STEPHANIE ANN SPARKS

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RESEARCH INTERESTS

Continental tectonics and associated transient thermal, rheological, and kinematic processes that occur in the lithosphere, from the upper mantle to the earth's surface.

EDUCATION

Arizona State University, Tempe, AZ — *Accepted*
Ph.D. in Geological Sciences, (K.V. Hodges, advisor)

University of Kentucky, Lexington, KY — July 2018
M.S. in Geology, (J.R. Thigpen, advisor), *Examining Linkages Between Critical Wedges and Crustal Channels: A Combined Numerical, Field, and Laboratory Investigation*
GPA: 4.0/4.0 overall

Virginia Tech, Blacksburg, VA — May 2013
B.S. in Chemical Engineering, B.S. in Materials Science and Engineering,
Chemistry Minor, Polymer Science and Engineering focus
GPA: 3.9/4.0 in major, 3.6/4.0 overall

University Honors – Honors Scholar Diploma
Graduation Honors – Magna Cum Laude

Technical University of Denmark, Lyngby, Denmark — June 2012
Summer Laboratory in Chemical/Biochemical Engineering (Unit Operations)

RESEARCH EXPERIENCE

Graduate Research Assistant — 08/2016 – 06/2018
University of Kentucky Structure and Geodynamics Laboratory, Lexington, KY
Use 2-D and 3-D coupled thermomechanical finite element models combined with deformational and thermal history data derived from transects across the Langtang and Annapurna Himalaya to test two fundamentally distinct orogen evolution models and develop an associated geodynamic model for how the crust accommodates shortening in large collisional systems.

Research Assistant — 8/2012 – 7/2013
Institute for Critical Technology and Applied Science, Blacksburg, VA
Performed comprehensive characterization of melt-blown polymer nanofiber nonwoven mats. Materials characterization was used primarily for materials selection and product assessment used in process optimization. Additional work included design and execution of fiber delamination experiment for post-process functionalization.

Undergraduate Researcher 1/2011 –
Virginia Tech Department of Chemistry, Blacksburg, VA 5/2012
Assessed the effects of temperature, molecular weight, and molecular weight distribution on the spherulitic growth rate of poly(ε-caprolactone) to investigate the fundamental mechanisms governing phase transitions in semicrystalline polymers.

TEACHING EXPERIENCE

University of Kentucky Department of Earth and Env. Science, Lexington, KY 08/2016 –
Instructor: Structural Geology Laboratory, Physical Geology Laboratory 05/2017
Teaching Assistant and Grader: Introduction to Environmental Geology

Virginia Tech Department of Materials Science and Engineering, Blacksburg, VA 1/2011 –
Teaching Assistant and Grader: Aerospace Engineering Materials, Materials Engineering 5/2013
Laboratory I and II, Fundamentals of Materials Engineering

PROFESSIONAL EXPERIENCE

Physical Scientist (GS-1301), Assistant Advisor for International Programs 7/2013 –
United States Department of Energy, Washington, DC 7/2016
Assisted on international matters by providing information and support to six Office of Science Programs to facilitate scientific collaborations. Also, collected, analyzed, and archived data on international interactions within the Office of Science, and served as an international program liaison within and outside of the Department of Energy.

Process Engineer (Intern) 1/2013 –
Novozymes, Salem, VA 5/2013
Used computational fluid dynamics to model downstream processing of microorganisms. Made recommendations for operation optimization based on three-dimensional numerical models of an industrial spray dryer for improved product yield.

STUDENT RESEARCH ADVISING

Tanner Polen (B.S. anticipated 2018, University of Kentucky) – Paleopiezometric analyses of mid-crustal shear zones in NW Scotland
Austin Stephens (Diploma 2017, STEAM Academy) – Investigating depth-variance of crustal rheology using 2-D coupled thermomechanical finite element models of tri-axial compression

FIELD EXPERIENCE

Annapurna Himalaya *(April – May 2017, central Nepal)* – Transect sampling along the Modi Khola and Marshyangdi Rivers
Grand Teton National Park and Bridger-Teton National Forest *(August 2016, Idaho and Wyoming)* – Sample collection for research laboratory
A Billion Years of Deformation in the Central Appalachians: Orogenic Processes and Products *(November 2015, Virginia)* – GSA Annual Meeting field trip
GSA/ExxonMobil Bighorn Basin Field Course *(August 2015, Montana and Wyoming)* **–** Comprehensive integrated structural basin analysis and petroleum play assessment of the Bighorn Basin taught by ExxonMobil
"Border to Beltway" Field Course *(March and May 2014, Texas, New Mexico, DC, Virginia, and West Virginia)* – Two-part regional geologic studies (1) in and around El Paso and (2) in the mid-Atlantic

REFEREED PUBLICATIONS

Hassounah, I.A., Rowland, W.C., **Sparks, S.A.**, Orler, E.B., Joseph, E.G., Camelio, J.A. & Mahajan, R.L., "Processing of multilayered filament composites by melt blown spinning". *J. of Appl. Polym. Sci.*, 2014, *131*, 40786.

OTHER PUBLICATIONS

Sparks, S.A., Thigpen, J.R., (2018) "Transient thermal-rheological interaction during collisional orogenesis revealed through numerical modeling". Manuscript in preparation

GRANTS AND FELLOWSHIPS

Sigma Xi Grant-in-Aid of Research	December 2017
GSA Southeastern Section Graduate Research Grant	April 2017
National Science Foundation Graduate Research Fellowship	March 2017
AAPG Meyerhoff Memorial Grant	March 2017
Pirtle Fellowship	February 2016
SMART Grant	February 2011

AWARDS AND HONORS

GSA Southeastern Section Student Travel Grant	September 2017
Brown-McFarlan Student Travel Grant	September 2017
University of Kentucky Graduate Student Incentive Program Award	August 2017
Southern California Earthquake Center Student Travel Award	July 2017
GSA Structural Geology and Tectonics Division Travel Award	July 2016
GSA/ExxonMobil Bighorn Basin Field Award	August 2015
GSA On To the Future Travel Award	August 2015
R.S. Gordon and J.H. Kroehling Materials Science Scholarships	August 2012
Warren Gentry and Gerhard Beyer Chemical Engineering Scholarships	August 2012
Gilbert L. and Lucille C. Seay Engineering Scholarship	August 2012
Virginia Tech Chemical Engineering Study Abroad Scholarship	June 2012
Virginia Tech Presidential Scholarship	January 2012
Friends of Chemistry Scholarship	May 2011
NASA's National Aerospace Scholar	2009 – 2010
The Provost's Service Award	May 2010

COMPUTER SKILLS

- C++, LaTeX, Mathematica, MATLAB
- Elfen FE
- Genesis, Kinex, Seisware, Trinity T3
- ANSYS Fluent and CFX
- Autodesk Inventor
- JMP, Minitab
- Aspen Plus
- Adobe Illustrator, InDesign, and Photoshop
- CentOS, macOS, Microsoft Windows
- Microsoft Office and Visio

RELEVANT LABORATORY SKILLS

- Scanning Electron Microscopy
- Electron Probe Microanalysis
- Dynamic Mechanical Analysis
- Thermogravimetric Analysis
- Uniaxial Tensile/Compressive Testing
- Fatigue Testing
- Dynamic Shear Rheometry
- 3- and 4-Point Bend Flexural Testing
- Brinell/Rockwell/Vickers Hardness Testing
- Charpy Impact Testing

PRESENTATIONS

Abstracts

Sparks, S.A., Thigpen, J.R. (2017), Linkages Between Critical Wedges and Crustal Channels Using 2-D Coupled Thermomechanical Finite Element Models: Implications for Himalayan Orogenic Evolution, Abstract 208645 presented at 2017 Fall Meeting, AGU, New Orleans, LA, 11-15 Dec.

Sparks, S.A., Thigpen, J.R., Examining transient thermal-rheological interaction during collisional orogenesis using numerical modeling: Implications for channel flow and critical wedge models. In *Geological Society of America Abstracts with Programs. Vol. 49, No. 6,* Geological Society of America: Seattle, WA, 2017.

Sparks, S.A., Thigpen, J.R., Lee, J., Evaluating gneiss dome thermal evolution using 2-D coupled thermomechanical finite element modeling. In *Abstracts of Papers, 66th Annual Meeting of GSA Southeastern Section*, Geological Society of America: Richmond, VA, 2017.

Sheth, S.S., **Sparks, S.A**., Marand, H., Influence of temperature and molar mass on the spherulitic growth rate of poly(epsilon-caprolactone). In *Abstracts of Papers, 244th National Meeting of the American Chemical Society*, American Chemical Society: San Diego, CA, 2012.

Other Presentations

University of Kentucky Rast-Holbrook Seminar, Lexington, KY 2017

Kentucky Geological Survey Seminar, Lexington, KY 2017

Imperial Barrel Award Regional Competition (3rd Place), Pittsburgh, PA 2017

Virginia Tech Undergraduate Research Symposium (Poster Contest Winner), Blacksburg, VA 2011

ACerS Speaking Contest (2nd Place), Blacksburg, VA 2011

WORKSHOPS

Computational Infrastructure for Geodynamics Crustal Deformation Modeling Tutorial and Workshop: Software tutorial (PyLith FE) and short-term tectonics workshop, July 2017.

LEADERSHIP

Department of Earth and Env. Sciences Graduate Student Representative (2017-18)

AAPG Bluegrass Chapter Vice President (2016-17) and Secretary (2017-18)

Materials Engineering Professional Society President (2012-13) and Vice President (2011-12)

PROFESSIONAL MEMBERSHIPS

American Geophysical Union

Association of Women Geoscientists

National Association of Geoscience Teachers

Geological Society of America

Sigma Xi

Tau Beta Pi