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EDUCATION:

MIT-WHOI Joint Program, Cambridge and Woods Hole, Massachusetts, 2003-present

Ph.D. in Geology and Geophysics, 2008 (expected), Area of Specialization: Igneous geochemistry
Dissertation title: Uranium-series isotope systematics of mid-ocean-ridge basalts from Kolbeinsey, Mohns, and Knipovich Ridges north of Iceland
Faculty advisors: K.W.W. Sims, F.A. Frey

University of New Mexico, Albuquerque, New Mexico, 2001-2003

M.S. in Earth and Planetary Sciences, 2003, Area of Specialization: Volcanology
Thesis title: Volatile recycling in the Central American Subduction zone: Insights from Nicaraguan gas chemistry and nitrogen isotope systematics
Faculty advisor: T.P. Fischer

Summer of Applied Geophysical Experience, IGPP/LANL, Field course based in Santa Fe, New Mexico, 2001

Smith College, Northampton, Massachusetts, 1997-2001

B.A. in Geology with highest honors, minor in Archaeology, 2001, *Magna cum laude*

AWARDS AND HONORS:

National Defense Science and Engineering Graduate Fellow, 2001-2005

Mineralogical Society of America Undergraduate Award, 2001

Phi Beta Kappa, 2001

TEACHING AND MENTORING EXPERIENCE:

Teaching Assistant, Introduction to Marine Geology and Geophysics, WHOI, Woods Hole, MA, 2007-present

- Helped faculty prepare and proofread class materials
- Designed and implemented website for class
- Led recitations for students outside of class lectures
- Assisted students new to geology with comprehension of lecture material and with problem sets

Science Mentor: Falmouth Public Schools, Falmouth, MA, 2007

- Coached middle school students on projects for a science fair.

Teaching Assistant: Mineralogy and Petrology, Smith College, Northampton, MA, 2000-2001

- Assisted J. Brady, helped run two Mineralogy and Petrology labs per week.
- Held office hours, aided students with class material.

Student Academic Advisor, Duckett House, Smith College, 2000-2001

- Acted as a liaison between other students and academic administration at the College and a resource for general academic information.

Substitute Teacher, East Brunswick Public Schools, East Brunswick, NJ, 2000-2001

- Served as a substitute teacher in the public school system.

America Reads! Tutor, Northampton Public Schools, Northampton, MA, 1998

- Led group activities for first through third grade children with reading difficulties.
- Worked one-on-one with individual children to assist with reading.

TEACHING INTERESTS:

General Earth Science and Geology, Mineralogy, Petrology, Volcanology, High-Temperature Geochemistry and Thermodynamics, Radiogenic Isotope Geochemistry.

Teaching young people how to learn effectively. Assisting girls and young women in particular in pursuing their interests. Helping all students become excited about science, geoscience, and research.

RESEARCH EXPERIENCE:

Doctoral Research: Geology and Geophysics, Woods Hole Oceanographic Institution and Earth, Atmospheric, and Planetary Sciences Department, Massachusetts Institute of Technology, 2003-2008 (expected)

Advisors: Ken W.W. Sims, Fred A. Frey

Committee Members: G. Gaetani, P. Kelemen, J. Lin (chair)

Thesis title: Uranium-series isotope systematics of mid-ocean-ridge basalts from Kolbeinsey, Mohns, and Knipovich Ridges north of Iceland

- Study examines uranium-series isotope systematics (^{238}U - ^{230}Th , ^{230}Th - ^{226}Ra , and ^{235}U - ^{231}Pa systems) in lavas from the ridges north of Iceland, with a sample suite encompassing glassy mafic quartz tholeiites from the Tjörnes Fracture Zone and Kolbeinsey, Mohns, and Knipovich Ridges.
- Study region represents a slow-spreading counterpart to the fast-spreading EPR studied by K. Sims in previous work and may be influenced in the south by the Iceland hot spot. These qualities are key to constraining melting models at endmember conditions.
- Results will help us determine the extent to which U-series disequilibria are controlled by melt fraction, partition coefficients and source lithology, porosity, upwelling and melting rates, and depth of melting. Will use the ^{238}U - ^{230}Th , ^{230}Th - ^{226}Ra , and ^{235}U - ^{231}Pa results to model melt processes beneath these ridges to help constrain these variables for slow spreading centers.
- Piston-cylinder experiments on partitioning of U, Th, and other trace elements during melting of garnet pyroxenite at 2.5 GPa showed that $D_{\text{U}}/D_{\text{Th}}$ ratios are controlled by clinopyroxene and garnet site radii, which depend on bulk and crystal composition. Because of this, pyroxenite generates smaller ^{238}U - ^{230}Th disequilibria during melting than peridotite. However, mixing between melts of pyroxenite and peridotite during upwelling cannot be ruled out by these partitioning measurements.

Masters Research: Earth and Planetary Sciences Department, University of New Mexico, 2001-2003

Advisor: Tobias P. Fischer

Committee Members: Y. Asmerom, F. Goff

Thesis title: Volatile recycling in the Central American Subduction zone: Insights from Nicaraguan gas chemistry and nitrogen isotope systematics.

- Examined the chemistry and N isotopes of volcanic and geothermal gases from the Nicaraguan volcanic front, and used those data to fingerprint sources contributing N_2 , He, and Ar to the volcanic emissions along the front.
- Results showed that Nicaraguan volcanic and geothermal volatile emissions register large contributions from a high- $\delta^{15}\text{N}$, high N_2/He source and lesser inputs from a low- $\delta^{15}\text{N}$, lower N_2/He source.
- Modeled these inputs using estimates for subducted sediment and mantle wedge reservoirs, respectively, and found a large sediment contribution across most of Nicaragua, in agreement with observations from lava chemistry.

- Mass balance input and output calculations for the subduction zone suggest the need for another source of high- $\delta^{15}\text{N}$ nitrogen beneath Nicaragua, perhaps altered ocean crust.

Graduate Intern, EES-11, Los Alamos National Laboratory, 2002

Mentor: W. Scott Baldrige

- Participated in a research project to develop and build a real-time, broad-sensitivity radon detector for use in geologic monitoring.
- Helped conduct tests during production of the detector.

Undergraduate Senior Thesis Research: Geology Department, Smith College, 2000-2001

Advisor: John Brady

Thesis title: Geochemistry of komatiite rocks, Archean Woodburn Lake Group, Pipedream Lake area, Churchill Province, Canada.

- Combined Re-Os isotope measurements from CIW internship with new major and trace element whole rock data for suite of Canadian komatiites.
- Conducted electron microscope EDS analyses of komatiite samples to identify phases and characterize the degree of metamorphism they had experienced as lower amphibolite facies.
- Synthesized whole rock and *in situ* data to evaluate degree of element mobility during post-depositional alteration. Concluded that despite some element mobility after komatiite emplacement, least altered (non-spinifex) samples produced Re-Os isochron that matched 2.7 Ga U-Pb zircon age for intercalating geologic units.
- Measured lowest $^{187}\text{Os}/^{188}\text{Os}$ ratio in any igneous sample (0.1098), producing extremely-well-characterized slightly subchondritic initial ratio for 2.7 Ga model age.

Research Intern, Department of Terrestrial Magnetism, Carnegie Institution of Washington, 2000

Mentor: Steve Shirey

- Measured Re-Os isotope systematics in 12 komatiite rocks from the Woodburn Lake Group in Canada (see above for summary of results).
- Learned clean lab, rock dissolution, spiking, and Re-Os isotope extraction techniques and the basics of N-TIMS analysis.

Research Intern, Geomicrobiology Group, Princeton University, 1999

Mentor: T.C. Onstott

- Assisted the Geomicrobiology Group at Princeton during early development of their bioremediation program.
- Analyzed grain size, pore volume, and phases present in sediment core sections using SEM and EDS.
- Ran programs and input data for carbon-fluorescing bacteria concentrations in cores.
- Performed night shifts during field tracer test for Virginia test site, sampling wells and making electrode measurements to monitor bromide tracer injection.

RESEARCH INTERESTS:

- Igneous geochemistry
- Mantle chemical structure and evolution
- Radiogenic and uranium-series isotopes
- Volcanology and volcanic hazards.

MEMBER:

American Geophysical Union
Mineralogical Society of America
Geochemical Society
Geological Society of America

Sigma Xi
Phi Beta Kappa

PUBLICATIONS:

- Elkins, L.J., Gaetani, G.A., Sims, K.W.W., *pending moderate revisions*, Partitioning of U and Th during garnet pyroxenite partial melting: Constraints on the source of alkaline ocean island basalts, *Earth Planet. Sci. Letters*.
- Elkins, L.J., Fischer, T.P., Hilton, D.R., Sharp, Z.D., McKnight, S., Walker, J., 2006. Tracing nitrogen in volcanic and geothermal volatiles from the Nicaraguan volcanic front, *Geochim. Cosmochim. Acta* 70, 5215-5235.

PRESENTATIONS:

- Elkins, L.J., Gaetani, G.A., Sims, K.W.W., 2006, Mineral/melt partitioning of U and Th during partial melting of garnet pyroxenite, *Geochim. Cosmochim. Acta Goldschmidt Suppl.*, 70, (18) 159.
- Elkins, L.J., Fischer, T.P., Hilton, D.R., Shaw, A.M., McKnight, S., Strauch, W., Sharp, Z., 2002. Sediment Underplating Beneath Central America: Insights From N-He, $\delta^{15}\text{N}$ Systematics of Volatile Discharges in Nicaragua, *EOS Trans. AGU, Fall Meeting Suppl.*, V21B-1209.

FUNDING:

- Assisted K. Sims with funding proposal and additional funding requests to NSF for dissertation research on Kolbeinsey Ridge. Responsible for annual reports and final report for this grant.
- Applied for and received funding to attend the American Geophysical Union fall conference (2007) from two funding sources (MIT travel assistance fund, WHOI Academic Programs Office fund).
- Petitioned for and negotiated funding from the WHOI Academic Programs Office to attend the Goldschmidt geochemical conference (2006) despite the sudden discontinuation of an expected fund (MIT travel assistance fund) at a critical time.
- Requested and arranged funds to participate in a research expedition and cruise to the Tjörnes Fracture Zone on the RS Poseidon (C. Devey, chief scientist) in August, 2005.

REFERENCES:

Ken W.W. Sims (ksims@who.edu)
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John Brady (jbrady@science.smith.edu)
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