

Lynne J. Elkins

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EDUCATIONAL AND PROFESSIONAL EXPERIENCE

Education

2009 Ph.D. in Igneous Geochemistry, Marine Geology and Geophysics, MIT-WHOI Joint Program
2003 M.S. in Volcanology, Earth and Planetary Sciences, University of New Mexico
2001 B.A. in Geology (Highest honors, *Magna cum laude*), Smith College
2001 IGPP/LANL Summer of Applied Geophysical Experience
1999 Semester abroad, University of Leeds

Professional Experience

2015-present Assistant Professor, Department of Earth and Atmospheric Sciences, University of Nebraska-Lincoln
2008-2015 Lecturer, Department of Geology, Bryn Mawr College
2009-2011 Director, Summer Science Research Program for Undergraduates, Bryn Mawr College

HONORS AND MEMBERSHIPS

Member: American Geophysical Union, Mineralogical Society of America, Geochemical Society, Geological Society of America, Association for Women Geoscientists, National Association for Geoscience Teachers, Sigma Xi, Phi Beta Kappa
Research Development Fellow, University of Nebraska-Lincoln, 2015-2016
National Defense Science and Engineering Graduate Fellow, 2001-2004
Mineralogical Society of America Undergraduate Award, 2001

RESEARCH INTERESTS

Igneous petrology
Volcanology and volcanic hazards
Isotope geochemistry
Divergent boundary processes and ocean crust formation
Mid-ocean ridge-hotspot interactions
Mantle chemical structure and evolution
Uranium-series and radiogenic isotopes

Current and Past Projects

- Study of tectonics and volcanic activity in Southern Vietnam and the Central Highlands (in progress; co-PI: C. Burberry)
- Study of U-Th-Ra-Pa isotope disequilibrium in mid-ocean ridge basalts from the Kane-Atlantis supersegment of the Mid-Atlantic Ridge (in progress)
- Uranium-series melt model development in the ENKI code repository and platform (in progress)

- Inquiry into the origins of the Central Atlantic Magmatic Province (in progress; collaborators: A. Marzoli, J. Lassiter, M. Bizimis, C. Meyzen)
- UNITE (University of Nebraska Isotope and Trace Element) Geochemistry Lab management, cleanroom certification, methods implementation
- Jan Mayen hotspot interactions with North Atlantic mid-ocean ridges (Elkins et al., 2016a, 2016b)
- Chemical alteration of mid-ocean ridge basalts (Elkins et al., 2011)
- Regional study of basalt petrogenesis beneath slow- and ultraslow-spreading Arctic mid-ocean ridges (Elkins et al., 2008; 2011; 2014)
- High-pressure U and Th partitioning during garnet pyroxenite melting (Elkins et al., 2008)
- Nitrogen isotopes and volatile concentrations in geothermal and volcanic fluids from the Nicaraguan volcanic arc (Elkins et al., 2006)

RESEARCH FUNDING

Awarded:

- 2018-2021 NSF Tectonics grant to L. Elkins (lead PI) and C. Burberry (UNL): Reconciling extrusion tectonics, rifting, and lithosphere-asthenosphere coupling models for the Central Highlands diffuse igneous province, Vietnam (\$413,437)
- 2017-2020 NSF MGG grant to L. Elkins: Assessing segment-scale compositional control over slow-spreading ridge morphology (\$259,150)
- 2016-2017 UNL CAS International Collaboration Fund: International Inquiry into the Origins of the Central Atlantic Magmatic Province (\$10,000)
- July 2016 UNL CAS International Travel Fund: Goldschmidt Conference, Yokohama, Japan (\$1500)
- 2011-2015 NSF MGG grant to L. Elkins (lead PI), K. Sims (UW): Collaborative RUI: Uranium-Series Constraints on Melting in the Jan Mayen Region (\$140,000 to Elkins)
- 2009-2010 Faculty Research Grant from Bryn Mawr College to L. Elkins for study of chemical alteration processes in mid-ocean ridge basalts (\$4,500)

PUBLICATIONS

Peer-reviewed journal articles and data products (Students)

- Elkins, L.J., Scott, S.R., Sims, K.W.W., Rivers, E.R., Devey, C.W., Reagan, M., Hamélin, C., Pedersen, R., 2016, Exploring the role of mantle eclogite at mid-ocean ridges and hotspots: U-series constraints on Jan Mayen Island and the Kolbeinsey Ridge, *Chemical Geology* 444, 128-140.
- Elkins, L.J., Hamélin, C., Blichert-Toft, J., Scott, S.R., Sims, K.W.W., Yeo, I., Devey, C., Pedersen, R.B., 2016, North Atlantic hotspot-ridge interaction near Jan Mayen Island. *Geochem. Perspectives Letters* 2, 55-67.

Elkins, L.J., 2015, Jan Mayen Geochemistry IEDA database.

Elkins, L.J., Sims, K.W.W., Prytulak, J., Blichert-Toft, J., Blusztajn, J., Fretzdorff, S., Reagan, M., Haase, K., Elliott, T., Humphris, S., Schilling, J.-G., 2014, Melt generation beneath Arctic Ridges: Implications from measurements of U decay series disequilibria in the Mohs, Knipovich, and Gakkel Ridges. *Geochim. Cosmochim. Acta* 127, 140-170.

Elkins, L.J., Sims, K.W.W., Prytulak, J., Elliott, T., Mattielli, N., Blichert-Toft, J., Blusztajn, J., Dunbar, N., Devey, C., Mertz, D., Schilling, J.-G., Murrell, M., 2011, Understanding melt generation beneath the slow-spreading Kolbeinsey Ridge using ^{238}U , ^{230}Th , and ^{231}Pa excesses, *Geochim. Cosmochim. Acta* 75, 6300-6329.

Elkins, L.J., Gaetani, G.A., Sims, K.W.W., 2008, Partitioning of U and Th during garnet pyroxenite partial melting: Constraints on the source of alkaline ocean island basalts, *Earth Planet. Sci. Lett.*, 265, 270-286.

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.

Journal articles in progress

Elkins, L.J., Bourdon, B., Lambart, S., *submitted*, Assessing mantle lithologic heterogeneity from uranium-series isotopes. Invited review article submitted to *Lithos*.

Elkins, L.J., Marzoli, A., Meyzen, C., Callegaro, S., Bizimis, M., *in prep.*, Mantle melt sources of end-Triassic tholeiites from Eastern North American using hafnium isotopes, for submission to *Geochem. Geophys. Geosys.*

Abstracts (Presenter*; Students)

Lyu, Y.*, Elkins, L.J., 2018, Implications from U, Th, and Ra partition coefficients for constraining uncertainties and investigating the melting process beneath mid-ocean ridges, *EOS Trans. AGU, Fall Meeting Suppl.*, *pending*.

Elkins, L.J.*, Spiegelman, M., Bourdon, B., Lyu, Y., 2018, Modeling uranium-series disequilibria in partial melts on the ENKI platform: progress and goals, *EOS Trans. AGU, Fall Meeting Suppl.*, *pending*.

Elkins, L.J.*, Bourdon, B., Lambart, S., 2018, The effects of two-lithology mantle melting on U-series in basalts, *Goldschmidt 2018 Meeting, Boston, MA*.

Elkins, L.J.*, Marzoli, A., Bizimis, M., Callegaro, S., Meyzen, C., Sorsen, N., Lassiter, J., Ernesto, M., 2017, Mantle sources for Central Atlantic Magmatic Province basalts from Hf isotopes, *North-Central GSA Paper No. 38-6*.

- Elkins, L.J.*, Marzoli, A., Bizimis, M., Meyzen, C., Callegaro, S., Sorsen, N., Lassiter, J., Ernesto, M., 2017, Mantle sources for Central Atlantic Magmatic Province basalts from Hf isotopes, *EOS Trans. AGU, Fall Meeting Suppl.*
- Burberry, C.M.*, Elkins, L.J., N. Hoang, L.D. Anh, Sang Q.D., 2017, Neogene-Recent Reactivation of Cretaceous-age faults in Southern Vientma, with implications for the Himalayan-Tibetan Orogen, *EOS Trans. AGU, Fall Meeting Suppl.*
- Elkins, L.J.*, Scott, S.R., Rivers, E.R., Sims, K.W.W., Reagan, M., Devey, C.W., Hamélin, C., Pedersen, R.B., 2016, Identifying pyroxenite in the mantle source for Jan Mayen Island and Northern Kolbeinsey Ridge, *Goldschmidt 2016 Meeting, Yokohama.*
- Rivers, E.R.*, Elkins, L.J., Sims, K.W.W., Blichert-Toft, J., Devey, C., Chernow, R., Davis, R., Meisenhelder, K., 2013, U-series constraints on magmatism near Jan Mayen, *EOS Trans. AGU, Fall Meeting Suppl.*
- Elkins, L.J.*, Rivers, E.R., Sims, K.W.W., Blichert-Toft, J., Devey, C., Chernow, R., Davis, R., Meisenhelder, K., 2013, Origins of anomalous ridge magmatism near Jan Mayen, *Geochim. Cosmochim. Acta Goldschmidt Suppl.*
- Davis, R.*, Elkins, L.J., Augustin, N., Yeo, I., Meisenhelder, K., Rivers, E., van der Zwan, F., Devey, C., Sims, K.W.W., 2013, Explaining anomalously high magma flux at volcanic centers on the Northern Kolbeinsey and Southern Mohns Ridges using bathymetry and basalt geochemistry, *NE GSA Abstracts with Programs*, v. 45, 58.
- Meisenhelder, K.*, Elkins, L.J., Augustin, N., Yeo, I., Rivers, E., van der Zwan, F., Devey, C., Sims, K.W.W., 2013, Constraining crust formation at slow-spreading ridges using the composition and morphology of Mt. Eggvin, *NE GSA Abstracts with Programs* v. 45, 58.
- Elkins, L.J.*, Devey, C., van der Zwan, F., Meisenhelder, K., Rivers, E., Davis, R., Sims, K.W.W., 2012, Detailed trace element systematics of Jan Mayen, Southern Mohns Ridge, and Eggvin Bank volcanic materials, *EOS Trans. AGU, Fall Meeting Suppl.*
- Yeo, I.A.*, Augustin, N., Devey, C.W., Deutschmann, M., Elkins, L.J., Laurila, T., Meisenhelder, K., Rivers, E., Rothenbeck, M., van der Zwan, F.M., 2012, The Northern Kolbeinsey Ridge, North Atlantic: Excess volcanism and ridge relocations close to Jan Mayen, *EOS Trans. AGU, Fall Meeting Suppl.*
- Elkins, L.J.*, Sims, K.W.W., 2011, Modeling non-linear variations in melt productivity in mantle melt regimes, *EOS Trans. AGU, Fall Meeting Suppl.*, V32B-03.
- Elkins, L.J.* Sims, K.W.W., Prytulak, J., Mattielli, N., Elliott, T., Dunbar, N., Blichert-Toft, J., Devey, C., Mertz, D., Schilling, J.-G., Murrell, M., 2011, Secondary Crustal Effects on MORB Composition at the Kolbeinsey Ridge, *Geochim. Cosmochim. Acta Goldschmidt Suppl.*, A3396.

- Elkins, L.J.*, Sims, K.W.W., Dunbar, N., 2009, Seawater alteration of Arctic mid-ocean ridge basalts, *EOS Trans. AGU, Fall Meeting Suppl.*, V33D-2063.
- Elkins, L.J., Sims, K.W.W.*, Prytulak, J., Blichert-Toft, J., Blusztajn, J., Fretzdorff, S., Haase, K., Elliott, T., Humphris, S., Schilling, J.-G., 2009, Generation of ^{231}Pa , ^{226}Ra , ^{238}U , and ^{230}Th excesses in Arctic mid-ocean ridge basalts from the Kolbeinsey, Mohns, Knipovich, and Gakkel Ridges, Plenary Lecture, *16th International Symposium on Polar Sciences*, Incheon Korea.
- Elkins, L.J.*, Sims, K.W.W., Prytulak, J., Mattielli, N., Elliott, T., Blichert-Toft, J., Blusztajn, J., Devey, C., Mertz, D., Kelemen, P., Murrell, M., Schilling, J.-G., 2009, ($^{234}\text{U}/^{238}\text{U}$) and ($^{230}\text{Th}/^{238}\text{U}$) disequilibria in fresh and altered Kolbeinsey Ridge basalts, *Geochim. Cosmochim. Acta Goldschmidt Suppl.*, A325.
- Elkins, L.J., Sims, K.W.W.*, Prytulak, J., Mattielli, N., Elliott, T., Blichert-Toft, J., Devey, C., Fretzdorff, S., Mertz, D., Kelemen, P., Murrell, M. Schilling, J.-G., Humphris, S., 2008, Insights into melting processes on slow-spreading ridges north of Iceland from U, Th, Ra, and Pa isotopes, *IAVCEI 2008 General Assembly*, 1c/1e P05.
- Elkins, L.J.*, Sims, K.W.W., Prytulak, J., Mattielli, N., Elliott, T., Kelemen, P., Mertz, D., Devey, C., Blichert-Toft, J., Schilling, J.-G., 2007, Constraints on Melting Beneath the Slow-Spreading Kolbeinsey Ridge from ^{238}U , ^{230}Th , and ^{231}Pa Excesses, *EOS Trans. AGU, Fall Meeting Suppl.*, V21B-0607.
- 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.
- Jenner, G.A.*, S.B. Shirey, D. Hyde, L.J. Elkins, B.A. Kjarsgaard, and J. Kerswill, 2002, Late Archean komatiites and BIFs, Woodburn Lake Group, Churchill Province, Nunavut, *Geochim. Cosmochim. Acta* 66(15A), A365.

INVITED LECTURES AND PRESENTATIONS

- Sept. 2017 “The Generation of Magma at Ultraslow Mid-Ocean Ridges.” University of Wyoming Geology and Geophysics Distinguished Lecturer Series.
- Sept. 2015 “Mid-Ocean Ridges and New Crustal Production.” Stout Lecture Series, University of Nebraska-Lincoln.
- April 2015 “Mid-Ocean Ridge Interactions with the Jan Mayen Hotspot.” Chemistry Department Seminar, Haverford College.

- Dec. 2014 “Mid-Ocean Ridge Interactions with the Jan Mayen Hotspot.” University of Nebraska-Lincoln.
- April 2014 “Petrogenesis of North Atlantic MORB.” Senior Seminar, Bryn Mawr College.
- Jan. 2014 “Petrogenesis of North Atlantic MORB from U-series and radiogenic isotopes.” Department Seminar, University of Bergen, Norway.
- April 2008 “Partitioning of U and Th during garnet pyroxenite partial melting.” University of Houston.
- March 2008 “Geochemistry of Mid-Ocean Ridges.” Bryn Mawr College

COURSES TAUGHT

University of Nebraska-Lincoln (2015-present)

- GEOL 110 Deadly Planet (*Previously: Geological Natural Hazards*)
- GEOL 200 Mineralogy
- GEOL 210 Earth Materials: Rocks and Minerals
- GEOL412/812 Volcanology and Igneous Petrology
- GEOL 499 Undergraduate Independent Study (supervised research)
- GEOL 815 Geochemical Thermodynamics
- GEOL 899 Graduate Research (supervised research)

Bryn Mawr College (2008-2015)

- EMLY002 Volcanoes and Society
- GEOL101 Physical Geology Lecture and Labs
- GEOL102 Earth History Labs
- GEOL103 Earth Systems & Environment Labs
- GEOL109 Quantitative Problems in Geoscience
- GEOL110 Molten Rock: The Evolution of Planet Earth
- GEOL115 Living With Volcanoes
- GEOL202 Mineralogy and Crystal Chemistry
- GEOL209 Natural Hazards and Human Populations
- GEOL305 Igneous and Metamorphic Petrology
- GEOL350 High-Temperature Geochemistry
- GEOL399 Senior Thesis Seminar
- Department Field Trip leader: Spring Break trip to Costa Rica (23 participants)

Guest lectures:

- Sept. 2018 Guest lecture on writing proposals, GEOS900, UNL
- Feb. 2018 Guest lecture on continental rifts, Tectonics class, UNL
- Jan. 2018 Guest lecture on Vesuvius, CLAS161, UNL
- Oct. 2017 Guest lecture, GEOL900, UNL
- Feb. 2017 Guest lecture, Natural Hazards class, UNK Geography
- Feb. 2017 Guest class on hazards science, College of Law, UNL
- Sept. 2016 Lecture on plate tectonics, ASTR 117, UNL

PEDAGOGICAL FUNDING

2017-2019 CAS Instructional Improvement Fund to L. Elkins: Student Projects for Synthesizing Applied Petrology Methods (\$5,580)

SERVICE

Service to the Profession

2016-present Member of ENKI working group; includes annual workshops in 2017, 2018

June 2016 Session Convener/Chair, Goldschmidt Meeting, Yokohama

Dec. 2015 Session Convener/Chair, American Geophysical Union Fall Meeting, San Francisco

Dec. 2013 Session Convener/Chair, American Geophysical Union Fall Meeting, San Francisco

Oct. 2012 NSF EarthCube Early Career Strategic Visioning Workshop, Carnegie Institution

Dec. 2011 Session Convener/Chair, American Geophysical Union Fall Meeting, San Francisco

Panelist: National Science Foundation (MG&G Program)

Journal Reviewer: Contribution to Mineralogy and Petrology, Geochemistry Geophysics Geosystems, Journal of Geoscience Education

Proposal Reviewer: National Science Foundation (MG&G, CAREER, Tectonics, GeoPRISMS), European Research Council

Service to the University

Spring 2018 Expert consultant for design of museum exhibit on Ashfall eruption, Nebraska State Museum (UNL)

2018-present Member, Hydrogeology Search Committee (UNL)

2017-present Member, EAS Ad-Hoc Computer Lab Design Committee (UNL)

2017-present Geology Group Meeting Coordinator (UNL)

2017-present EAS Faculty Recording Secretary (UNL)

2015-present Libraries Liaison (UNL)

2016 Member, Salary Advisory Committee (UNL)

2015-2017 Member, Beautification Committee (UNL)

- 2013-2015 Member, Faculty Welfare Committee (Bryn Mawr College)
- 2008-2012 Member and Chair (2011-2012), Committee on Libraries, Information Services, and Computing (Bryn Mawr College)
- 2009, 2011 Freshman advisor (Bryn Mawr College)

Professional Development

- June 2016 Computational thermodynamics and petrology with the MELTS family of models workshop, Yokohama, Japan
- Fall 2015 ARISE Faculty teaching workshop (UNL)
- Dec. 2012 Effective Teaching and Learning in the Large Classroom Setting, NAGT Workshop
- June 2011 Early Career Geoscience Faculty Workshop, NAGT and On the Cutting Edge
- Summer 2011 Teaching and Learning Initiative Summer Seminar
- Fall 2010 Teaching and Learning Initiative Faculty Pedagogy Seminar
- Dec. 2009 How to Get a Research Program Started at a Primarily Undergraduate Institution, GeoCUR Workshop

Selected Outreach

- Sunday With A Scientist event development, Nebraska State Museum, 2018-present
- Station leader, Dinosaurs and Disasters, Nebraska State Museum, 2016-present
- Departmental mineral display cleaning and redesign, Fall 2017
- Invited Lecturer, UN Kearney disaster movie class screening and discussion, Spring 2017
- Invited Speaker, Nebraska Citizens for Science Forum, Sept. 2016
- Involved in research covered by popular science articles in BBC, Daily Mail (R/V Poseidon expedition to 71°N, July 2016)
- Faculty Trip Leader/Lecturer, Icelandic Interlude, Bryn Mawr College, Feb. 2015
- Faculty Trip Leader/Lecturer, Patagonian Frontiers, Bryn Mawr College, Jan. 2015
- Invited Speaker, Philadelphia Mineralogical Society, May 2014
- Volunteer “Big Sister” with Big Brothers Big Sisters of Southeastern Pennsylvania, mentored middle school girl interested in science
- Volunteer demonstrator and teaching for Expanding Your Horizons workshop at Swarthmore College, exposing middle school girls to science topics, Spring 2010, 2011
- Volunteer ocean sciences guest teacher and science project coach, Falmouth Public Schools, Falmouth, MA, 2008