 1990.

B.S. (1988), California State University, Fullerton; major field: Geology; advisor: Dr. J.D. Cooper; Degree conferred: 19 August 1988.

Experience

2013-present: **Professor**, with tenure, *University of Tennessee, Knoxville*

2006-2013: **Associate Professor**, with tenure, *University of Tennessee, Knoxville*

2005-2006: **Assistant Professor**, *University of Tennessee, Knoxville*

2002-2005: **Associate Professor**, with tenure, *The George Washington University*

1996-2002: **Assistant Professor**, *The George Washington University*

1994-1996: **Postdoctoral Fellow**, *University of Western Ontario*, Advisor: Dr. Grant M. Young

Competitive Grants and Awards Received

2018, NASA Exobiology and Evolutionary Biology, \$695,014; “Soil development, braidplain deposition, and potential terrestrial colonization in the Cambrian of eastern California”; 8/1/18 – 7/31/21.

2016, NASA Mars Science Lab - Participating Scientist Program 2, \$419,377, “Analysis of the rocks at Mount Sharp and vicinity, Gale Crater using an integrated stratigraphic, petrologic, and geochemical approach”; 4/1/16 – 3/31/20.

2013, National Science Foundation, \$40,007; “Collaborative Research: The Provenance of “Grenville” age detrital zircon in western North America and the Neoproterozoic to early Paleozoic evolution of southwestern Laurentia”; 5/1/13 – 4/30/15.

2013, NASA Mars Fundamental Research Program, \$176,466; “Resolving basaltic sediment characteristics from 2D images using known 3D data: interpreting Mars surface processes from lander imagery”; 5/1/13 – 4/30/16.

2009, NASA Astrobiology: Exobiology and Evolutionary Biology, \$308,154; “Geochemical investigation of Precambrian Banded Iron Formation (3.8 – 1.9 Ga)”; 5/1/09 – 4/30/12.

2008, University of Tennessee Professional Development Award, \$4998; “Effects of hydrodynamic sorting on bulk composition in terrestrial basaltic weathering profiles and

sediments: an analog for understanding the structure and habitability potential of the Martian critical zone; 6/1/08 – 5/30/09.

- 2004, Recipient of a J. William Fulbright Fellowship. ~ SEK 80,000; “Preservation of Earth's First Life: Geological and Geochemical Constraints” Swedish Museum of Natural History; 5/31/05 - 9/1/05.
- 2003, North Atlantic Treaty Organization (NATO) (979801), \$8,000; “Radionuclide incorporation into the structure of carbonate minerals”; 6/03 – 6/04.
- 2001, National Geographic Society, Committee for Research and Exploration (7066-01), \$2,000; “Reconstruction of Earth’s earliest paleogeography”; 6/01 - 8/01.
- 2000, George Washington University, Junior Scholar Incentive Award, \$5,000.
- 1999, National Science Foundation (EAR-9909308), \$129,994; “Deciphering the interconnected roles of climate and tectonics in reconstructing the early evolution of a rifted continental margin”; 1/00 - 12/02.
- 1998, National Geographic Society, Committee for Research and Exploration (6257-98), \$25,265; “Reconstruction of Earth’s earliest paleogeography”; 7/98 - 8/01.
- 1998, American Chemical Society - Petroleum Research Fund (33251-G8), \$20,000; “Paleoenvironmental and sequence stratigraphic analysis of a mixed siliciclastic and carbonate platform”; 5/98 - 8/00.
- 1998, George Washington University, University Facilitating Fund, \$12,000; “Paleoenvironments and the emergence of life on Earth”; 7/98 - 6/99.
- 1998, Danish Statens naturvidenskabelige Forskningsråd, Peter Appel P.I., ~DKR3,000,000 (~\$300,000); “Isua Multidisciplinary Research Project (IMRP)”; 1998-2001.
- 1997, George Washington University, University Facilitating Fund, \$11,093; “Evolving record of paleoclimate across the Precambrian - Cambrian boundary”; 1/97 - 5/98.
- 1996, NSF Earth Sciences Postdoctoral Research Fellowship (\$72,000; fellowship declined); “Impact of paleoweathering intensity and provenance on the petrogenesis of a Lower Cambrian arkose-quartzarenite couplet: geochemical and isotopic constraints”.
- 1991, National Science Foundation (EAR-9104876); K.A. Eriksson P. I., \$92,295; “Archean Sedimentation Adjacent to an Orogenic Belt-Examples from Zimbabwe with Implications for Archean Tectonics”; 5/91 - 5/95.
- 1991, American Chemical Society-Petroleum Research Fund; J.D. Cooper P. I., \$20,000; “‘Sheets’ or ‘shingles’?: a case study on the origin of laterally extensive sandstones of an early stage continental margin”.

Awards and Distinctions

2021, Elected *Fellow of the Geological Society (London)*

2019, Elected *Fellow, American Association for the Advancement of Science (AAAS)*

2019, Selected as inaugural recipient of the *McSween Chair of Earth and Planetary Sciences*, University of Tennessee, Knoxville

2013, Graduate Faculty Teaching Award, Dept. Earth & Planetary Sciences, University of Tennessee, Knoxville

2010, Elected *Fellow, Geological Society of America*

2004, Selected to receive a J. William Fulbright Fellowship
1997, Promoted to Full Member, Sigma Xi
1994, Selected as a Postdoctoral Fellow at the University of Western Ontario
1992, Selected to receive the *SEPM SED (Student Excellence and Development) AWARD* by the SEPM
1991, Selected to receive the *Promising Young Geoscientist Award* by the SEPM
1988, Nominated to participate in the USGS-NAGT Cooperative Field Training Program
1988, Elected as an Associate Member of Sigma Xi

Research Interests

Specific problems of interest to me include: Precambrian sedimentology and basin analysis; geochemical signatures of weathering in modern environments; use of geochemistry for determining provenance, paleoweathering, and diagenetic conditions; early evolution of life and planetary habitability; facies and sequence stratigraphic analysis of siliciclastic deposits; sedimentary petrography; tectonics and sedimentation of rifted margins; geologic mapping; Planetary science, particularly the sedimentology and geochemistry of sediments on Mars.

Professional Societies

Geological Society of America • SEPM (Society for Sedimentary Geology) • International Association of Sedimentologists • American Geophysical Union • Geochemical Society

Service

- Have served as a referee for the following:

Journals: Sedimentology, Journal of Sedimentary Research, Geological Magazine, Chemical Geology, South African Journal of Geology, Australian Journal of Earth Sciences, Precambrian Research, Science, Geology, Geological Society of America Bulletin, American Mineralogist; Geochimica et Cosmochimica Acta, MSA-Reviews in Mineralogy, Earth & Planetary Science Letters, Geosphere, Gondwana Research, Journal of Sedimentary Research

Granting Agencies: US National Science Foundation, American Chemical Society - Petroleum Research Fund, NASA Astrobiology Institute, NASA Exobiology Program, NASA Mars MSL-PSP Program, NSERC – Canada

- 2020, Panel Member, NASA Exobiology/Evolutionary Biology Program
- 2018, Panel Member, NASA Exobiology/Evolutionary Biology Program
- 2017-present, Member, Precambrian Subcommittee, International Commission on Stratigraphy
- 2013-2015, Co-Editor-in-Chief, *Precambrian Research*
- 2000-2013, Board of Associate Editors, *Precambrian Research*
- 2011-2013, Board of Associate Editors, *Geosphere*
- 2014, Panel Lead, NASA Exobiology/Evolutionary Biology Program
- 2013, Panel Member, NASA Exobiology/Evolutionary Biology Program
- 2011, Panel Member, NASA Mars Science Lab – Participating Scientist Program
- 2006, Panel Member, NASA Exobiology/Evolutionary Biology Program

- 2004, Panel Member, NASA Exobiology/Evolutionary Biology Program
- 2003, Panel Member, NASA Astrobiology Institute
- 2002-2003, Chair, Geobiology & Geomicrobiology Division, Geological Society of America
- 2002, Panel Member, National Science Foundation, “Geology and Paleontology” Program
- 2002, Steering committee member, National Science Foundation, “Biogeosciences” Program
- 2001-2002, First Vice Chair, Geobiology & Geomicrobiology Division, Geological Society of America
- 2000, Co-founder Geobiology & Geomicrobiology Division, Geological Society of America
- 2000, Panel Member, National Science Foundation, “Life in Extreme Environments” Program
- 2000-2001 Past Chair, Sedimentary Geology Division, Geological Society of America
- 1999-2000 Chair, Sedimentary Geology Division, Geological Society of America
- 1998-1999 First Vice Chair, Sedimentary Geology Division, Geological Society of America

Graduate Student Supervision

Catherine Trewhella, M.S., current

Title: in development

Constance Cooper, M.S., current

Title: in development

Morgan Lewis, Ph.D., current

Title: in development

Kristan Watkins, M.S., current

Title: Development of a weathering profile in the Stepladder Mountains, Mojave Desert, southeastern California

Samantha Gwizd, Ph.D., current

Title: Sedimentary environments, paleoweathering, and provenance analysis of part of the Murray formation, Gale crater, Mars

Jason G. Muhlbauer, Ph.D., 2021

Title: Architecture element analysis and depositional model for pre-vegetated braidplain and braid delta environments: investigation of the Cambrian middle member Wood Canyon Formation southeastern California and modern analogs

Mariana B. Bonich, Ph.D., 2016 (Syracuse University)

Title: The Stepladder Effect: Application of radiogenic isotopes and detrital zircons as provenance discriminators

F. Christopher Driscoll, M.S., 2016

Title: Understanding the controls on the composition of siliciclastic sediment: implications for compositional deviations from source after limited transport in an arid setting

Mary A. Eibl, M.S., completed 2016

Title: Resolving Sediment Characteristics from 2D Images: A Mars-Analog Comparative Textural Analysis Using Known 3D Data

Jason G. Muhlbauer, M.S., 2015

Title: Comparison of detrital-zircon age spectra from multiple samples in a single fluvial channel: A case study from the Cambrian Wood Canyon Formation, southeastern

California

Latisha A. Brengman, Ph.D., 2015

Title: Geochemical and isotopic characteristics of Precambrian primary and secondary chert

Melissa M. Hage, Ph.D., 2015

Title: Examining banded iron formation through petrographic, geochemical, and iron isotopic analyses

Ian O. McGlynn, Ph.D., 2012 (co-advised with H.Y. McSween)

Title: Formation and alteration of basaltic soils on Mars

Aubrey L. Modi, M.S., 2011

Title: Processes controlling the composition of first-cycle sediments deposited in an arid-climate, with implications for provenance reconstruction studies

Eric G. Hogan, M.S., 2010

Title: Reassessment of the Basal Sauk Supersequence Boundary across the Laurentian Craton-Margin Hinge Zone, Southeastern California

William A. Schoenborn, Ph.D., 2009

Title: Geochemistry of the Neoproterozoic Johnnie Formation and Stirling Quartzite, southern Nopah Range, California: Deciphering the Roles of Climate, Tectonics, and Sedimentary Process in Reconstructing the Early Evolution of a Rifted Continental Margin

Melissa M. Hage, M.S., 2006

Title: Biomarker and stable isotope characterization of coastal pond organic matter, McMurdo Dry Valleys, Antarctica

Robert D. Crangle, M.S., 2002

Title: Paleoenvironmental and Sequence Stratigraphic Analysis of the Middle Member Stirling Quartzite, a Neoproterozoic Mixed Siliciclastic and Carbonate Platform, Southeastern California

INVITED LECTURES

2020: University of Tennessee, Knoxville

2018: Rice University

2017: University of Memphis
Stony Brook University

2011: Gordon Research Conference, – Geobiology, Invited lecture
Syracuse University

2009: University of Tennessee, Knoxville

2008: James Madison University

2007: University of Western Ontario
University of Kansas

Pratt Institute

2006: Virginia Tech
Memorial University of Newfoundland

2005: Royal Society of London Discussion Meeting "*Major steps in cell evolution: palaeontological, molecular and cellular evidence of their timing and global effects*" (c
University of Tennessee, Knoxville

- University of Wyoming
- 2004: University of Oklahoma
Roger Williams University
- 2003: Binghamton University
University of Rhode Island/Graduate School of Oceanography
Smithsonian Institution, National Museum of Natural History, Dept. Mineral Sciences
University of Freiburg, Germany; lecture as part of an MSA short course on “zircon”
- 2002: Washington State University
Paleontological Society of Washington
Hofstra University
Carnegie Institute of Washington, Dept. of Terrestrial Magnetism
Geological Society of Washington
George Washington University, Dept. of Chemistry
George Washington University, Dept. of Earth & Environmental Sciences
- 2001: Virginia Tech
- 2000: University of Colorado, Boulder
University of Nevada, Las Vegas
Smithsonian Institution, National Museum of Natural History, Dept. Mineral Sciences
- 1999: Bryn Mawr College
- 1998: University of Maryland
George Washington University
- 1997: William & Mary
Argonne National Laboratory
- 1996: George Washington University
Geological Society of Washington
- 1995: Rensselaer Polytechnic Institute
California State University, Long Beach
California State University, Fullerton
- 1994: University of Western Ontario
- 1993: University of Zimbabwe
Massachusetts Institute of Technology
California State University, Fullerton
- 1992: University of Zimbabwe

MEDIA COVERGE

- 10 March 2005 *Nature* News and Views, “Dating earliest life” by Stephen Moorbath, v. 434, p. 155.
- March 2005 *Geotimes*, “Rocky Debate over Early Life” by Sarah Pratt
- 21 January 2005, *Le Figaro*, “Controverse sur les plus anciennes traces de vie” by Cyrille Vanlerberghe
- 15 July 2004 *Nature*, “Its Life... isn’t it?” by John Whitfield, p. 288-290
- 17 June 2004 *Nature*, “Fresh study questions oldest traces of life in Akilia rock” by Rex Dalton
- April 2003 *Scientific American*, “Questioning the oldest signs of life” by Sarah Simpson
- 22 February 2003 *NewScientist*, “Proof of life” by Jon Copley
- November 2002 *Geotimes*, “Debating evidence for early life” by Salma Monani
- 4 June 2002 *New York Times*, “Dusted for life’s fingerprints, rocks fail” by Kenneth Chang

- 3 June 2002 *Dallas Morning News*, “Greenland rocks too hot for life, researchers contend” by Alexandra Witze
- June 2002 *Geotimes*, “Dispute over first rocks fit for life” by Christina Reed
- 24 May 2002 *Science*, News Focus “Reversals reveal pitfalls in spotting ancient and E.T. life” by Richard Kerr, p. 1384-1385
- 23 May 2002 astrobiology.com
- 23 May 2002 CNN.com, “New look at old rock questions evidence of earliest life” by Marsha Walton
- 23 May 2002 nationalgeographic.com, “New analysis throws age of life on Earth into doubt” by Ben Harder
- 23 May 2002 News article distributed globally via *Associated Press*, “Evidence of earliest life disputed” by Paul Recer