

B. Kathleen Kitts

Northern Illinois University
Assistant Professor
Teacher Certification Coordinator
Department of Geology and Environmental Geosciences
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Current Position: *Assistant Professor, Teacher Certification Coordinator and Genesis Science Team Member.* Scientific research interests include cosmochemistry emphasizing the formation and evolution of the early solar system. Pedagogical research interests include inquiry, professional development and improving instruction in the large college classroom.

Previous Research Experience:

- 2002-2004 *Post Doctoral Student.* Developed a system to determine the initial strontium isotopic composition of the sun by analyzing the Sr isotopic composition of the implanted solar wind-bearing component in lunar soils in order to establish a baseline for the Rb-Sr chronometer. Advisor: Dr. F. A. Podosek, Earth and Planetary Science Department, Washington University, St. Louis, MO.
- 1998-2002 *Doctoral Student.* Determined the chromium isotopic signature of the implanted solar wind-bearing component in Apollo 16 lunar soils in order to constrain theories on the formation and evolution of the solar system via acid etching techniques, cation column separation and Thermal Ionization Mass Spectrometry (TIMS). Advisor: Dr. F. A. Podosek, Earth and Planetary Science Department, Washington University, St. Louis, MO.
- 1996-1998 *Masters Student.* Compiled, analyzed, evaluated and published a database of eucrite bulk elemental abundances pinpointing weaknesses and voids in previous studies and developed chemical and microwave digest techniques of silicate materials for bulk elemental analyses using Inductively Coupled Plasma Mass Spectrometry (ICP-MS). Advisors: Dr. K. Lodders and Dr. B Fegley Jr., Earth and Planetary Science Department Washington University, St. Louis, MO.

1988-1990 *Graduate Researcher*. Isolated and characterized four species of photosynthetic purple non-sulfur bacteria destined for use in municipal water reclamation, industrial waste neutralization and environmental hazard evaluation. Advisors: Dr. I. Shechmeister and Dr. M. Madigan, Teachers in Research Program, Southern Illinois University at Carbondale, Carbondale, IL.

Previous Teaching Experience:

2001-2004 *Adjunct Instructor in Earth and Planetary Science*, Washington University, St. Louis, MO. Duties included: curriculum development, formulation of course structure, requirements and materials, lecturing and grade administration.

1999-2004 *Adjunct Instructor in Astronomy*, University of Missouri St. Louis, St. Louis, MO. Duties included: curriculum development, formulation of course structure, requirements and materials, lecturing and grade administration.

1995-2004 *Planetarium Director*, Pattonville School District, St. Louis, MO. Duties included: curriculum development for grades K-12, authoring and producing two public shows per month for the district's planetarium and observatory, handling all public relations and outreach associated with these programs, and design and maintenance of the Pattonville Observatory's webpage.

1996-2000 *Teaching Assistant and Guest Lecturer*, Washington University, St. Louis, MO. Duties included: guest lecturing, development of testing materials, grading, development and supervision of all student laboratory activities, audio-visual and webpage management.

1989-1995 *Adjunct Instructor of French*, Saint Louis University, St. Louis, MO. Duties included: curriculum development, formulation of course structure, requirements and materials, lecturing, language laboratory supervision and grade administration.

1985- 1995 *High School Teacher*, Cor Jesu Academy, St. Louis, MO. Courses taught: French levels 1-5, Biology, Genetics and Astronomy. Duties included: Department Head Foreign Languages (5 years), Academic council member, Science Club Moderator, French Club Moderator, French Honors Society Moderator and Academic Advisor.

Educational Background:

- May 2002 **Ph.D. in Geochemistry**
 Washington University (St. Louis, MO)
 Earth and Planetary Science Department
 Dissertation: Chromium Isotopic Composition of the Implanted
 Solar Wind-bearing Component in Apollo 16 Lunar Soils.
 Advisor: Dr. F. A. Podosek
- May 1998 **Masters in Geochemistry**
 Washington University (St. Louis, MO)
 Earth and Planetary Science Department
 Masters Research Project: Survey, Analysis and Evaluation of
 Euclite Bulk Compositions.
 Advisors: Dr. K. Lodders and Dr. B. Fegley Jr.
- December 1993 **Masters in French**
 Saint Louis University (St. Louis, MO)
 Modern Language Department
 Advisor: Dr. J. L. Pautrot
- 1988-1990 **Graduate Research in Microbiology**
 Southern Illinois University at Carbondale (Carbondale, IL)
 Teachers in Research Program
 Advisors: Dr. I. Shechmeister and Dr. M. Madigan
- May 1985 **Bachelor of Arts and Science Degree**
 Washington University (St. Louis, MO)
 Majors: French, Biology and Education

Certification: Missouri (NCATE) Life Biology (7-12), 1985.

Grants: (Limited to last five years.)

- As PI: NSF's Opportunities for Enhancing Diversity in the Geosciences (OEDG) Grant (\$1,030,000) 2007-2012.
- As Planning Team Member: State of Illinois Math and Science Program Grant (MSP) 2007-2009.
- As PI: NASA-SRLIDAP (\$360,000) 2007-2008.
- As PI: NASA-DDAP (\$158,400) 2006-2009.
- As PI: NSF's Opportunities for Enhancing Diversity in the Geosciences (OEDG) Grant (\$100,000) 2005-2008.
- As Co-PI: NASA's Mars Data Analysis Program grant (EPO) 04-035 (\$30,000) 2005-2008.
- As Co-PI: NASA's Origins of Solar Systems grant (EPO) NAG5-9449A (\$45,000) 2003-2008.

- As PI: NASA Sub-grant from Genesis Project (\$29,942) 2006-2007.
- As PI: NSF's Geoscience Education Grant (GEO-0507341) (\$200,000) 2005-2007.
- As PI: NASA's Office of Space Science "Scientist-Teacher Cooperation" Grant. (\$1,000) 2003.

Teaching Awards:

- 2000 Tolman Award for Outstanding Graduate Teaching Assistant (Geoscience).
 1993 U. S. Department of Education Blue Ribbon Award (General Education).
 1992 Monsanto Corporation Teacher of Excellence Award (Science).
 1991 University of Richmond Teacher of Excellence Award (French).
 1990 Missouri Scholars Academy Teacher of Excellence Award (French).
 1990 Southern Illinois University Teacher of Excellence Award (Science).

Colloquia, Conferences and Workshops: (Limited to past five years.)

- "Discrimination and Quantification of Implanted Solar Wind Via Grazing Incidence Synchrotron X-ray Techniques: New Detector Initial Results." Genesis Science Team Conference; Houston TX; March 9, 2008.
- "Discrimination and Quantification of Implanted Solar Wind in Genesis Collectors: New Detector Initial Results." Lunar and Planetary Science Conference, Houston TX, March 11, 2008.
- "Did it ever rain on Mars? A professional development opportunity for teachers and an actual NASA research opportunity for middle and high school students." National Science Teachers Conference; Boston, MA; March 28 and 29, 2008.
- "Solar Wind and the Early Solar System: Genesis Shards and Apollo Lunar Soils." Presolar Grain Conference; St. Louis, MO; Feb. 6, 2007.
- "Solar Wind and the Early Solar System: Genesis Shards and Apollo Lunar Soils." Genesis Science Team Conference; Houston TX; March 11, 2007.
- "Abundance and Charge State of Implanted Solar Wind Transition Metals in Individual Apollo 16 and 17 Lunar soil Plagioclase Grains Determined In Situ Using Synchrotron X-ray Fluorescence." Lunar and Planetary Science Conference; Houston TX; March 15, 2007.
- "A New in situ Method of Determining Relative Abundances and Charge States of Implanted Transition Metals in Individual Grains Using Synchrotron X-ray Fluorescence." Lunar and Planetary Science Conference; Houston, TX; March 15, 2007.
- "Teaching Science in the 21st Century: Neuroplasticity and Applications to the Modern Science Classroom." Keynote Speaker, NIU, March 19, 2007.
- "MARS Valley Networks Project: Martian Valley Network Analysis Run-off or Sapping? - A Web-GIS Approach." National Science Teachers Association Convention; St. Louis, MO; March 29, 2007.
- "Solar System Evolution: Constraints from New Genesis Results." Gordon Conference; South Hadley, MA; July 8-13, 2007.
- "Stardust, Super Novae and Earth... Oh My! Project Year End Report" NASA Origins EPO Workshops; St. Louis, MO.; Series of three Summer 2007.
- "Enhancing Diversity Track II: Intensive Field Experience in Northern Illinois and Central Mexico for Middle and Senior High School Teachers Serving Large Hispanic Populations."

- OEDG NSF Grantee Conference; Washington DC; October 5-7.
- “How to recruit K-12 STEM teachers.” OEDG NSF Grantee Conference; Washington DC; October 5-7.
 - “MARS Valley Networks Project: Martian Valley Network Analysis Run-off or Sapping? - A Web-GIS Approach.” Ran workshop, NIU, November 3, 2007.
 - “Discrimination and Quantification of Contamination and Implanted Solar Wind in Genesis Collector Shards Using Grazing Incidence Synchrotron X-ray Techniques.” Genesis Science Meeting; Houston, TX; March 12, 2006.
 - “Discrimination and Quantification of Contamination and Implanted Solar Wind in Genesis Collector Shards Using Grazing Incidence Synchrotron X-ray Techniques.” Lunar and Planetary Science Conference; Houston, TX; March 14, 2006.
 - “Initial Results for Collaborative Research: Development and Implementation of a Field-based Inquiry Focused Geoscience Course for Pre-service Teachers: A Plan to Improve Geoscience Education K-16.” GeoEd NSF Grantee Meeting; University of Nebraska-Lincoln; March 21-23, 2006.
 - “Enhancing Diversity Track 1: Intensive Field Experience in Northern Illinois and Central Mexico for Middle and Senior High School Teachers Serving Large Hispanic Populations: Initial Report.” OEDG NSF Grantee Meeting; Washington DC; April 28-30.
 - “Solar Wind and the Early Solar System: Genesis Shards and Apollo 16.” Colloquium Northern Illinois University, Sept. 15, 2006.
 - “How to recruit and improve the quality of new K-12 STEM teachers” and “How to enhance the skills of existing K-12 STEM teachers.” Panel participant. National Academies of Science; Washington DC; Sept. 28, 2006.
 - “Stardust, Super Novae and Earth... Oh My! Project Year End Report” NASA Origins EPO Meeting; St. Louis, MO.; Oct. 6-7, 2006.
 - “Solar Wind and the Early Solar System: Genesis Shards and Apollo Lunar Soils.” Colloquium Argonne National Lab; Chicago, IL; Oct. 27, 2006.
 - “No Child Left Behind: MSP Strategies.” Panelist for Illinois Mathematics and Science Partnerships MSP-IHE Deans and Colleagues Advisory; Chicago, IL; Dec. 14, 2006.
 - “Stardust, Super Novae and Earth... Oh My!” NASA EPO Project Materials Workshop. NSTA Regional Conference; Chicago, IL; Nov. 10-12, 2005
 - “Solar System Evolution” Invited speaker. Sigma Xi, Northern Illinois University, DeKalb, IL. Nov. 8, 2005.
 - “US-ANDRILL Workshop.” Formal Education Section Lead and Panelist. Denver, CO. April 1-2, 2005
 - “Before the First Day of School: Pre-Service Teacher Preparation and the Role of the Earth and Space Science Community.” Invited Speaker and Panelist. Lunar and Planetary Institute; Houston TX; March 13, 2005.
 - “Bridging the Poles: Education linked with Research” Panelist. Washington DC. June 23-25, 2004.
 - “Learning from the Frontier: Getting Planetary Data in the Hands of Educators” Lunar and Planetary Institute, Houston TX. March 14, 2004.
 - “Isotopic composition of surface-correlated chromium in Apollo 16 lunar soils: Implications for solar system evolutionary theories.” Northern Illinois University, Grand Valley State University, Central Washington University, January and February 2004.

- “The Formation and Evolution of the Solar System: Incorporating Complex Science Concepts in Elementary Education,” Continuing Education Seminar Series, University of Missouri-St. Louis with webcast to six other institutions, 2003-04 academic year.
- “Formation and Evolution of the Solar System,” Saint Louis Astronomical Society Speaker Series, St. Louis, MO, June 2003.
- “The Electromagnetic Spectrum: Incorporating Complex Science Concepts in Elementary Education,” Continuing Education Seminar Series, University of Missouri-St. Louis with webcast to six other institutions, 2002-03 academic year.

Publications:

- Kitts K., Choi Y., Eng P., Sutton S., Ghose S. and Burnett D. (2008) Discrimination and Quantification of Implanted Solar Wind in Genesis Collector Shards Using Grazing Incidence Synchrotron X-ray Techniques: New Detector Initial Results. *LPSC*, **39** #1296.
- Kitts K., Sutton S. and Newville M. (2007) Abundance and Charge State of Implanted Solar Wind Transition Metals in Individual Apollo 16 and 17 Lunar soil Plagioclase Grains Determined In Situ Using Synchrotron X-ray Fluorescence. *LPSC*, **38** #1106.
- Kitts K., Sutton S., Eng P. and Newville M. (2007) A New in situ Method of Determining Relative Abundances and Charge States of Implanted Transition Metals in Individual Grains Using Synchrotron X-ray Fluorescence. *LPSC*, **38** #1128.
- Johnson B. and Kitts K. (2006) “Rock Music in the Geoscience Classroom.” *The Earth Scientist*, **22-2**, 17-22.
- Luo W., Kitts K., Young P., Schwantes F. and Hung W. (2006). “MARS Valley Networks Project: Martian Valley Network Analysis Run-off or Sapping? - A Web-GIS Approach.” *Eos Trans. AGU*, **87** (52), Fall Meet. Suppl., Abstr. # ED42A-07.
- Kitts K., Sutton S., Eng P., Ghose S. and Burnett D. (2006) “Discrimination and Quantification of Contamination and Implanted Solar Wind in Genesis Collector Shards Using Grazing Incidence Synchrotron X-ray Techniques: Initial Results.” *Lunar and Planetary Science Conference* (abstr.) **37**, #1451.
- B. Kathleen Kitts, Frank A. Podosek, Robert H. Nichols, Jr., Joyce C. Brannon, Jahan Ramezani, Randy L. Korotev and Brad L. Jolliff. (2003) “Isotopic composition of surface-correlated chromium in Apollo 16 lunar soils.” *Geochimica et Cosmochimica Acta*, **67**, No. 24, pp. 4881–4893.
- K. Kitts, R. Nichols and F. Podosek. (2002) “Megascale Isotopic Anomaly in Cr.” *Goldschmidt Conference* (abstract) #3550.

- R. Nichols, K. Kitts and F. Podosek. (2002) “Spallogenic Chromium in the Solar Wind.” *Meteoritic and Planetary Science* (abstract) **37**: #5241.
- K. Kitts, F. Podosek, R. Nichols, J. Brannon, J. Ramenzani, R. Korotev and B. Jolliff. (2002) “Chromium Isotopic Composition of Implanted Solar Wind From Apollo 16 Lunar Soils.” *Lunar and Planetary Science Conference* (abstract) **33**: cd-rom file #1822.
- R. H. Nichols, U. Ott, K. Kitts and F. A. Podosek. (2000) “Chromium-54 isotopic anomaly distribution in Orgueil colloidal separates.” *Meteoritic and Planetary Science* (abstract) **35**: A199-120.
- K. Kitts and K. Lodders. (1998) “Survey and Evaluation of Eucrite Bulk Compositions.” *Meteoritics and Planetary Science* **33**: A197-213.

Professional Associations:

AGU (American Geophysical Union)
 AAAS (American Association for the Advancement of Science)
 GSA (Geological Society of America)
 IATE (Illinois Association of Teacher Educators)
 NAGT (National Association of Geology Teachers)
 NESTA (National Earth Science Teachers Association)
 NSTA (National Science Teachers Association)
 The Meteoritical Society
 The Geochemical Society

References:

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