

Tyler Louise Spano

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EDUCATION

Ph.D., Actinide Mineralogy and Nuclear Forensics (in progress)
University of Notre Dame, Notre Dame IN – August 2017 (expected)
B.A., Earth Science, Chemistry, *summa cum laude*
Kean University, Union NJ – May 2012

EXPERIENCE

University of Notre Dame, Notre Dame IN

Graduate Research and Teaching Assistant August 2012-present
Eilers Graduate Student Fellow May 2016- present
Lecturer Fall 2016

- Performed extensive research in actinide geochemistry and mineralogy.
- Mastered techniques in inorganic chemistry, analytical chemistry, geochemistry, and mineralogy.
- Developed procedures for hydrothermal synthesis of uranyl vanadate minerals and novel mineral analogues.
- Designed calculations for determining the structural stability of minerals.
- Advanced methods for quantifying crystal structure stability with normalized charge deficiency per anion calculations.
- Analyzed hyalite opal for uranium distribution and concentration and related results to paragenetic sequences.
- Completed trace element analyses on uranium-rich materials for source attribution and nuclear forensic applications.
- Contributed to community outreach and research goals of the Center for Sustainable Energy at the University of Notre Dame.

Kean University, Union NJ

Undergraduate Research Assistant May 2010-May 2012

- Collected and analyzed water samples from estuarine environments using field and laboratory methods.
- Developed and preformed research procedures for determining use of pH as a multiple indicator of water quality.
- Preformed detailed petrographic analyses of Jurassic flood basalts.
- Completed an extensive review of radioactive mineral occurrences in New Jersey.
- Contributed to departmental community outreach goals.

TEACHING EXPERIENCE

University of Notre Dame: Lecturer- Environmental Mineralogy

Brookhaven National Lab: Nuclear and Radiochemistry Summer School Invited Lecturer-
Nuclear Forensics Research at the University of Notre Dame

University of Notre Dame: Teaching Assistant- Mineralogy, Engineering Geology,
Environmental Climate Change, Environmental Mineralogy

Kean University: Peer Tutor- Physics I-II, General Chemistry I-II, Introduction to Geology,
Mineralogy, Structural Geology, Geomorphology

Middlesex Borough Board of Education- Substitute Teacher 2006-2009

PUBLICATIONS

2017 Spano, T.; Olds, T.; Hall, S.; Kampf, A.; Burns, P. *Finchite*. **International Mineralogical Association**. Submitted.

2017 Balboni, E.; Spano, T.; Cook, N.; Simonetti, A.; Burns, P. *Rare earth fractionation in uranium ore and its U(VI) alteration minerals*. **Applied Geochemistry**. Submitted.

2017 Spano, T.; Simonetti, A.; Wheeler, T.; Carpenter, G.; Freet, D.; Balboni, E.; Dorais, C.; Burns, P. *A novel nuclear forensic tool involving deposit type normalized rare earth element signatures*. **Terra Nova**. Accepted.

2017 Spano, T.; Simonetti, A.; Balboni, E.; Dorais, C.; Jones, N.; Monaco, B.; Burns, P. *Trace element and isotopic analysis of uranium ore concentrates: applications for nuclear forensic analysis*. **Applied Geochemistry**. Accepted.

2017 Spano, T.; Dzik, E.; Sharifironizi, M.; Dustin, M.; Turner, M.; Burns, P. *Thermodynamic investigation of uranyl vanadate minerals: implications for structural stability*. **American Mineralogist**. Accepted.

2016 Olds, T.A.; Haynes, P.; Kampf, A.R.; Spano, T.; Plášil, J.; Carlson, S.M.; Burns, P.C.; Simonetti, A.; Mills, O.P. *Leesite, IMA 2016-064*. CNMNC Newsletter No. 34, **Mineralogical Magazine**. Accepted.

2016 Qiu, J.; Spano, T.; Dembowski, M.; Kokot, A.; Szymanowski, J.; Burns, P. C. *Sulfate-Centered Sodium-Icosahedron-Templated Uranyl Peroxide Phosphate Cages with Uranyl Bridged by μ - η 1: η 2 Peroxide*. **Inorganic Chemistry**. 2016, 56(4), 1874-1880

2016 Balboni, E.; Jones, N.; Spano, T.; Simonetti, A.; Burns, P.C. *Chemical and Sr isotopic characterization of North American uranium ores: nuclear forensic applications*. **Appl. Geochem**. 2016, 74, 24-32.

PUBLICATIONS (Continued)

2015 Fritsch, E.; Spano, T.; Megaw, P. *Green daylight-fluorescent hyalite opal from Mexico*. **Journal of Gemmology**. 2015, 34(4), 294-296.

2015 Fritsch, E.; Megaw, P.; Spano, T.; Rondeau, B.; Gray, M.; Hainschwang, T.; Renfro, N. *Green-luminescing hyalite opal from Zacatecas, Mexico*. **Journal of Gemmology**. 2015, 34(6), 490-508

PRESENTATIONS

2016 **EFRC All Hands Meeting** Presentation “*Advances in crystal chemistry and thermodynamics of uranyl vanadate minerals*”

2016 **Women in Science Conference** Poster “*Structural stability and thermodynamics of uranyl vanadate minerals*”

2016 **Annual Meeting of the Geological Society of America** Poster “*Structural stability and thermodynamics of uranyl vanadate minerals*”

2016 **Annual Meeting of the Geological Society of America** Poster “*Trace element and isotopic fractionation in the nuclear fuel cycle*”

2016 **Annual Meeting of the American Chemical Society** Presentation “*Trace element and isotopic fractionation in the nuclear fuel cycle*”

2016 **ACS-CERM** Presentation “*Trace element analysis of uranium ore concentrates: source attribution, provenance indicator, and proof of concept*”

2016 **UND Graduate Student Union Research Symposium** Poster “*Synthesis and materials properties of uranyl vanadate mineral analogues*”

2015 **PINDU** Poster “*Synthesis and structural properties of novel praseodymium uranyl vanadate and praseodymium uranyl hydroxide mineral analogues*”

2015 **Annual Meeting of the Geological Society of America** Poster “*Trace element analysis of uranium ore concentrates: source attribution, provenance indicator, and proof of concept*”

2015 **Annual Meeting of the Geological Society of America** Presentation “*Materials properties of synthetic uranyl vanadate mineral analogues possessing the francevillite anion topology*”

2015 **Annual Meeting of the American Chemical Society** Poster “*Distribution of uranium and uranyl minerals near and within hyalite opal*”

2015 **DHS-DNDO-ARI Program Review Meeting** Poster “*Trace element signatures of UOCs: Provenance Indicator*”

PRESENTATIONS (Continued)

2014 EFRC All Hands Meeting Poster “*Ion exchange properties of uranyl vanadate minerals and new synthetic phases possessing the francevillite anion topology*”

2013 Annual Meeting of the Geological Society of America Poster “*Synthesis of and applications for the curienite-francevillite mineral series*”

VOLUNTEER / LEADERSHIP ACTIVITIES

Research Mentor: Introduced and guided undergraduates and high-school students in laboratory-based research. University of Notre Dame, 2013-Present (Mentored 10 students).

Presenter: Winter Sports Weekend Energy Demonstrations: Spoke with alumni and families about energy research at the University of Notre Dame. January 2017.

Judge: You be The Chemist Challenge: Oversaw adherence to rules and judged competitors in chemistry challenge for children. February 2017.

Presenter: University of Notre Dame Alumni Association Leadership Conference: Presented a poster and provided an overview of energy-related research at the University of Notre Dame. April 2017.

STEMentor: Worked with female undergraduate engineering students to explore career and research options. Fall 2016-present.

Mentor: Boys and Girls Club of America: Led weekly activities and discussions. Aided club members in design and execution of a community-based project. Summer 2016.

Tour Guide: Junior Parents Weekend: Conducted lab tours for families visiting the University of Notre Dame and explained ongoing energy research at the University of Notre Dame. (February 2016)

Letters to a Pre-Scientist: Exchanged monthly letters with an assigned pen pal. Introduced concepts of my research and encouraged my pen-pal to engage in science. September 2015-May 2016.

Science Fair Volunteer: Presented mineral identification techniques to students. Northpoint Elementary School, 2014.

Science Alive! Volunteer: Instructed children on methods of detecting and observing ionizing radiation. South Bend Public Library, 2014, 2015, 2016.

Visiting Speaker: Spoke with high-school students about career options in geology. Clay High School, 2014.

Mole Day Presenter: Created interactive science exhibits for children. Liberty Science Center, 2010-2011.

VOLUNTEER / LEADERSHIP ACTIVITIES (Continued)

President, Kean University Student Chapter of the American Chemical Society: Organized weekly meetings, community outreach events, and campus-wide activities. Kean University, 2010-2012.

SELECTED COURSEWORK

University of Notre Dame

- Environmental and Aquatic Chemistry
- ICP-MS Analytical Methods
- Chemistry of Lanthanides and Actinides
- Chemical Crystallography
- Geochemistry
- Actinide Mineralogy

Kean University

- Geomorphology
- Structural Geology
- Mineralogy
- Groundwater Hydrology
- Instrumental Methods of Chemical Analysis
- Quantitative Chemical Analysis

ADDITIONAL COURSEWORK

ACA Crystallography Summer School- American Crystallographic Association, July 2014

Uranium: Cradle to Grave- Mineralogical Association of Canada Short Course, May 2013

Student Leadership Summit- Kean University, September 2010

PROFESSIONAL SOCIETIES

Geological Association of America (GSA)

American Chemical Society (ACS)

Mineralogical Society of America (MSA)

Association for Women Geoscientists (AWG)

Association for Women in Science (AWIS)

Women in Nuclear (WiN)

AWARDS AND HONORS

Eilers Graduate Student Fellowship

Graduate Student Union Research Symposium (1st Place- Poster Competition)

Graduate Student Union Conference Presentation Grant Award

Zahm Research Travel Grant Award

New Minerals and Mineralogy in the 21st Century: Student Grant Award

SELECTED SKILLS AND TECHNIQUES

Crystallographic Techniques & Software

Single crystal X-ray Diffraction

Powder X-ray Diffraction

Bruker SHELX

FullProf Suite

Powder Diffraction File (PDF4)

Platon

CrystalMaker

Mercury

SELECTED SKILLS AND TECHNIQUES (Continued)

Analytical Chemistry Techniques

Raman Spectroscopy

Infrared Spectroscopy

Inductively Coupled Plasma Optical Emission Spectrometry

Inductively Coupled Plasma Mass Spectrometry

Multicollector Inductively Coupled Plasma Mass Spectrometry

X-ray Fluorescence Spectroscopy

Electron Microprobe Analysis

Scanning Electron Microscopy

Thermogravimetric Analysis

Synthetic Chemistry Techniques

Hydrothermal Synthesis

Solid-state Synthesis

Other Skills

Geologic Thin Section Preparation

Petrographic Microscopy

Reflected Light Microscopy

Handling of Radioactive Materials