

ERIC HORSMAN

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Research interests: (1) Igneous emplacement processes in the shallow crust, (2) Spatial and temporal relationships between magmatism and deformation, (3) Rheology of and fabric development in naturally deformed rocks, (4) Development of student spatial visualization skills.

EMPLOYMENT & EDUCATION

Associate Professor, Dept. of Geological Sciences, East Carolina Univ. (Aug. 2017 – present)

Assistant Professor, Dept. of Geological Sciences, East Carolina Univ. (Jan. 2010 – Aug. 2017)

Mendenhall Postdoctoral Fellow, U.S.G.S., Menlo Park, Calif. (Jan. 2008 – Dec. 2009)

Research topic: Examining past and present heterogeneous deformation of the San Andreas Fault system and borderlands using a 3-d geologic map of the San Francisco Peninsula

Postdoctoral Scholar, University of California - Berkeley (Aug. 2006 – Dec. 2007)

Research topics: (1) Development of lattice-preferred orientation and microstructural fabric in naturally deformed rocks, (2) Pluton emplacement processes.

Ph.D. in Geology, University of Wisconsin - Madison (May 2006)

Dissertation topic: Quantifying heterogeneous deformation: theory and application

M.S. in Geology, University of Wisconsin - Madison (Jan. 2003)

Thesis topic: Magmatic fabric and sheeted emplacement of the Maiden Creek sill, Henry Mountains, Utah.

Environmental Geologist, URS / Dames & Moore, Houston, Texas (Aug. 1999 – Aug. 2000)

B.A. in Geology, Rice University, Houston, Texas (May 1999)

Thesis topic: Lineation rotation due to pluton emplacement, Mt. Morrison Pendant, Sierra Nevada: testing transpressional models

PEER-REVIEWED PUBLICATIONS – Student authors in *italics*

- Morgan, S.S., *Jones, R., Conner, J., Student, J., Schaner, M.,* Horsman, E., & de Saint Blanquat, M., in press. Magma sheets defined with magnetic susceptibility, Maiden Creek sill, Henry Mountains, Utah, USA. Accepted for publication in *Geology*.
- Horsman, E., *Broda, R.J., Gwyn, N.Z., Maurer, E.A., Thornton, E.D., & Ward, M.D.,* in press. Progressive construction of laccolithic intrusive centers, Henry Mountains, Utah, U.S.A. In: Breitkreuz, C. & Rocchi, S. (eds), *Physical Geology of High-Level Magmatic Systems*, a volume in the *Advances in Volcanology* book series.
- Zaremba, N., Mallinson, D., Leorri, E., Culver, S.; Riggs, S.; Mulligan, R.,* Horsman, E. & *Mitra, S.,* 2016. Controls on the stratigraphic framework and paleoenvironmental change within a Holocene estuarine system: Pamlico Sound, North Carolina, USA. *Marine Geology*, 379: 109-123.
- Manda, A. & Horsman, E., 2015. Fracturesis jointitis: Causes, symptoms, and treatment in groundwater communities. *Groundwater*, 53: 836-840
- Leorri, E., Cearreta, A., Irabien, M.J., *García-Artola, A.,* Corbett, D.R., Horsman, E., Blake, W.H. & Sanchez-Cabeza, J.-A., 2014. Anthropogenic disruptions of the sedimentary record in coastal marshes: Examples from the southern Bay of Biscay (N. Spain). *Continental Shelf Research*, 86: 132-140.
- Davis, J.R., Titus, S.J. & Horsman, E., 2013. Non-steady homogeneous deformations: Computational techniques using Lie theory, and application to ellipsoidal markers in naturally deformed rocks. *Journal of Structural Geology* 56: 142-155.
- Saint Blanquat (de), M., Horsman, E., Habert, G., Morgan, S., Vanderhaeghe, O., Law, R. & Tikoff, B., 2011. Magmatic pulsing, duration of pluton construction, and the paradoxical relationship between tectonism and plutonism. *Tectonophysics*, 500: 20-33.
- Titus, S.J., *Crump, S., McGuire, Z.,* Horsman, E., & Housen, B., 2011. Using vertical axis rotations to characterize off-fault deformation across the San Andreas Fault system, central California. *Geology*, 39: 711-714.
- Horsman, E., Morgan, S, de Saint-Blanquat, M., Habert, G., *Hunter, R.S.,* Nugent, R. & Tikoff, B., 2010. Emplacement and assembly of shallow plutons through multiple magma pulses, Henry Mountains, Utah. In: J.D. Clemens et al. (eds.), 6th Hutton Symposium on the Origin of Granites and Related Rocks. *Geological Society of America Special Publication*, 472: 117-132.
- Titus, S.J. & Horsman, E., 2010. Characterizing and improving spatial visualization skills. *Journal of Geoscience Education*, 57: 242-254.

- Czeck, D., *Fissler, D.*, Horsman, E., and Tikoff, B., 2009. Strain analysis and rheology contrasts in polymictic conglomerates: an example from the Seine metaconglomerates, Superior Province, Canada. *Journal of Structural Geology*, 31: 1365-1376.10
- Horsman, E., Tikoff, B., & Czeck, D., 2008. Rheological implications of heterogeneous deformation at multiple scales in the Late Cretaceous Sierra Nevada, California. *G.S.A. Bulletin*, 120: 238-255.
- Morgan, S., *Stanik, A.*, Horsman, E., Tikoff, B., Saint-Blanquat (de), M., & Habert, G., 2008. Emplacement of multiple magma sheets and wall rock deformation: Trachyte Mesa intrusion, Henry Mountains, Utah. *Journal of Structural Geology*, 30: 491-512.
- Horsman, E. & Tikoff, B., 2007. Constraints on deformation path from finite strain gradients. *Journal of Structural Geology*, 29: 256-272.
- Saint-Blanquat (de), M., Habert, G., Horsman, E., Morgan, S. S., Tikoff, B., Launeau, P., & Gleizes, G., 2006. Mechanisms and duration of non-tectonically assisted magma emplacement in the upper crust, the Black Mesa pluton, Henry Mountains. *Tectonophysics*, 428: 1-31.
- Horsman, E., Tikoff, B. & Morgan, S., 2005. Emplacement-related fabric and multiple sheets in the Maiden Creek sill, Henry Mountains, Utah. *Journal of Structural Geology*, 27: 1426-1444.
- Horsman, E. & Tikoff, B., 2005. Quantifying simultaneous discrete and distributed displacement. *Journal of Structural Geology*, 27: 1168-1189.
- Morgan, S., Horsman, E., Tikoff, B., Saint-Blanquat (de), M., & Habert, G., 2005. Sheet-like emplacement of satellite laccoliths, sills, and bysmaliths, Henry Mountains, southern Utah. In: Pederson, J. & Dehler, C.M. (eds.) *Interior Western United States: G.S.A. Field Guide 6*: 283-309.

NON-PEER-REVIEWED PUBLICATIONS

- Horsman, E., Morgan, S., de Saint Blanquat, M. & Tikoff, B., 2010. Emplacement and assembly of shallow intrusions, Henry Mountains, Utah. Field trip guidebook for the LASI 4 conference, 22-26 September 2010, Moab and Henry Mountains, Utah.
This field guide describes a two-day field trip I led for ~40 geoscientists in association with the 4th Laccolith and Sill (LASI) conference, which I co-organized.

RECENT ABSTRACTS – Student authors in *italics*

Horsman, E. & Currier, R., 2016. Details of sill and laccolith growth in the shallow crust: comparing results from field studies, geophysics, analog models, and geodesy. Geological Society of America Annual Meeting.

Rost, R., Giorgis, S.D. & Horsman, E., 2016. Constraints on minimum rates of igneous emplacement from paleomagnetic data, Trachyte Mesa laccolith, Henry Mountains, UT. Geological Society of America Annual Meeting.

Giorgis, S.D., Morgan, S.S., & Horsman, E., 2016. Paleomagnetic investigation of pulsed assembly of the Maiden Creek sill, Henry Mountains, UT. Geological Society of America Annual Meeting.

Reed, M.P., Giorgis, S.D. & Horsman, E., 2016. Depth to bedrock from a 3d gravity survey of a paleo-valley, Glacial Lake Geneseo, Livingston Co., NY. Geological Society of America Annual Meeting.

Donovan, B.G., Culver, S.J., Leorri, E., Mallinson, D.J., Parham, P.R., Noor, S.A.M., & Horsman, E., 2016. A multiproxy paleoenvironmental reconstruction of marine sediments from two interglacials: western Sunda shelf, southern South China Sea. Geological Society of America Annual Meeting.

Harrison, E.I., Culver, S.J., Leorri, E., Mallinson, D.J., Parham, P.R., Noor, S.A.M., & Horsman, E., 2016. Holocene paleoenvironmental reconstruction of the Sunda shelf, off northeastern peninsular Malaysia. Geological Society of America Annual Meeting.

Horsman, E., Giorgis, S.D., Morgan, S.S. & De Saint Blanquat, M., 2015. Testing geochemical homogeneity of incrementally emplaced sills and laccoliths, Henry Mountains, Utah. Geological Society of America Annual Meeting.

Giorgis, S.D., *Chervin, J.*, Horsman, E. & Morgan, S.S., 2015. Constraints on rate of igneous emplacement using paleomagnetic secular variation, Maiden Creek sill, Henry Mountains, Utah. Geological Society of America Annual Meeting.

Rost, R., Giorgis, S.D. & Horsman, E., 2015. Paleomagnetic constraints on the duration of laccolith growth, Trachyte Mesa intrusion, Henry Mountains, Utah. Geological Society of America Annual Meeting.

Braunagel, M., Giorgis, S.D. & Horsman, E., 2015. Using preserved secular variation to constrain emplacement duration in large scale sills, Copper Ridge intrusion, Mt Ellen, Henry Mountains, Utah. Geological Society of America Annual Meeting.

- Burns, R. & Horsman, E., 2014.* Constraints on Late Paleozoic slip history and possible Quaternary reactivation, Eastern Piedmont Fault System, North Carolina and Virginia. Geological Society of America Annual Meeting.
- Maurer, E. & Horsman, E., 2014.* Geometry and construction history of the Copper Ridge Laccolith, Mount Ellen, Henry Mountains, Utah. Geological Society of America Annual Meeting.
- Horsman, E., 2014. Rates and magnitudes of strain during igneous emplacement in the shallow crust: Buckhorn Ridge Intrusion, Henry Mountains, Utah. Geological Society of America Annual Meeting.
- Horsman, E., Morgan, S., de Saint Blanquat, M. & Giorgis, S.D., 2013. Snapshots of progressive intrusive center growth in the shallow crust, Henry Mountains, Utah. Geological Society of America Annual Meeting.
- Poythress, C.R. & Horsman, E., 2013.* Preliminary findings of a recently discovered Mesozoic rift basin concealed beneath coastal plain cover, Bertie County, North Carolina. Geological Society of America Annual Meeting.
- Thornton, E.D. & Horsman, E., 2013.* Emplacement mechanisms, timing, and internal flow characteristics of the intrusive sheet network on the southern margin of Mount Hillers, Henry Mountains, Utah. Geological Society of America Annual Meeting.
- Ward, M. & Horsman, E., 2013.* Evidence of pulsed construction of a mid-Tertiary laccolith by distinguishing component magmas at Mount Pennell, Henry Mountains, Utah. Geological Society of America Annual Meeting.
- Broda, R.J. & Horsman, E., 2013.* Geometry and construction history of an asymmetric laccolithic intrusive center: Mount Hillers, Henry Mountains, Utah. Geological Society of America Annual Meeting.
- Schaner, M., Morgan, S. & Horsman, E., 2013.* Multiple sheet magma emplacement in the Maiden Creek sill, Henry Mountains, Utah. Geological Society of America Annual Meeting.
- Cramer, J., Thornton, E.D., Horsman, E. & Giorgis, S., 2013.* Paleomagnetic constraints on the relative timing of emplacement of igneous intrusions from the south side of Mount Hillers, Henry Mountains, Utah. Geological Society of America Annual Meeting.
- Thompson, P., Broda, R.J., Horsman, E. & Giorgis, S., 2013.* Paleomagnetic constraints on the timing of intrusions in Gold Creek canyon, Mt. Hillers, Henry Mountains, Utah. Geological Society of America Annual Meeting.

- Glose, T., Ward, M., Horsman, E. & Giorgis, S., 2013. Paleomagnetic insight into the emplacement history of the northeastern flank of Mount Pennell, Henry Mountains, Utah. Geological Society of America Annual Meeting.*
- Leorri, E., Cearreta, A., Jesus Irabien, M., Mitra, S., Garcia-Artola, A., Blake, W.H., Zimmerman, A.R. & Horsman, E., 2013. Proxies to use in order to identify the Holocene / Anthropocene transition in coastal salt marshes. Atlantic Estuarine Society Annual Meeting.*
- Conner, J., Morgan, S., Student, J.S. & Horsman, E., 2013. AMS and image analysis data at multiple scales support a multiple sheet emplacement model for the Maiden Creek sill, Henry Mts., Utah. Geological Society of America North-Central Section Meeting.*
- Burns, R. & Horsman, E., 2013. Tectonic evolution of the Contentnea Creek pluton, Wilson, North Carolina. East Carolina University Research and Creative Activities Week.*
- Thornton, E. & Horsman, E., 2012. Emplacement of the Gupton pluton: a lobe of the Alleghanian Rolesville batholith, eastern Piedmont, North Carolina. Geological Society of America, Southeastern Section Meeting.*
- Ciruzzi, D., Farrell, M., Horsman, E., and Giorgis, S., 2012. Relative age dating of sills and satellite intrusions from paleomagnetic data. Geological Society of America, Northeastern Sectional Meeting.*
- Horsman, E., de Saint Blanquat, M., and Morgan, S.S., 2012. Igneous emplacement processes in the shallow crust: Buckhorn Ridge intrusion, Henry Mountains, Utah. Geological Society of America Annual Meeting.*
- Davis, J.R., Horsman, E., and Titus, S., 2012. Using deformable clasts to constrain rock deformation: an example from the Gem Lake shear zone Geological Society of America Annual Meeting.*
- Thornton, E. & Horsman, E., 2012. Emplacement of the Gupton pluton: a lobe of the Alleghanian Rolesville batholith, eastern Piedmont, North Carolina. East Carolina University Research and Creative Activities Week.*

GRANT ACTIVITY

- 2017 Pending NSF proposal to Tectonics program, Horsman as PI. Collaborative Research: Constraints on the emplacement history of sheeted intrusions, Henry Mountains, Utah -- \$203,509 requested.

- 2013 Funded East Carolina University summer research proposal, Horsman as lead PI. Quantitative constraints on conditions of breccia formation in shallow magma systems – \$5,395 awarded.
- 2012 Funded NSF grant to Tectonics program, Horsman as lead PI. Collaborative Research: Spatial and temporal growth of upper crustal intrusions, Henry Mountains, Utah – \$209,958 awarded to Horsman.
- 2012 Funded USGS EDMAP grant, Horsman as sole PI. Geologic mapping to examine construction of igneous intrusions in the shallow crust, Henry Mountains, Utah – \$14,697 awarded.
- 2011 Funded USGS EDMAP grant, Horsman as sole PI. Geologic mapping to examine construction of igneous intrusions in the shallow crust, Henry Mountains, Utah – \$16,250 awarded.
- 2011 Funded East Carolina Univ. teaching grant. Improving student spatial thinking skills in geoscience courses – \$13,222 awarded.

INVITED PRESENTATIONS

University of South Florida, Spring 2014
 Appalachian State University, Spring 2013
 Western Washington University, Spring 2012
 College of William and Mary, Spring 2012
 University of North Carolina – Chapel Hill, Fall 2011
 Western Carolina University, Spring 2011
 North Carolina State University, Fall 2010
 University of Arkansas, Spring 2009
 East Carolina University, Spring 2009
 Topical session, American Geophysical Union Fall meeting, Fall 2008
 California State University - Sacramento, Fall 2008
 University of California - Davis, Spring 2008
 Sonoma State University, Fall 2007
 Colgate University, Spring 2007
 San Jose State University, Fall 2006
 Sonoma State University, Fall 2006
 Topical session, Geological Society of America annual meeting, Fall 2005

AWARDS

Distinguished Graduate Student Award, Dept. of Geoscience, Univ. of Wisconsin – Madison, 2006

Innovative Teaching Award (university-wide), Univ. of Wisconsin – Madison, 2006

Ciriacks Distinguished Graduate Fellowship, Dept. of Geoscience, Univ. of Wisconsin – Madison, 2005

Thomas E. Berg Award for Excellence in Teaching, Dept. of Geoscience, Univ. of Wisconsin – Madison, 2005

Geology & Geophysics Teaching Enhancement Award, Dept. of Geoscience, Univ. of Wisconsin – Madison, 2005

Outstanding Student Research Award, G.S.A. Structure & Tectonics division, 2004

Thomas E. Berg Award for Excellence in Teaching, Dept. of Geoscience, Univ. of Wisconsin – Madison, 2001

Weeks Research Assistantship, Dept. of Geoscience, Univ. of Wisconsin – Madison, 2000

RECENT COLLABORATORS

Dyanna Czeck (Univ. of Wisconsin - Milwaukee)

Joshua Davis (Carleton College)

Guillaume Delpech (Université Paris Sud, Orsay, France)

Scott Giorgis (SUNY - Geneseo)

Russell Graymer (U.S. Geological Survey)

Bernard Housen (Western Washington Univ.)

Robert Jachens (U.S. Geological Survey)

Richard Law (Virginia Tech)

Eduardo Leorri (East Carolina Univ.)

David Mallinson (East Carolina Univ.)

Alex Manda (East Carolina Univ.)

Sven Morgan (Central Michigan Univ.)

Jean-Louis Paquette (Université Blaise Pascal, Clermont, France)

Michael Petronis (New Mexico Highland Univ.)

Michel de Saint Blanquat (CNRS Midi-Pyrenees, Toulouse, France)

Basil Tikoff (University of Wisconsin - Madison)

Sarah Titus (Carleton College)

Olivier Vanderhaeghe (Université Henri Poincaré, Nancy, France)

TEACHING EXPERIENCE

At ECU I have taught the following courses.

GEOL 1500: Dynamic Earth –

This is an introductory geoscience course with an enrollment of 80-100 students.

GEOL 3200 / 3201: Introduction to Field Methods & Laboratory

This is an upper-level course for undergraduate majors with a typical enrollment of 25-30 students. One highlight of the course is a four-day field trip to the Appalachian Mountains, where students collect data for use in a major final project (geological maps, cross sections, report, etc.)

GEOL 3300 / 3301: Structural Geology & Laboratory

This is an upper-level course for undergraduate majors with a typical enrollment of 25-30 students. One highlight of the course is a four-day field trip to the Appalachian Mountains, where students make and record scientific observations of a wide range of geological structures.

GEOL 4000: Summer Geological Field Course

This is the capstone course for our undergraduate students – an immersive experience making and recording scientific observations in a variety of field areas in New Mexico and Colorado. I usually teach for about two weeks of this six-week course.

GEOL 6500: Tectonics

This is a graduate-level course in which we explore Earth from a very “big picture” perspective. Topics vary depending on student interest, but typically include plate tectonics, evolution of crust / mantle / atmosphere compositions, major geological events in Earth history, etc. This course usually involves a four-day field trip.

Prior to arriving at ECU, I had the following teaching experience and training.

Graduate Teaching Assistant, Department of Geology & Geophysics, Univ. of Wisconsin - Madison (2000-2006). *Courses:* Structural Geology, Field Methods, Historical Geology, Introduction to Geologic Structures

Lecturer, Department of Geosciences, Univ. of Wisconsin - Milwaukee (Spring 2003).
Course: Structural Geology (lecture & lab)

Delta program Certificate in Research, Teaching and Learning, Univ. of Wisconsin - Madison (2006) – Website: www.delta.wisc.edu

STUDENT ADVISING

I have served as the primary graduate supervisor for the following 10 students:

- Robert Broda, M.S. 2014. *Thesis*: Geometry and progressive development of a shallow crustal intrusive complex, Mount Hillers, Henry Mountains, Utah.
- Richard Burns, M.S. 2015. *Thesis*: The Contentnea Creek granite: constraints on late Paleozoic magmatism and deformation, eastern Piedmont fault system, North Carolina.
- Nathan Gwyn, M.S. 2011. *Thesis*: Emplacement and growth of large complex intrusions in the shallow crust, Henry Mountains, Utah.
- Emmett Keeler, departed ECU without completing thesis. *Thesis*: Mechanical behavior of mid-crustal shear zones, Carthage Colton shear zone, Adirondacks, New York.
- Elizabeth Maurer, M.S. 2015. *Thesis*: Geometry and construction history of the Copper Ridge laccolith, Mount Ellen, Henry Mountains, Utah.
- Matthew McDaniel, M.S. x2018. *Thesis*: Geophysical characterization of subsurface intrusion geometry, Henry Mountains, Utah
- C. Ryan Poythress, departed ECU without completing thesis. *Thesis*: Geology and geophysics of the Bertie Basin: a Mesozoic rift basin concealed beneath the North Carolina coastal plain.
- Max Robinson, M.S. x2017. *Thesis*: Constraints on strain partitioning in the Tablerock thrust sheet from crystallographic preferred orientation analysis: Blue Ridge thrust complex, North Carolina.
- Erik Thornton, M.S. 2015. *Thesis*: Timing, internal flow characteristics, and emplacement mechanisms of the intrusive sheet network on the southern margin of Mount Hillers, Henry Mountains, southern Utah.
- Mitchell Ward, M.S. 2014. *Thesis*: Geometry and construction history of a complex intrusive center in the shallow crust, Mount Pennell, Henry Mountains, Utah.

Additionally, I have served on the thesis committees of 14 graduate students supervised by other ECU faculty, including: Joshua Bitner, Scott Brinkley, Katie Cummings, Tiffany Cummings, Alex Hammerstrom, Heather Lancaster, Leatha Moretz, Justin Nixon, Jonathan Prevatte, Jonathan Noles, Erica Serna, Casey Smith, Sage Wagner, and Jason Yonts.

I have served as the research supervisor for 11 undergraduate students, including: Erik Anderson, Tyler Anderson, Richard Burns, Jacob Lewis, Elizabeth Maurer, Matthew Mellis, Joseph Perry, Ryan Poythress, Conor Riddle, Erik Thornton, and Kimberly Walsh.

PROFESSIONAL DEVELOPMENT & SERVICE

Reviewer for peer-reviewed journals and books, and funding agencies, including: Advances in Volcanology, Geological Society of America Bulletin, Geological Society of America Special Papers, Geology, Geosphere, Geological Society of London Special Papers, GSA Today, International Journal of Earth Sciences, Journal of the Geological Society of London, Journal of Geoscience Education, Journal of Structural Geology, Journal of South American Earth Science, National Science Foundation, Tectonics, Tectonophysics, Terra Nova

Conference co-convenor and field trip leader: Laccoliths and Sills International (LASI) 4: Physical geology of shallow-level magmatic systems, Moab and the Henry Mountains, Utah, 22-26 September 2010.

Field trip guidebook: http://myweb.ecu.edu/horsmane/vitae/henrysFieldTrip_lasi4.pdf

Abstract volume: <http://myweb.ecu.edu/horsmane/vitae/LASI4AbstractBook.pdf>

I was one of four principal organizers and conveners of this four-day conference attended by approximately 40 geoscientists, more than half of whom traveled from outside North America. We had two full days of scientific talks and posters, followed by a two-day field trip that I led and for which I wrote the above-linked field guide.

Conference co-organizer: Short course organizer, Geological Society of America Southeast Section Meeting, Asheville, NC, Spring 2012

Conference topical session co-organizer:

- (7) Emplacement of upper crustal magmatic intrusions: Field studies of laccoliths, sills, and sub-volcanic plugs, G.S.A. Annual Meeting, Oct. 2014
- (6) Magma transport, emplacement, and accommodation: morphology, mechanisms, and models, G.S.A. Annual Meeting, Oct. 2013
- (5) Multidisciplinary studies of fault system deformation, G.S.A. Annual Meeting, Oct. 2011
- (4) Pluton emplacement: duration, mechanisms, and structural controls, G.S.A. Annual Meeting, Oct. 2009
- (3) Understanding strike-slip faults, A.G.U. Fall Meeting, Dec. 2008
- (2) Using geology and geophysics to solve geoscience problems, G.S.A. Annual Meeting, Fall 2007
- (1) Visualization in the Geosciences, G.S.A. Annual Meeting, Fall 2006

External reader Ph.D. thesis, Emanuele Roni, Univ. of Pisa, Italy – 2011

Five-day Cutting Edge workshop on Teaching Structural Geology, Tectonics & Geophysics, Univ. of Tennessee, Knoxville, TN – July 2012

Four-day Cutting Edge workshop on Preparing of an Academic Career in the Geosciences,
Penn State Univ., State College, PA – July 2005

Three-day Cutting Edge workshop on Teaching Quantitative Skills in a Geoscience Context,
Northfield, MN – July 2002

Field trip co-leader: Sheet-like emplacement of satellite laccoliths, sills, and bysmaliths,
Henry Mountains, southern Utah. Geological Society of America Annual Meeting, Fall
2005