

Barbara Lee Dutrow

ADDRESS: Adolphe G. Gueymard Professor of Geology
Department of Geology & Geophysics
Louisiana State University
Baton Rouge, LA 70803-4101
voice: (225) 578-2525
e-mail: dutrow@lsu.edu <http://www.geol.lsu.edu/dutrow>

EDUCATION

Ph.D. 1985, Geological Sciences, Southern Methodist University, Dallas, TX
M.S. 1980, Geological Sciences, Southern Methodist University, Dallas, TX
B.A. 1977, Earth Sciences, Chadron State College, Chadron, NE, GPA (3.98/4.00)

Ph.D. Thesis: *A Staurolite Trilogy: I. Lithium in staurolite and its petrologic significance II. An experimental determination of the upper stability of staurolite plus quartz III. Evidence for multiple metamorphic episodes in the Farmington Quadrangle, Maine.*

M.S. Thesis: *Metric analysis of a Late Pleistocene mammoth assemblage, Hot Springs, South Dakota*

PROFESSIONAL EXPERIENCE

Adolphe G. Gueymard Distinguished Professor, Louisiana State University; 2002-present

Visiting Professor, University of Arizona, Tucson, 2008 sabbatical

Professor, Louisiana State University; 2002-present

Associate Professor, Louisiana State University; 1995-2002

Assistant Professor, Louisiana State University; 1992-1995

Affiliate or Visiting Scientist, Los Alamos National Lab; 1993-present

Visiting Assistant Professor, University of Iowa; 1990-1992

Assistant Professor-Research, Louisiana State University; 1985-1990

Research Associate, University of Arizona, 1989-1991; **Visiting Scientist**, April-June, 1988; *focus on fluid flow and chemical transport.*

Alexander von Humboldt Fellow, Institut für Mineralogie, Ruhr-Universität, Bochum, West Germany; Sept. 1985 - Oct. 1987. *Research focused on high P - high T experimental mineral stability and phase relations*

Instructor, Southern Methodist University; taught Mineralogy, Fall 1982 and 1984

Research Assistant, Southern Methodist University; 1981-1984

Teaching Assistant, Southern Methodist University; 1978-81

Igneous and Metamorphic Petrology, Optical Mineralogy, Mineralogy, Structural Geology and Introduction to Geology.

Consulting Geologist, Mobil Exploration and Producing Services, Inc., Dallas, TX; 1980-85, 1988; *Full-time geologist* January - June, 1980. Focus on hydrocarbon potential for carbonates, sandstones, volcanoclastics from the North Slope, Alaska; North Sea; Monterey Formation, California.

Expert Witness: Akin, Gump, Hauer, Strauss and Feld, LLP, Washington, D.C. and Horsehead Industries, NYC, NY, 1997-1998, Microanalyses and chemical characterization of slags.

Taylor, Porter, LLP, Baton Rouge, LA, 2001, 2005, 2009; Chemical composition and structure of asbestiform silicates.

Field Assistant

Beartooth Mountains, MT; July-August, 1982
Assistant supervisor and cartographer, Hot Springs Mammoth Site, SD. summers 1976-1979
 National Geographic Expeditions to Panama, Collection of early Tertiary mammals, Canal Zone
 and Balboa, Panama. January, 1979; Prof. Slaughter, SMU
 Excavation of vertebrates at Trolinger Springs Mastadon Site, MO. Illinois State Museum. June-
 July, 1978
 Excavation of Brewer Pueblo, Dove Creek, Colorado. June, 1978, Northern Arizona University
Cartographer, Hudson Meng Bison Kill Site, NE, July, 1975, CSC
 Lehner Ranch Mammoth Kill Site, AZ, July, 1975; University of Arizona
 Geologic mapping of Pleistocene terraces, Grand Gulch, Utah; June, 1975; CSC

AWARDS and HONORS

Adolphe G. Gueymard Professorship of Geology & Geophysics, 2002-present
Best Educational Exhibit by an Institution, Tucson Gem and Mineral Show, 2011
Distinguished Alumni Award, Chadron State College, NE, 2009
 Elected *Fellow*, Geological Society of America, 2007
Distinguished Achievement, Honorary Award, 2006-2007, South Central Federation of Mineralogical So-
 cieties, American Federation Scholarship Foundation.
 Commendation for *Excellence in Teaching*, Spring 2005, Fall, 2006; College of Basic Sciences, LSU. (based
 on teaching evaluations of students in Geol 2081 - Mineralogy and Geol 4043: Earth Materials and
 the Environment)
 Selected panelist, *NAS/National Research Council Study, Principles and Design Strategies of a Staged
 Repository System*, Board on Radioactive Waste Management, June 2001 - Dec. 2002. co-authored:
*One Step at a Time: The Staged Development of Geologic Repositories for High-Level Radioactive
 Waste*
Distinguished Faculty Member, University-wide award, LSU, 2002
Faculty Honor Roll, LSU, Spring 2001. Professors nominated by graduating students, for contributions to
 student life and the undergraduate experience "who exhibit characteristics and behaviors that show
 you truly care about them". Only faculty member from College of Basic Sciences to receive award.
Distinguished Young Alumni Award, Chadron State College, NE, 1997
Nontenured Faculty Award for Natural and Physical Sciences, Phi Kappa Phi, LSU, 1995.
 Elected as *Fellow*, Mineralogical Society of America, 1995
Nontenured Faculty Research Award, College of Basic Sciences, LSU, 1994.
Outstanding Service Award, Mineralogical Society of America, 1993.
Alexander von Humboldt Stiftung Fellowship, Alexander von Humboldt Foundation, Bonn, West Germany,
 1985-1987.
Best Student Paper, Geological Society of America, Rocky Mountain Section, 1980.
Nebraska Board of Regents Scholarship, four years full tuition, 1974-77; plus 10 additional undergraduate
 scholarships.
 see Service to Professional Societies for Elected positions.

National LECTURESHIPS

Sigma Xi National Lecturer, 1996-1998
Distinguished Lecturer, Mineralogical Society of America, 1991- 1992.
Lecturer, American Women in Geosciences, 1992-present.

CONTRIBUTIONS to PROFESSION

Leadership Positions including Elected Offices in Professional Societies

Chair, Executive Committee, Elements; 2009-2015. *Member*, 2008-2009. Elected position of the 17 international society representatives from seven countries. Elements is a collaborative venture of societies that are broadly in the fields of mineralogy, petrology and geochemistry. The EC is responsible for the financial oversight, society interactions, approve/appoint all Editors, work with new societies.

Foundation Board Member, Geological Society of America Foundation, 2014 - 2019.

Member, Policy Committee, IEDA (Integrated Earth Data Applications), 2013 - present.

Member, Geochemical Society, Committee on the Future of Publications, 2012 - 2013.

Executive Committee, Geological Society of America; 2011-2012

Councillor, Geological Society of America; 2010-2014

Chair, Penrose Committee (2013,2014); Chair, Day Medal Committee (2012); Chair, Nominating Committee (2012, member 2013); Member, Outstanding Woman in Geoscience Committee (2012, 2013); Member, External Awards Committee (2012, 2013); Introduction of M.T. Halbouty Distinguished Lecturers; John F.J. Thompson (2011), Sally Benson (2009).

Chair, Geochemical Society, Fellowship committee, 2009-2010;

President, Mineralogical Society of America; 2007. Oversee operation of the society, ca. 2 million dollar endowment, publications of the American Mineralogist and Reviews in Mineralogy and Geochemistry; committees and finances.

Vice-President, 2006; Past-President, 2008-2009; Chair, Executive Committee; Chair, Committee on Committees (oversee nominations of members to fill 150 positions); Chair, Publications Committee; Board of Directors, Edward Kraus Family Trust Fund;

Councillor, Mineralogical Society of America; 2002-2005 Chair, Benefactors Committee 1999-present; Chair, Nominating Committee for Officers, 2003; Chair, Roebling Medal Committee, 2004; Chair, Dana Medal Committee, 2005.

Secretary and Board of Directors, Mineralogical Society of America, 1995-1999

Executive Committee; Management Committee; Committee on Committees; Board of Directors, Edward Kraus Family Trust Fund; 1995-1999

Chair, F.D. Clarke Award Committee, *Geochemical Society*, 1996; Committee member, 1995-1998

Chair, Arts Council, *Mineralogical Society of America*, 1992-1995

Review Committees and Panelist

Member, The Natural History Museum (London), Ten-year Review, Committee for Department of Mineral Sciences, 2008-2009

Member, University of Minnesota, Duluth, review of the Department of Geology, 2005

Panelist, National Science Foundation, Tectonics Review Panel, 2013 (Spring, Fall)

Panel Member, U.S. Department of Energy Office of Geothermal Energy; review panel for "Enhanced Geothermal Technologies" 2011; Geothermal Energy, 2012; 2013.

Panel Member, U.S. Department of Energy Office of Geothermal Energy; review panel for "Site Characterization", 2010

Panel Member, U.S. Department of Energy Office of Civilian Radioactive Waste Management Source Term and Natural Barriers Review; panel for "Near Field Processes", 2005

Panel Member, Dept. of Energy, Environmental Management Science Program, Hydrogeology, 2002 Program Review Council, LSU, 1999-2004 (Chair, Marketing Review, March 2001; Food Science Review, 2002; Chemical Engineering, 2003)

External Reviewer, Institute for Geophysics and Planetary Physics, Los Alamos National Lab, 1995.

Committee Appointments and Editorships

Appointed *Mineralogical Society of America* representative to the *Elements'* Executive Committee, 2008-present.

Appointed *MSA Nominating Committee for Officers*, 2012, 2013

International Program Committee, 2010 Goldschmidt Conference, Knoxville, TN, USA (convene overarching sessions for Metamorphic Processes); 2005 Goldschmidt Conference, Moscow, ID, USA (convenor for sessions on Fluid Flow and Metamorphic Petrology); 1998 International Mineralogical Association meeting, Toronto, Canada (Fluids and Metamorphic).

Member, Kuno Award Committee, VGP section, American Geophysical Union, 2010-2014

Member, American Geophysical Union, VGP Officer selection committee, 2009-2011

Member, Nominating Committee for Officers, VGP section, American Geophysical Union, 2008-2012

Member, IMA Award Committee (career award), International Mineralogical Association, 2007-2011.

Member, Fellows Selection Committee, Geochemical Society, 2007-2009, Chair - 2009; Publications Committee, 2012-2013

Member, Geological Society of America Ad-Hoc Committee for Overarching Themes, 2009

Member, Annual Program Committee, Geological Society of America, 2005-2009; oversee all aspects of the annual meeting; successfully nominated two Halbouty Lecturers.

Member, Advisory Committee, 2009 Geological Research Conference, Geological Institute of America (2008-2009)

Ad-hoc Committee Member, NAS/NRC Committee on Research Priorities in Earth Science and Public Health, 2004

Member, National Research Council, Board on Earth Sciences and Resources, 1999-2002

Invited Participant, Integrated Solid Earth Sciences, NSF workshop for Earthscope, 2003-2007

Member, Cyberinfrastructure for Integrated Solid Earth Sciences, NSF, Metamorphic Petrology Databases, 2003-2010.

Member, International Commission for Tourmaline Nomenclature, International Mineralogical Association, 2002-present

Associate Editor, *American Journal of Science*, 2003-2016

Associate Editor, *Reviews of Geophysics*, 1995-2001

Associate Editor, *American Mineralogist*, 1992-1996; Guest AE for Special Holdaway Issue, 2001-2002.

See also **Professional Service**

Member, **Professional Societies:**

American Geophysical Union

European Union of Geosciences

Geological Society of America

Alexander von Humboldt Association of America

Geochemical Society

Mineralogical Society of America

Mineralogical Association of Canada

Sigma Xi

Phi Kappa Phi

European Association of Geochemistry New Orleans

RESEARCH ACTIVITY

Currently, my research concentration focuses on metamorphic petrology - mineralogy and fluid-rock interactions, combining field, experimental, and theoretical approaches to unravel the geologic history of metamorphic terranes. Mineral chemistry is essential to solving a variety of tectonic problems. General themes of my research are: (1) deciphering the geologic evolution of specific metamorphic terranes through computational modeling of heat and mass transfer; (2) combining thermal modeling studies with thermodynamic and kinetic models of nucleation and growth to interpret metapelitic rock textures; (3) tectonic evolution of the Sawtooth Mtns, ID and its implications for western Laurentia; (4) crystal chemistry of

minerals as a guide to formation conditions (pressure, temperature, and fluid composition), and vice versa, how formation conditions affect chemistry; (5) use of mineral chemistry as a provenance indicator; (6) feedback of thermal-chemical-mechanical processes related to hydrothermal systems in the crust and the effects on mineral stability and chemistry; (7) mineralogy and the environment and the need for mineralogy in public policy; (6) the use of scientific visualization for teaching and research and the use of very large datasets to teach geology; and (7) developing spatial and penetrative thinking skills in geosciences curriculum.

Projects include:

- Heat and mass transport in heterogeneous porous media; techniques for 4-D visualization;
- Textural, mechanical, thermal and chemical feedback effects of fluids on metamorphic genesis and resultant mineralogy and textural development;
- Metamorphic history of NW Maine and of the Sawtooth Metamorphic Complex, ID;
- Pseudomorph formation as a guide to prograde metamorphic history;
- Fracture mechanisms associated with contact metamorphism;
- Dynamics of double advective flow in porous media; its effects on chemistry and mineralogy;
- Fibrous tourmaline, crystallographic controls on growth habits and mineral;
- Thermodynamics of staurolite and tourmaline (calorimetry and phase relations);
- Experimental stability relationships of minerals in the KFMASH system;
- Microanalyses of materials, especially the influence of light elements; and
- Techniques for teaching complex-systems behavior and visualization of data.

My research background includes the application of numerous analytical techniques e.g., SIMS and electron microprobe, X-ray diffraction, SEM, CL, hydrogen extraction line; experimental apparatus e.g., hydrothermal pressure vessels, piston-cylinder presses, as well as computational techniques and programs. An integral portion of my research program involves undergraduates.

PUBLICATIONS:

Articles in Refereed Journals

- Dutrow, B.L., 1977. Preliminary post-cranial metric analysis of mammoths from the Hot Springs Mammoth Site, South Dakota. *Transactions of the Nebraska Academy of Sciences* 4:223-227.
- Holdaway, M.J., Dutrow, B.L. and Shore, P., 1986. A model for the crystal chemistry of staurolite. *American Mineralogist* 71:1147-1159.
- Holdaway, M.J., Dutrow, B.L., Borthwick, J., Shore, P., Harmon, R.S. and Hinton, R.W., 1986. Staurolite water contents as determined by hydrogen extraction line and ion microprobe. *American Mineralogist* 71:1135-1146.
- Dutrow, B.L., Holdaway, M.J. and Hinton, R.W., 1986. Lithium in staurolite and its petrologic significance. *Contributions to Mineralogy and Petrology* 92:496-506.
- Holdaway, M.J., Dutrow, B.L. and Hinton, R.W., 1988. Devonian and Carboniferous metamorphism in west-central Maine: The muscovite- almandine geobarometer and the staurolite problem revisited. *American Mineralogist* 73:20-48.
- Dutrow, B.L. and Holdaway, M.J., 1989. Experimental determination of the upper thermal stability of Fe-staurolite + quartz at medium pressures. *Journal of Petrology* 30:229-248.
- Henry, D.J. and Dutrow, B.L., 1990. Ca substitution in Li-poor aluminous tourmalines. *Canadian Mineralogist* 28:111-124.

- Dutrow, B.L., 1991. The effects of Al and vacancies on Li substitution in Fe-staurolite: A synthesis approach. *American Mineralogist* 76:42-48.
- Dyar, M.D., Perry, C., Rebbert, C., Dutrow, B., Holdaway, M., Lang, H., 1991. Mössbauer spectra of synthetic and naturally-occurring staurolites. *American Mineralogist* 76:27-42.
- Holdaway, M., Mukhopadhyay, B., Dutrow, B., Dyar, M., Rumble, D., and Grambling, J., 1991. A new perspective on staurolite crystal chemistry: Use of stoichiometric and chemical endmembers for a mole fraction model. *American Mineralogist*, 76:1910-1919.
- Henry, D.J. and Dutrow, B.L., 1992. Tourmaline in clastic metasedimentary rocks: an illustration of the petrogenetic potential of tourmaline. *Contributions to Mineralogy and Petrology*, 112:203-218.
- Holdaway, M.J., Mukhopadhyay, B., and Dutrow, B.L., 1995. Thermodynamic Properties of Stoichiometric Staurolites $H_2Fe_4Al_{18}Si_8O_{48}$ and $H_6Fe_2Al_{18}Si_8O_{48}$. *American Mineralogist*, 80:520-533.
- Dutrow, B. and Norton, D., 1995. The Evolution of Fluid Pressure and Fracturing During Contact Metamorphism. *Journal of Metamorphic Geology*, 13:677-686.
- Henry, D. and Dutrow, B., 1996. Petrologic Aspects of Metamorphic Tourmaline. in Anovitz, L and Grew, Ed, Editors, *Reviews in Mineralogy* Volume 33, Boron: Mineralogy, Petrology, and Geochemistry in the Earth's Crust. p. 503-558. *Mineralogical Society of America*, Washington, D.C.
- Dutrow, B., 1996. Better Living through Minerals. Identification of Minerals through XRD. *Teaching Mineralogy*, Eds. J.Brady, D.Mogk, D. Perkins III, Mineralogical Society of America, p. 90-104.
- Holdaway, M., Mukhopadhyay, B., Dyar, M.D., Guidotti, C. and Dutrow, B., 1997. Garnet-biotite geothermometry revisited: New Margules parameters and a natural specimen data base from Maine. *American Mineralogist* 82, 582-595.
- Dutrow, B.L., Henry, D.J., Christensen, C., Gable, C, Travis, B, and Heydari, E., 1997. Blackened Smackover: Thermal evolution and mass transfer adjacent to a subsurface alkalic igneous dike in Northern, Louisiana. *Gulf Coast Association of Geological Societies Transactions* 47:131-139.
- Dutrow, B.L., Foster, C.T., Jr., and Henry, D.J. 1999. Tourmaline-rich pseudomorphs in sillimanite zone metapelites: Demarcation of an infiltration front. *American Mineralogist* 84:794-805.
- Dutrow, B.L., and Henry, D.J. 2000. Complexly zoned fibrous tourmaline: A record of evolving magmatic and hydrothermal fluids. *Canadian Mineralogist*, 38:125-137.
- Dutrow, B., 2000. Water and Water Types. in Oxford Companion to the Earth, P.L. Hancock and B.J. Skinner, Eds. pp. 1,127 - 1,130. Oxford University Press. Oxford, Great Britain.
- Henry, D.J. and Dutrow, B.L., 2001. Compositional zoning and element partitioning of nickel tourmaline in a metamorphosed karstbaxite from Samos, Greece. *American Mineralogist*, 86:1130-1142.
- Norton, D. and Dutrow, B., 2001. Complex Behavior of Magma-Hydrothermal Processes: Role of Supercritical Fluid. Invited for special issue: *Geochimica et Cosmochimica Acta*, 65:4009-4018.
- Dutrow, B.L., Travis, B.J., Gable, C.W., and Henry, D.J. 2001. Coupled heat and silica transport associated with dike intrusion into sedimentary rock: Effects on isotherm location and permeability evolution Invited for special issue: *Geochimica et Cosmochimica Acta*, 65:3749-3768.
- Dutrow, B.L., 2002. Introduction fo the Michael J. Holdaway commenorative issue. *American Mineralogist* 87: 373-374.
- Henry, D.J., Dutrow, B.L. and Selverstone, J. 2002. Compositional asymmetry in replacement tourmaline: An example from the Tauern Window, Eastern Alps. *Geological Materials Research*, 4:1-18.
- McCombie, C., Daniel, D., Bernero, R., Byerly, R., Dutrow, B., Isaacs, T., Konikon, L, Laporte, T. Long, J., Lutze, W., Rosa, E, Suzuki.A., Weart, W., Harris, J., 2003. *One Step at a time: The staged development of geologic repositories for High-Level Radioactive Waste*. National Academies Press, Washington D.C., 201 p.
- Dutrow, B.L., 2004. Teaching Mineralogy from the core to the crust. *J. Geoscience Education*, 52:81-86.
- Dutrow, B.L., 2007. Visual communication: Do you see what I see? *Elements* , v. 3, no. 2, pp. 119-126.

- Dutrow, B.L. and Foster, C.T., Jr. 2007. The Impact of Fluid Flow on Mineral Development: Three-dimensional modeling as a predictor of spatial distribution patterns. Fifth IMA Conference on Modelling Permeable Rocks, 1-4 p. *Institute for Mathematics and its Applications*, Cambridge, United Kingdom.
- Dutrow, B.L., Foster, C.T., Jr. and Whittington, J., 2008. Prograde pseudomorphs as indicators of metamorphic conditions during metamorphism: An example from NW Maine. *American Mineralogist* 93:300-314.
- Henry, D. J., Sun, H., Slack, J. and Dutrow, B. L., 2008. Tourmaline in meta-evaporites and highly magnesian rocks: perspectives from Namibian tourmalinites. *European Journal of Mineralogy*, 20, 973-993.
- Armstrong, C., Dutrow, B., Henry, D.J., and Thompson, R.A., (accepted in 2009) Provenance of volcanic clasts from the Santa Fe Group, Culebra graben of the San Luis Basin, Colorado: A guide to tectonic evolution. *Hudson, M.R., and Grauch, V.J.S., eds., New Perspectives on Rio Grande Rift Basins: From Tectonics to Groundwater* Geological Society of America Special Paper 494.
- Henry, D.J., Novk, M., Hawthorne, F.C., Ertl, A., Dutrow, B.L. Uher, P. and Pezzotta, F., 2011. Nomenclature of the tourmaline supergroup-minerals. *American Mineralogist* 96:895-913.
- Henry, D.J. and Dutrow, B.L. 2011. The incorporation of fluorine in tourmaline: internal crystallographic controls or external environmental influences. *Canadian Mineralogist* 49:41-56.
- Dutrow, B.L. 2011. Engaging with Congress: An unexpected encounter. *EOS*, v. 92, no 21, 24 May 2011. <http://www.agu.org/journals/eo/v092/i021/>
- Dutrow, B.L., and Henry, D.J., 2011. Tourmaline: A geologic DVD. *Elements* 7: 301-306.
- van Hinsberg, V.J., Henry, D.J., and Dutrow, B.L., 2011. Tourmaline as a petrologic forensic mineral: A unique recorder of its geologic past. *Elements* 7:327-332.
- Dutrow, B.L., and Henry, D.J., 2011. Editors. Tourmaline. *Elements*, vol. 7, no 5.
- Henry, D.J. and Dutrow, B.L., 2012. The tourmaline diaries: an eye-catching mineral and its many facets. *Natural History*, 120(3), 16-27,
- Henry, D.J., and Dutrow, B.L., 2012. Tourmaline in low temperature environments: its petrogenic applicability (Invited review). *Lithos* v 154: 16-32.
- Armstrong, C., Dutrow, B., Henry, D.J., and Thompson, R.A., 2013. Provenance of volcanic clasts from the Santa Fe Group, Culebra graben of the San Luis Basin, Colorado: A guide to tectonic evolution. *Hudson, M.R., and Grauch, V.J.S., eds., New Perspectives on Rio Grande Rift Basins: From Tectonics to Groundwater*, Geological Society of America Special Paper 494, p 21-45. doi:10.1130/2012.2494(02)
- Henry, D.J., Novk, M., Hawthorne, F.C., Ertl, A., Dutrow, B.L. Uher, P. and Pezzotta, F., 2013. Erratum: Nomenclature of the tourmaline supergroup-minerals. *American Mineralogist* 98:524.
- Dutrow, B.L. and Henry, D.J. (submitted) Fibrous tourmaline: a record of late stage fluid processes. *Canadian Mineralogist*.
- Ma, Chong, Bergeron, P., Foster, DA, Dutrow, B., and Mueller, PA (2015, accepted) Detrital Zircon Geochronology of the Sawtooth Metamorphic Complex, Idaho: Evidence for Lower Paleozoic Shelf Strata within the Idaho Batholith. Accepted for *Geosphere*.

Publications: BOOKS

- Klein, C., and Dutrow, B., 2008. *The Manual of Mineral Science*. 23rd Edition, John Wiley and Sons, Hoboken, NJ. 675 pp. (I reorganized and largely rewrote the first 14 chapter covering conceptual aspects of mineralogy; acquired many new mineral photographs). Released in Feb. 2007.
- Klein, C. and Dutrow, B. 2012. *Manual de Cincia dos Mienralias*. 23rd Edio. Translated into Portuguese. Bookman. 706 ppsa

In PREPARATION for Publication

- Dutrow, B., Metz, K., Fukai, I., Bergeron, P. Mueller, P. and Anderson, S. Metamorphic History of the Sawtooth Metamorphic Complex, Idaho: A key to the Proterozoic Selway Terrane
- Dutrow, B. and Miller, N. in prep. *Lithium in metapelitic minerals determined by LA-ICP-MS*
- Dutrow, B., in prep., *Modeling contact metamorphism: Energy, fluids and feedback* MSA Presidential Address. *American Mineralogist*.
- Dutrow, B., Travis, B.J., and Gable, C. W., in prep. A quantitative diagnostic for determining up temperature fluid flow in hydrothermal systems.
- Dutrow, B.L. and Gable, C.W., in prep. Visual diagnostics for hydrothermal processes. Invited for *Visual Geoscience*.
- Foster, C.T., Jr. and Dutrow, B.L., in prep. Deciphering the evolution of metamorphic terranes through 3D thermal and textural modeling.
- Dutrow, B., Foster, C.T., Jr., Gable, C.W., and Travis, B.J., in prep. Permeability and heating rates as controls on mineral equilibria and textural development in contact metamorphic aureoles.
- Foster, C.T., Jr. and Dutrow, B.L., in prep. The role of advective heat transport on the development of regional-contact metamorphic terranes.
- Dutrow, B.L., Gable, C.W., and Travis, B.J. Effects of pluton fracture, permeability structure and fluid flow on the location of metamorphic isograds.
- Dutrow, B., Travis, B.J., and Gable, C. W., in prep. The effects of latent heat on pressure-temperature-time paths in contact aureoles.

Other Publications

- Dutrow, B., 2010. Pliny the Elder and William D. Blake. in Lindsey, L.F. (ed) *Treasures of LSU*. p. 200-201.
- Novk, M., Henry, D., Hawthorne F.C., Ertl, A., Uher, P., Dutrow, B. and Pezzotta, F., 2010. *Nomenclature of the tourmaline-group minerals*. Report of the Subcommittee on Tourmaline Nomenclature to the International Mineralogical Association's Commission on New Minerals, Nomenclature and Classification.
- Tremblay, P., Henry, D., Dutrow, B., and Catlos, E. 2007. Roaming the Scottish Highlands. *Elements* 3:364-365.
- Dutrow, B. 2006. Sustainability. *Elements* 2:378.
- Dutrow, B. 2007. From the President: Introducing our Newest Editor. *Elements* 3:60.
- Dutrow, B. 2007. Educational Resources at MSA. *Elements* 3:130.
- Dutrow, B., 2007. Mineral Madness Month. *Elements* 3:200.
- Dutrow, B., 2007. The F. Donald Bloss Fund - A Gift to MSA. *Elements* 3:280.
- Dutrow, B., 2007. From the President: Transition. *Elements* 3:348.
- Dutrow, B.L., 1982, Petrologic description of Amoco Cathedral River No. 1 Sands: Consultant's report available to public as Alaska Geologic Materials Center (AGMC) Report No. 37, State of Alaska Geological Materials Center.

Research Reports

- Dutrow, B.L., 1978. *Preliminary Report of Investigations: The Hot Springs Mammoth Site*. Cave Research Foundation, 1978 Annual Report, Columbus, Ohio.
- Dutrow, B.L., 1997. "Coupled fluid flow and chemical transport: Implications of mineral chemistry, permeability evolution and thermal-chemical feedback effects". Institute of Geophysics and Planetary Physics 1997 Annual Report, University of California, Los Alamos National Lab, p. 44-46.

- Roy, A, Dutrow, B., Schilling, P.J. and Tittsworth, R.C., 2000. *An XAS Study of Charoite*. CAMD, 1998 & 1999 Annual Reports. The J. Bennett Johnston, Sr., Center for Advanced Microstructures and Devices, Louisiana State University, Baton Rouge, LA. p. 201-202.
- Dutrow, B.L., 1998. *Mineralogical and chemical characterization of iron-rich materials*. Expert Report: prepared for Akin, Gump, Strauss, Hauer, and Feld, LLP, Washington D.C. and Horsehead Industries, New York City, NY. 45 pg.
- Dutrow, B.L., 2001, 2007. *Chemical and structural characteristics of asbestiform silicates*. Taylor, Porter, Brooks, Sheilds, LLP. Baton Rouge, LA. 7 pg.

Field Trip Guides

- Dutrow, B.L., 1977. Preliminary post-cranial analysis of Mammoths from the Hot Springs Mammoth Site, South Dakota. IN: *Guidebook and Roadlogs for Rocky Mountain-Plains Field Conference; Friends of the Pleistocene*. p. 27-32.
- Holdaway, M.J., Dickerson, R.L. and Dutrow, B.L., 1986. Petrology and field relations of M2 metamorphism in west-central Maine. IN: Newberg, D.W., ed. *78th Annual Meeting NEIGC Guidebook for Field Trips in Southwestern Maine*, p. 240-253.
- Holdaway, M.J. and Dutrow, B., 1989. The significance of Al silicate in staurolite grade rocks of northwest Maine. in Berry, A., ed. *81st Annual Meeting NEIGC Guidebook for Field Trips in Northwestern Maine*, Co-leader.
- Dutrow, B., 1989. Equilibrium activity diagrams in the KMFASH system. Supplement to Berry, A. ed. *81st Ann. Mtg. NEIGC Guidebook, Field Trips in Northwestern Maine*, 7p.

Technical Publications

- Dutrow, B.L., 1980-1985. *Technical Reports, Mobil Exploration and Producing Services, Inc..*
- Silica Diagenesis of the Monterey Formation, CA, 25 p.
- Petrogenesis of North China Sea Basalts and associated sediments, 27 p.
- Hydrocarbon potential in deep sandstones, Norway. 13 p.
- Diagenesis of Volcanogenic Clastic Sediments, North Slope and Peninsular, Alaska, 33 p.

available as: Dutrow, B.L., 1982, Petrologic description of Amoco Cathedral River No. 1 Sands: Consultant's report available to public as Alaska Geologic Materials Center (AGMC) Report No. 37, State of Alaska Geological Materials Center.

TEACHING Publications, electronic

- Dutrow, B.L. and Ormand, C. 2015. *Spatial Thinking Workbook: Deciphering Mineral Structure Diagrams*.
http://serc.carleton.edu/spatialworkbook/activities/mineral_diagrams.html
- Dutrow, B.L. and Ormand, C. 2015. *Spatial Thinking Workbook: Comparing Quartz Polymorphs*.
<http://serc.carleton.edu/spatialworkbook/activities/quartz.html>
- Dutrow, B.L. and Ormand, C. 2015. *Spatial Thinking Workbook: Comparing Phyllosilicate Structures*.
<http://serc.carleton.edu/spatialworkbook/activities/phyllosilicates.html>
- Dutrow, B.L., Kinari, Atit, and Ormand, C. 2015. *Spatial Thinking Workbook: Understanding Crystal Symmetry via Gesture*.
<http://serc.carleton.edu/spatialworkbook/activities/symmetry.html>

- Dutrow, B.L., Kinari, Atit, and Ormand, C. 2014. *Spatial Thinking Workbook: Gestures for Miller Indices*.
<http://serc.carleton.edu/spatialworkbook/activities/MillerIndices.html>
- Dutrow, B.L., Kinari, Atit, and Ormand, C. 2014. *Spatial Thinking Workbook: Gestures for Silicate Structures*.
<http://serc.carleton.edu/spatialworkbook/activities/silicates.html>
- Dutrow, B.L. and Ormand, C. 2015. *Spatial Thinking Workbook: Understanding Polyhedral Diagrams*.
<http://serc.carleton.edu/spatialworkbook/activities/polyhedra.html>
- Dutrow, B.L., Kinari, Atit, and Ormand, C. 2014. *Spatial Thinking Workbook: Understanding Mineral Cleavage via Gestures*.
<http://serc.carleton.edu/spatialworkbook/activities/mineralcleavage.html>
- Dutrow, B.L. 2010. *Minerals as recorders of complex systems with coupled processes*.
<http://serc.carleton.edu/NAGTWorkshops/complexsystems/workshop2010/participants/dutrow.html>
- Dutrow, B.L., 2010. *Deciphering complex fluid-mineral interactions in the palm of your hand*. (Instructional Module).
http://serc.carleton.edu/NAGTWorkshops/complexsystems/activities/fluid_min_interact.html
- Dutrow, B.L., 2010. *Developing visual interpretation of complex geosystems*. Invited Panelist for Teaching Complex Systems with Visualizations.
http://serc.carleton.edu/NAGTWorkshops/complexsystems/activities/fluid_min_interact.html .pdf of presentation available.
- Dutrow, B.L. and Mogk, D., 2010. *Modeling exsolution (and perthite formation) as an example of complex-system behavior*.
<http://serc.carleton.edu/NAGTWorkshops/complexsystems/activities/exsolution.html>
- Dutrow, B.L. and Clark, C.M. 2007. *X-ray Powder Diffraction*. Instructional Module for the Geochemical Instrumentation and Analysis Workshop associated with the *Integrating Research and Education-moving research results into geosciences courses* program.
http://serc.carleton.edu/research_education/geochemsheets/techniques/XRD.html
- Clark, C.M. and Dutrow, B.L. 2007. *Single Crystal X-ray Diffraction*. Instructional Module for the Geochemical Instrumentation and Analysis Workshop associated with the *Integrating Research and Education-moving research results into geosciences courses* program.
http://serc.carleton.edu/research_education/geochemsheets/techniques/SXD.html
- Dutrow, B.L., 1996. *Better living through minerals: X-ray diffraction of household products*.
<http://serc.carleton.edu/NAGTWorkshops/mineralogy/activities/householdxrd.html>

Published ABSTRACTS for oral presentations

- Laury, R.L., Agenbroad, L.D. and Dutrow, B.L., 1978. Sedimentology of a Late Quaternary mammoth-bearing sinkhole deposits, Hot Springs, South Dakota. *American Association of Petroleum Geologists Bulletin*, 62:535–536.
- Dutrow, B.L., 1979. Variation of enamel thickness and lamellar frequency in *Mammuthus columbi*. 59th Annual meeting, *American Society of Mammologists*, p.6.
- Dutrow, B.L., 1980. Population structure of a Late Pleistocene mammoth assemblage, Hot Springs, South Dakota. 5th Biennial Meeting, *American Quaternary Association*, p. 67–68.
- Dutrow, B.L., 1981. The Hot Springs Mammoth Site: an unusual Late Pleistocene mammoth trap in South Dakota. *Geological Society of America Abstracts with Program (Rocky Mtn. Section)* 13:195. (*Best student paper award*).
- Holdaway, M.J., Duncan, I., Dutrow, B.L. and Shore, P., 1983. Significance of variable water contents in staurolite. *Geological Society of America Abstracts with Program* 15:597.

- Dutrow, B.L. and Holdaway, M.J., 1983. Upper stability of staurolite and quartz at low pressures. *Geological Society of America Abstracts with Program* 15:563.
- Dutrow, B.L., Holdaway, M.J. and Hinton, R.W., 1984. Lithium in staurolite: its petrologic significance. *Geological Society of America Abstracts with Program* 16:497.
- Dutrow, B.L., Holdaway, M.J. and Hinton, R.W., 1985. Staurolite crystal chemistry: variable hydrogen and lithium contents and petrologic significance. *Terra Cognita* 6:41.
- Dutrow, B.L. and Holdaway, M.J., 1986. Upper thermal stability of staurolite and quartz at medium pressures: a reinvestigation. *Terra Cognita* 6:214.
- Dutrow, B.L. and Holdaway, M.J., 1986. Multiple metamorphic episodes in the Farmington Quadrangle, Maine. *Geological Society of America Abstracts with Program* 18:590.
- Dutrow, B.L. and Holdaway, M.J., 1987. Use of SEM for determination of reaction direction for refractory silicates: an example from the Fe-staurolite and quartz equilibrium. *Mineralogical Society of Great Britain Bulletin*, 72.
- Dutrow, B.L., 1987. Lithian staurolite: synthesis, stability and crystal chemistry. *Terra Cognita* 7:384.
- Henry, D.J. and Dutrow, B.L., 1987. Ca-deprotonation in tourmaline from aluminous metamorphic rocks. *Geological Society of America Abstracts with Program* 19:700.
- Holdaway, M.J., Geving, R., Goodge, R., Dickerson, R., and Dutrow, B., 1987. The case for retrograde chlorite in staurolite-sillimanite schists from NW Maine. *Geological Society of America Abstracts with Program* 19:705.
- Dutrow, B.L. and Holdaway, M.J., 1987. Toward a solution of the staurolite enigma. *Geological Society of America Abstracts with Program* 19:649.
- Dutrow, B.L. and Norton, D.L., 1988. Mineral compositions, aqueous ion activities and fluid flow: implications for the formation of metapelites. *Geological Society of America Abstracts with Program* 20:A43.
- Dutrow, B.L., Norton, D.L. and Henry, D.J., 1989. Tourmaline-bearing pseudomorphs after staurolite: Boron metasomatism in high grade metapelites. *Geological Society of America Abstracts with Program* 21:A328.
- Henry, D.J., Dutrow, B.L., and Maag, C., 1989. Tourmaline in clastic metasedimentary rocks: an illustration of the petrogenetic potential of tourmaline. *Geological Society of America Abstracts with Program* 21:A275.
- Dutrow, B.L. and Norton, D.L., 1989. The Effect of Advective Metasomatism on the Interpretation of Isograds in Metapelites. *Transactions, American Geophysical Union*, 70:43, p. 1391.
- Dutrow, B.L. and Nunn, J., 1990. Fluids in metamorphic environments: Temporal and spacial evolution of advective metasomatism. *AGU Chapman conference on Large Scale Fluid Transport*, June 3-8, 1990.
- Henry, D.J. and Dutrow, B.L., 1990. Evolution of tourmaline in metapelitic rocks: diagenesis to melting. *Geological Society of America Abstracts with Program* 22:A125.
- Dutrow, B.L., 1990. Pore fluid pressures and the timing of fluid-mineral interaction in contact metamorphic settings: A preliminary analysis. *Geological Society of America Abstracts with Program* 22:A213-214.
- Dutrow, B. and Norton, D., 1991. The generation of a percolation network: fluid pressure, fracture propagation and fluid flow. Invited. *Geological Society of America, Abstracts with Programs*, 23:A49.
- Dutrow, B. and Foster, C.T., Jr., 1992. Constraints on Metamorphic Fluid from Irreversible Thermodynamic Modeling of Tourmaline Pseudomorph Formation. *Geological Society of America, Abstracts with Programs*, 24:A218.
- Roberts, S.J., and Dutrow, B., 1992. Ion Activity Ratios in MOR Hydrothermal Fluids and Their Relation to Secondary Mineral Assemblages. *EOS*, 73:254.
- Dutrow, B., Rosenberg, N., and Spera, F.J., 1993. The Role of Porosity and Chemical Buoyancy on Fluid Flow Regimes in the Crust. *Geological Society of America, Abstracts with Programs* 25:A23.

- Dutrow, B., Spera, F.J. and Rosenberg, N., 1993. Dynamics of Chaotic Thermohaline Convection in Low-Porosity Hydrothermal Systems. *EOS, Transactions, American Geophysical Union*, 74:688.
- Dutrow, B., 1994. Temporal and spatial variations of fracture propagation: Fluid pressures in contact metamorphic environments. *AGU Chapman conference on Hydrogeologic Processes: Building and Testing Atomistic- to Basin-Scale Models*. p. 11-12. American Geophysical Union, Washington, D.C.
- Holdaway, M.J., Mukhopadhyay, B., Dyar, M., Guidotti, C., and Dutrow, B., 1994. A re-examination of the muscovite-almandine- biotite-sillimanite geobarometer. in Session: Mineral-chemistry and geothermobarometry. Invited. *16th International Mineralogical Association: Abstracts*, p. 177. Pisa, Italy.
- Dutrow, B. and Henry, D., 1994. Crystal Chemistry of Tourmaline: A guide to metamorphic evolution of metapelites. in Session: Recent Advances in the Crystal Chemistry of Rock forming minerals. *16th International Mineralogical Association: Abstracts*, p. 108, Pisa, Italy.
- Henry, D.J., and Dutrow, B.L., 1994. Tourmaline in metamorphic rocks: A monitor of boron flux. Invited. *Geological Society of America, Abstracts with Programs*, 26:A449.
- Dutrow, B., Cash, T., and Henry, D., 1994. Crystal chemistry of charoite: A product of intense metasomatic processes. *Geological Society of America, Abstracts with Programs*, 26:A481.
- Heydari, E., Byerly, G., Henry, D., and Dutrow, B., 1994. Enhanced hydrocarbon migration by igneous intrusions. *Geological Society of America, Abstracts with Programs* 26:A231.
- Nunn, J. and Dutrow, B., 1994. Buoyancy-Driven Propagation of an Isolated Fluid-filled Crack: Implications for fluid transport along fault zones in the Eugene Island Area, Offshore Louisiana. *EOS, Transactions, American Geophysical Union*, 75:231.
- Anderson, S., Dutrow, B., Henry, D., Mueller, P., and Giaramita, M. 1995. High grade metamorphic roof pendants in the Sawtooth Mountains, ID: A missing peice of the accretionary puzzle? *Geological Society of America, Abstracts with Programs*, 27:A437.
- Dutrow, B., Rosenberg, N., Travis, B., and Spera, F., 1995. Dynamics of Hydrothermal Convection in Layered Brine Systems: Implications for Mineralization. *Geological Society of America, Abstracts with Programs*, 27:A281. (invited)
- Penn, R., Banfield, J., Henry, D., and Dutrow, B., 1995. Charoite: An alkali silicate with cation exchange properties. *Geological Society of America, Abstracts with Programs*, 27:A440.
- Dutrow, B., Anderson, S., Henry, D., Mueller, P., and Giaramita, M. 1995. A new Precambrian crustal province in south-central Idaho? *EOS, Transactions, American Geophysical Union*, 76:F678.
- Travis, B., Rosenberg, N., and Dutrow, B., 1995. A numerical study of thermohaline convection in layered systems with mineralization. *EOS, Transactions, American Geophysical Union*, 76:F702.
- Dutrow, B. and Henry, D., 1996. Luminescence of charoite and associated minerals. *Mineralogical Record*, 27:28.
- Dutrow, B., 1996. Evolution of fluid pressure and fracture propagation in contact metamorphic aureoles. University of Oslo, *Kongsbergseminar*, Kongsberg, Norway. (invited)
- Christensen, C., Dutrow, B., Henry, D, and Heydari, E., 1996. Contact metamorphism in subsurface northeastern Louisiana: Metasomatism in a hydrocarbon source rock. *Geological Society of America, Abstracts with Programs*, 28:A44.
- Foster, C.T., Jr., Dutrow, B.L., and Travis, B.J., 1996. Simulation of metamorphic textures: combining thermal models of metamorphism with forward models of metamorphic textures. *Geological Society of America, Abstracts with Programs*, 28: A424.
- Dutrow, B.L., Foster, C.T., Jr., Henry, D.J. and Travis, B., 1997. Tourmaline-rich pseudomorphs as markers of an infiltration front. *Tourmaline 1997*, Moravian Museum, Brno, Czech Republic, p. 12-13. (Invited).
- Henry, D.J. and Dutrow, B.L., 1997. Tourmaline in Metamorphic and Sedimentary rocks. *Tourmaline 1997*, Moravian Museum, Brno, Czech Republic. (Invited)

- Dutrow, B.L., Henry, D.J. and Hawthorne, F.C., 1997. Fibrous tourmaline after rubellite: A hoary record of evolving fluids. *Tourmaline 1997* Moravian Museum, Brno, Czech Republic, p. 123-124. (Invited)
- Dutrow, B.L., Henry, D., Christensen, C., Gable, C, Travis, B, and Heydari, E., 1997. Blackened Smackover: Thermal evolution and mass transfer adjacent to a subsurface alkalic igneous dike in Northern, Louisiana. *Gulf Coast Association of Geological Societies Transactions* 47:131.
- Henry, D., Dutrow, B., & Guidotti, C., 1997. $Mg - Fe^{2+}$ partitioning involving tourmaline in metapelitic rocks: Bringing disorder from chaos. *Geological Society of America, Abstracts with Programs*, 29:A401
- Dutrow, B., Henry, D., Christensen, C., Gable, C., Travis, B., & Heydari, E. , 1997. Effects of latent heat of crystallization on contact metamorphism: A critical factor for modeling natural systems. *Geological Society of America, Abstracts with Programs*, 29:A93.
- Dutrow, B., Foster, C.T., Jr., Travis, B., Gable, C., 1997. Using Thermal Modeling and Forward Models of Metamorphic Textures to Decipher P-T-t-X Conditions of Regional-Contact Metamorphic Terranes. *American Geophysical Union Transactions*, 78:F783.
- Dutrow, B., Foster, C.T., Jr., and Travis, B. 1998. Deciphering signatures of fluid infiltration using 3D thermal and textural modeling. *International Mineralogical Association meeting*, A76 (Invited)
- Dutrow, B., Henry, D., Gable, C., and Travis, B., 1998. Thermal evolution and fluid infiltration: development of metasomatic mineralogy adjacent to an alkalic dike. *International Mineralogical Association meeting*, A77 (Invited)
- Dutrow, B. and Henry, D., 1998. Fibrous tourmaline as a recorder of evolving magmatic and hydrothermal fluids. *Geological Society of America Abstracts with Programs*, 30:A281.
- Dutrow, B., Travis, B.J., Gable, C.W., and Henry, D.J., 1998. Thermal-chemical feedback in hydrothermal systems: silica precipitation, dissolution, permeability and flow dynamics. *Transactions of the American Geophysical Union*, 79:F282
- Dutrow, B., Gable, C.W., Travis, B.J., and Henry, D.J. 1998. Thermal evolution and fluid infiltration adjacent to an alkalic dike: Development of metasomatic mineralogy and implications for hydrocarbon maturation. *IGPP Annual Meeting*, Abstracts (Poster session), Los Alamos National Lab, p. 8-9.
- Dutrow, B., Foster, C.T., Jr., Gable, C., Travis, B., 1999. Deciphering the evolution of metamorphic terranes: combining 3d thermal and textural modeling. *Mineralogy at the Millennium, Carnegie Institution of Washington* April, 1999.
- Cavosie, A., Pletsch-Rivera, L., Selverstone, J., Sharp, Z., and Dutrow, B. 1999. Quartz veins as proxies for fluid pressure evolution in the contact aureole of the 1.4 Ga Sandia Pluton, New Mexico. *New Mexico Geological Society Annual Meeting*.
- Dutrow, B., Travis, N.J., and Gable, C.W., 1999. Silica fingering coupled to flow and transport: effect on flow dynamics and isograd morphology. *Geological Society of America, Abstracts with Programs*, 31:A101.
- Foster, C.T., Jr. and Dutrow, B.L., 2000. Evidence for separate hydration and thermal pulses during M3 regional-contact metamorphism in western Maine. *Geological Society of America, Abstracts with Programs*, 32:A54.
- Dutrow, B., Foster, C.T., Jr., Gable, C.W. and Travis, B.J., 2000. 4D Thermal Models for Regional-Contact metamorphism in NW Maine. *Geological Society of America, Abstracts with Programs*, 32:A113.
- Foster, C.T., Jr. and Dutrow, B.L., 2000. Scales of local equilibrium, metastable mineral assemblages and nucleation patterns during regional contact metamorphism. *American Geophysical Union Transactions*, 81:F1379.
- Dutrow, B., Gable, C.W., Travis, B.J. and Foster, C.T., Jr. 2000. Effects of fluid flow, permeability and pluton fracturing on T-t paths in metamorphic aureoles: Implications for models of nucleation and mineral growth. *American Geophysical Union Transactions*, 81:F1379-1380.

- Foster, C.T., Jr. and Dutrow, B., 2001. The influence of meta-stable reactions on textures during regional-contact metamorphism. Goldschmidt Meeting, Blacksburg, VA.
- Foster, C.T., Jr. and Dutrow, B., 2001. The effect of conductive vs. advective thermal regimes on reaction mechanisms in pelites near tabular plutons in the middle crust. *Geological Society of America, Abstracts with Programs*, 33:A251.
- Dutrow, B., Foster, C.T., Jr., Gable, C.W., Travis, B.J., 2001. Advective thermal pulses as hydration-dehydration mechanisms in contact-regional metamorphic terranes. *Geological Society of America, Abstracts with Programs*, 33:A251
- Henry, D.J., Viator, D., and Dutrow, B.L., 2002. Estimation of light element concentrations in tourmaline: How accurate can it be? 18th General Meeting of the International Mineralogical Association, Programme with Abstracts, p. Edinburgh, Scotland.
- Dutrow, B., Foster, C.T., Jr., Gable, C.W., Travis, B.J., 2002. Permeability and heating rates as controls on mineral equilibria, isograd patterns and textural development in contact metamorphic aureoles. 18th General Meeting of the International Mineralogical Association, Programme with Abstracts, p. 240. Edinburgh, Scotland.
- Dutrow, B., Foster, C.T., Jr., Gable, C.W., Travis, B.J., 2003. Metamorphic heating rates in contact aureoles: Consequences of intrusion depth and size, geothermal gradient and host rock permeability. *Geological Society of America, Abstracts with Programs*35:396.
- Foster, C.T., Jr and Dutrow, B. L., 2003. The relations of multi-mineral crystal size distributions to rates of temperature change during metamorphism. *Geological Society of America, Abstracts with Programs*35:396.
- Henry, D.J. and Dutrow, B.L., 2003. Taos Plateau volcanic project: A vehicle for integration of concepts in igneous petrology. *Transactions of the American Geophysical Union*, 84:F456.
- Ascher, Pranoti and Dutrow, B.L., 2003. Modeling and databases for teaching petrology. *Transactions of the American Geophysical Union*, 84:F464.
- Dutrow, B., Foster, C.T., Jr., Gable, C.W., Travis, B.J., 2003. Deciphering metamorphic processes through 3D visualization of thermal and textural modeling. *Transactions of the American Geophysical Union*, 84:F1606.
- Clark, R., Foster, C. T., Jr. and Dutrow, B. L., 2004. Garnet crystal size and spatial distributions in a staurolite schist. *Geological Society of America, Abstracts with Programs*(North Central meeting) , v. 36 , no. 3, p. 42.
- Dutrow, B., 2004. Thermal and mineral textural modeling of contact metamorphism as a guide to fluid-rock interactions and hydrothermal activity. *Mineralogical Society Winter Meeting*, p. 15. Bath, England. (Invited keynote).
- Dutrow, B., Foster, C.T., Jr., Gable, C.W., Travis, B.J., 2004. Heating rates and mineral textures as indicators of fluid flow during metamorphism. Goldschmidt Conference, June, 2004, Copenhagen. *Geochimica et Cosmochimica Acta*68(11):A249 Suppl.S.
- Dutrow, B., Foster, C.T., Jr., Gable, C.W., Travis, B.J., 2004. Aspects of 3D heat transfer and fluid flow on mineral growth surrounding plutons. *GSA Penrose Conference on Mass Redistribution in Continental Magmatic-Hydrothermal Systems*. (Invited)
- Foster, C.T., Jr. and Dutrow, B.L., 2004. Modeling heterogeneous metamorphic reaction mechanisms and their relationship to textures and P-T-X-T paths. *Geological Society of America, Abstracts with Programs*, v. 36, p. 202.
- Dutrow, B., Foster, C.T., Jr., Gable, C.W. and Travis, B.J., 2004. Advances in modeling contact metamorphism: 3D thermal and flow structure, mineral textural analyses and interpretive visualization. *Geological Society of America, Abstracts with Programs*, v. 36, p. 338.
- Dutrow, B., Foster, C.T., Jr., Gable, C.W. and Travis, B.J., 2005. Heat and Mass Transport Modeling and Rates of Metamorphic Processes. *Goldschmidt Conference*, May, Moscow, Idaho. *Geochimica et Cosmochimica Acta*69:A401.

- Whittington, J., Dutrow, B. and Foster, C.T., 2005. Muscovite-rich pseudomorphs after staurolite as a record of fluid infiltration during prograde metamorphism. *Geological Society of America, Abstracts with Programs*, v. 37, p. 227.
- Armstrong, C., Dutrow, B. and Henry, D.J., 2005. When bivalves get the blues: vivianite replacement of bivalves from the Kerch iron-ore deposits, Ukraine. *Geological Society of America, Abstracts with Programs*, v. 37, p. 300.
- Foster, C.T. and Dutrow, B., 2005. Local reaction affinities and their effect on nucleation patterns in metamorphic rocks. *Geological Society of America, Abstracts with Programs*, v. 37, p.53.
- Dutrow, B., 2005. Evolution of thermal, mechanical, and chemical processes during contact metamorphism. *Geological Society of America, Abstracts with Programs*,v.37, p. 51 (Invited).
- Dutrow, B., Foster, C.T., Jr., and Gable, C.W., 2006. Consequences of thermal input on metamorphic textures in contact and regional-contact terranes. *19th General Meeting of the International Mineralogical Association*, Kobe, Japan.p. 173.
- Whittington, J., Dutrow, B. and Foster, C.T., Jr. 2006. Prograde pseudomorphs as indicators of metamorphic processes. *Geological Society of America, Abstracts with Programs*, v. 38, p. 48.
- Foster, C.T., Jr. and Dutrow, B., 2006. Porphyroblast spacing and nucleation time spans in well equilibrated metamorphic rocks. *Geological Society of America, Abstracts with Programs*, v. 38, p. 270.
- Dutrow, B., Foster, C.T., Jr. and Gable, C.W., 2007. The Impact of fluid flow on mineral development: Three-dimensional modeling as a predictor of spatial distribution patterns. *Fifth IMA conference on Modeling Permeable Rocks*, p.1-4. (Invited keynote).
- Henry, D.J. and Dutrow, B.L., 2007. Sulfide-silicate interactions in medium grade metapelites, NW Maine. *Frontiers in Mineral Sciences*, Cambridge, England. Programme and Abstracts, 242-243.
- Henry, D.J., Sun, H., Dutrow, B.L. and Slack, J., 2007. Tourmaline in evaporites and metaevaporites: perspectives from Namibian Metasediments. *Geochimica et Cosmochimica Acta*, 71:A396 (Dutrow presented at: Goldschmidt 07, Cologne,Germany). Invited.
- Dutrow, B.L., 2007. Introduction to the session in honor of Prof. Werner Schreyer: A U.S. perspective. *Geochimica et Cosmochimica Acta*, 71: (Invited)
- Mogk, D., Clark, C.E., Dutrow, B., Goodge, J., Henry,D., Ketcham, R., Mueller, P., Swap, S., Vervoort, J., Wirth, K., 2007. Web resources for teaching geochemical instrumentation and analyses. *Geological Society of America, Abstracts with Programs*, 39:557.
- Dutrow, B.L., 2007. MSA Presidential Address. Modeling Metamorphism: Energy, Fluids, and Feedbacks. *Geological Society of America, Abstracts with Programs*, 39. Invited.
- Dutrow, B.L., Gable, C.W., Travis, B.J. and Foster, C.T., Jr., 2008. Modeling Heat and Mass Transport in Metamorphic Systems. *NSF-IGERT joint LSU-LANL Workshop*.
- Dutrow, B.L., Gable, C.W., Travis, B.J., and Foster, CT, Jr., 2008. Numerical Experiments as a Guide to Rates of Metamorphic Processes. *Geological Society of America Abstracts with Program*, 170-4.
- Armstrong, C. Dutrow, B.L., Henry, D.J., and Thompson, R.A., 2008. Provenance Studies of Santa Fe Group Volcaniclastic Sedimentary Rocks in the San Luis Basin, Colorado: A Guide to Basin Evolution. *Geological Society of America Abstracts with Program*. 163-6.
- Henry, D.J., Sun, H. Slack, J., and Dutrow, B., 2008. Tourmaline in Meta-Evaporites: Perspectives from Namibian Tourmalinites. *Geological Society of America Abstracts with Program*. 323-4.
- Dutrow, B.L., 2008. Lithium Contents of Metapelites from NW Maine: Implications for Li Redistribution. *EOS Transactions of the American Geophysical Union* (Invited presentation), v. 89, no. 53. Fall meeting suppl. V43C-2173.
- Foster, C.T. and Dutrow, B.L., 2008. Textural Evidence for Metastable and Non-equilibrium Processes in Metapelites. *EOS Transactions of the American Geophysical Union* (invited presentation), v. 89, no. 53. Fall meeting suppl. V42C-06.

- Armstrong, C., Dutrow, B., Henry, D., and Thompson, R., 2009. Crystal chemistry of volcanic clasts as a guide to provenance and tectonic evolution: An example from the Santa Fe Group, CO. *Geological Society of America Abstracts with Program*, v. 41, no. 7, p. 542.
- Metz, Kyle M., Dutrow, B.L., Henry, D. J. and Mueller, P.M., 2009. Metamorphic rocks in the Sawtooth Mountains, Idaho, USA: A window into the Precambrian basement of southwest Laurentia. *Geological Society of America Abstracts with Program*, v. 41, no. 7, p. 484.
- Henry, D., Novak, M., Hawthorne, F., Ertl, A., Uher, P., Dutrow, B., and Pezzotta, F. 2009. The Tourmaline Group Minerals: A consistent nomenclature. *Geological Society of America Abstracts with Program*, v. 41, no. 7, p. 100.
- Kirkland, Thibault, McNeal, Sherman-Morris, Baghi-Riding, Meek, Dickerson, Jennings, Dutrow, Schmitz, Lawrence. Human Resources for the Energy Workforce of the Future: Finding the Best Employees Requires Addressing Diversity Now. *AAPG*.
- Dutrow, B., 2009. Seeing is believing: Believing is seeing. Impact of visualization in the geosciences. *EOS Transactions of the American Geophysical Union* (invited presentation), v. 90, no. 52. Fall meeting suppl. ED53E-02.
- Dutrow, B.L. 2010. Developing visual interpretation of complex geosystems. On the Cutting Edge Workshop, "Developing student understanding of complex systems in the geosciences". Carleton College, MN (04-2010).
- Dutrow, B., Foster, C.T., Gable, C., and Travis, B., 2010. Timescales of contact-regional metamorphic events: Constraints from heat and mass transport modeling. *GeoCanada 2010*. Calgary, Alberta, Canada.
- Henry, D. J. and Dutrow, B.L., 2010. The course-embedded research project in undergraduate geoscience education: introduction to research, development of communication skills and means of programmatic assessment. *GeoCanada 2010*, Calgary, Alberta, Canada. 4 page abstract.
- Dutrow, B., Foster, C.T., Gable, C., and Travis, B., 2010. Time-dependent 3-D modeling of contact-regional metamorphism suggests reactions occur in ≤ 1 Ma. *Geochimica et Cosmochimica Acta* 74:A254.
- Henry, D. J. and Dutrow, B.L., 2010. Course-embedded projects in undergraduate geoscience education: Research experience, communication skills and programmatic assessment. *Geochimica et Cosmochimica Acta* 74:A401.
- Dutrow, B., 2010. Minerals in Context: The Earth, Rocks and Society. *2010 International Mineralogical Society*, Budapest, Hungary (Invited, keynote).
- Henry, D.J. and Dutrow, B.L. Incorporation of fluorine in tourmaline: external environmental vs. internal crystallographic influences. *2010 International Mineralogical Association meeting* (invited).
- Dutrow, B., Foster, C.T., and Gable, C. 2010. The relation of polymetamorphic textures to transient thermal regimes in regional-contact terranes with multiple intrusions. *GSA Abstracts with Programs*, vol. 42, no. 5, p. 392.
- Mogk, D., and Dutrow, B., 2010. Exsolution as an Example of Complex-System Behavior. *EOS Transactions of the American Geophysical Union*. ED21A-0653.
- Dutrow, B., Henry, DJ, Gable, CW, Travis, BJ, Foster, CT, Jr., 2011. B-bearing fluids: Caught in the act. *Goldschmidt Conference Abstracts*, p. 793.
- Foster, D.A., Mueller, P.A., Dutrow, B., 2011. Proterozoic accretion of western Laurentia with implications for Nuna and Rodinia reconstructions. *GSA Abstracts with Programs*, v. 43.
- Dutrow, B., Miller, N.R., and Carlson, W.R. 2011. Lithium and trace-element incorporation into metapelitic minerals: New data from LA-ICP-MS measurements. *GSA Abstracts with Programs*, v. 43.
- Foster, C.T. and Dutrow, B.L., 2011. The thermal evolution of a regional contact terrane in northwest Maine. *GSA Abstracts with Programs*, v. 43.

- Henry, D.J. and Dutrow, B.L., 2011. Tourmaline as a petrogenetic indicator mineral: Where are we in 2011? European Geoscience Union General Assembly 2011, 13, EGU2011-8205 (invited).
- Dutrow, B. and Henry, D.J., 2011. Tourmaline: A powerful mineral monitor in metamorphic rocks. Abstract V13G-04 Fall Meeting of the American Geophysical Union. San Francisco, CA.
- Henry, D.J. and Dutrow, B.L., 2012. Monopolar and highly asymmetric nucleation at low temperatures: Insights from tourmaline. Goldschmidt Geochemistry Conference, Montreal.
- Foster, D.A., Mueller, P.A., Dutrow, B.L. and Lambeck, A., 2012. Proterozoic Accretion of the Western Laurentian Margin in the Realm of Supercontinents. 34th International Geological Congress, Brisbane.
- Dutrow, B., Gable, C.W, Travis, B.J., and Foster, C.T., Jr. 2012. Impact of Fluid Flow on Timescales of Contact Metamorphism: A 4-D Numerical Approach. 4D Adamello Conference, Abstract vol., p. 6. Bagolino, Switzerland. (invited).
- Nunn, J.A. and Dutrow, B.L., 2012. Comprehensive Cross-Training among STEM Disciplines in Geothermal Energy. ED53F-0952. Fall Meeting of the American Geophysical Union.
- Fukai, Isis, Dutrow, B.L., Henry, D.J., Mueller, P.A., and Foster, D.A., 2012. Metamorphic and geochemical signatures within calc-silicate gneisses of the Sawtooth Metamorphic Complex, ID: Implications for western North America crustal evolution. V51B-2793, Fall Meeting of the American Geophysical Union.
- Bergeron, P.B., Dutrow, B.L., Mueller, P.A., and Foster, D.A., 2012. U-Pb Geochronology of Detrital Zircons in Quartzites of the Sawtooth Metamorphic Complex, Sawtooth Range, Idaho, U.S.A. Abstract V23D-2865, Fall Meeting of the American Geophysical Union.
- Fukai, I., Dutrow, B.L., Henry, D.J., Mueller, P., and Foster., 2013. Deciphering Crustal Evolution from Metamorphic and Geochemical Signatures in Calc-Silicate Gneisses. Goldschmidt Geochemistry meeting, Florence.
- Ormand, C.J., Shipley, T.F, Tikoff, B., Manduca, C., Dutrow, B., Goodwin, L., Hickson, T., Atit, K, Gagnier, K, Resnick. 2013. Improving Spatial Reasoning Skills in the Undergraduate Geoscience Classroom Through Interventions Based on Cognitive Science Research. AAPG Hedberg Research Conference "3D Structural Geologic Interpretation: Earth, Mind, and Machine".
- Dutrow, B.L. 2013. The Making of Minerals in Contact Aureoles. (invited). GSA Abstracts with Programs v 45, no 7, p.81.
- Ma, Chong, Foster, D.A., Dutrow, B.L., Mueller, P.A. 2013. Exhumation and cooling history of the Sawtooth Metamorphic Complex, Idaho. GSA Abstracts with Programs, v. 45, no. 7, p. 167.
- Curry, J.C., McMillan, N.J., Dutrow, B.L., and Henry, D.J. 2013. Provenance of tourmaline using Laser-Induced Breakdown Spectroscopy (LIBS) and chemometric analysis. GSA Abstracts with Programs v. 45, no. 7, p. 82.
- Ormand, C.J., Shipley, T.F, Tikoff, B., Manduca, C., Dutrow, B., Goodwin, L., Hickson, T., Atit, K, Gagnier, K, Resnick. 2013. Improving Spatial Reasoning Skills in the Undergraduate Geoscience Classroom Through Interventions Based on Cognitive Science Research. GSA Abstracts with Program, v. 45, no 7.
- Henry, D.J. and Dutrow, B.L. 2013. The O-P Trend in Tourmaline: Indicator of high salinity and select metal deposits. GSA Abstracts with Programs v 45, no 7, p.82.
- Ormand, C.J., Shipley, T.F, Tikoff, B., Manduca, C., Dutrow, B., Goodwin, L., Hickson, T., Atit, K, Gagnier, K, Resnick. 2013. Transforming Spatial Reasoning Skills in the Undergraduate Geoscience Classroom Through Interventions Based on Cognitive Science Research. AGU abstracts with program. ED31C-0757 v 45, no 7, p.148.
- Dutrow, B.L., Henry, D.J., Fukai, I. and Metz, K. 2013. Garnet as a reactant during and recorder of mid-crustal metamorphism: Sawtooth Metamorphic Complex, Idaho. AGU abstracts with program. V51B-2666

- Allen, C., Foster, D.A., Mueller, P., Ma, Chong, and Dutrow, B. 2014. U/Pb Geochronology of Detrital Zircons in quartzites from the Sawtooth Metamorphic Complex, Idaho. GSA Rocky Mountain Section Abstracts with Program, v 46., no 5., p. 69.
- Smith, E.W., Dutrow, B.L., Henry, D.J., and Vogl, J. 2014. Pressure-temperature conditions for mid-to-upper crustal metapelites from the Pioneer Core Complex and the Sawtooth Metamorphic Complex, Idaho. GSA Rocky Mountain Section Abstracts with Program, v. 46, no 5., p 69.
- Dutrow, B.L., Henry, D.J., Fukai, I., Metz, K. and Mueller, P. 2014. Metamorphism in the Sawtooth Metamorphic Complex, Idaho: Constraints on the middle crust. GSA Rocky Mountain Section Abstracts with Program, v. 46, no. 5, p. 96.
- Ma, Chong, Foster, D.A., Dutrow, B., Mueller, P., Allen, C., and Bergeron, P., 2014. Structure and geochronology of the Sawtooth Metamorphic Complex, Idaho: Implications for the tectonics of the Cordilleran Hinterland in the Idaho Batholith sector. GSA Abstracts with Program v. 46, no. 5, p 95.
- Curry, John C., McMillan, N.J., Dutrow, B.L. (speaker), and Henry, D.J., 2014. Tourmaline as a provenance indicator: using the complete chemical spectrum. International Mineralogical Association meeting, Johannesburg, S.A.
- Dutrow, B.L. and Henry, D.J. 2014. Tourmaline: The Perfect Accessory. 2014 Goldschmidt meeting, Sacramento, CA.
- Henry, D.J. and Dutrow, B.L. 2014 (invited). The petrologic potential of tourmaline: Interaction between crystallography and local environment revisited. International Mineralogical Association meeting, Johannesburg, S.A.
- Curry, John C., McMillan, N.J., Dutrow, B.L. (speaker), and Henry, D.J., 2014. Using Laser-Induced Breakdown Spectroscopy and chemometric analysis to generate a tourmaline provenance model. New Mexico Geological Society Annual Spring Meeting.
- Dutrow, B.L. and Henry, D.J. 2014. Gemstones with Tourmaline as an Accessory. GSA Abstracts with Program, v 46, no.6, p 417.
- Foster, C.T., Jr., Dutrow, B.L. and Gable, C.W., 2014. Time-transient mineral nucleation and growth controlled by 4D thermal fields during regional-contact metamorphism. GSA Abstracts with Program, v. 46, no. 6., p.81.
- Curry, John C., McMillan, N.J., Dutrow, B.L., and Henry, D.J., 2014. Determination of petrogenetic association of detrital tourmaline: A tool for resource exploration. GSA Abstracts with Program, v. 46. no. 6, p. 416.
- Dutrow, B.L., Foster, D., Mueller, P. and Ma, C., 2014. New Constraints on the Geochronology and Thermochronology of the Sawtooth Batholith, ID. AGU Fall Meeting V31E-4807.
- Ormand, C., Shipley, T., Dutrow, B., Goodwin, L., Hickson, T., Tikoff, B., Atit, K., Gagnier, K., and Resnick, I. 2014. Transforming spatial reasoning skills in the upper-level undergraduate geoscience classroom through curricular materials informed by cognitive science research. AGU Fall Meeting ED42B-05.
- Ormand, C., Shipley, T., Dutrow, B., Goodwin, L., Hickson, T., Tikoff, B., Atit, K., Gagnier, K., and Resnick, I. 2015. Teaching spatial thinking in Mineralogy, Structural Geology, and Sedimentology and Stratigraphy: Tools and Strategies from Cognitive Science Research. Earth Educators Roundtable.
- Dutrow, B.L., McMillan, N.J., Curry, J., and Henry, D.J., 2015. Laser-Induced Breakdown Spectroscopy as a Basis for Enhanced Provenance Studies. Goldschmidt Geochemistry Meeting, Prague, Abstract 2615.
- Mueller, P., Mogk, D., Henry, D.J., Foster, D., Dutrow, B., and Gifford, J., 2015. Ontogeny and Orogeny: Hadean to Holocene Evolution in Western Laurentia. GSA Abstracts with Programs, v. 47.
- Hoffmann, T., Dutrow, B. and Foster, C.T., Jr., 2015. Plagioclase Halos around Garnets: Implications for Pressure-Temperature Paths in Metapelites. GSA Abstracts with Programs, v. 47.

- Smith, E.W., Dutrow, B.L., and Henry, D.J., 2015. Phase equilibrium modeling of peraluminous gneisses from the Sawtooth Metamorphic Complex, ID: Implications for the middle-lower crust. *GSA Abstracts with Programs*, v. 47.
- Dutrow, B.L., and Henry, D.J., 2015. Charoite, Charoitites, and Associated Minerals: The Products of Intense Metasomatic Activity. *GSA Abstracts with Programs*, v. 47.
- McMillan, N.J., Curry, J., Dutrow, B.L., and Henry, D.J., 2015. New Techniques for using Tourmaline as an Indicator Mineral for Exploration: Analysis by Laser-Induced Breakdown Spectroscopy (LIBS) and Multivariate Statistics. *GSA Abstracts with Programs*, v. 47.
- Dutrow, B.L., Foster, C.T., Jr. and Gable, C.W., 2015. Integrated numerical models of metamorphism: linking the regional (km) and thin-section (cm) scales in space and time. *Am. Geophysical Union meeting*.

GRANTS: Recently SUBMITTED

Louisiana Education Quality Support Fund, Enhancement, 2015. Acquisition of a Spectrometer for the new JEOL 8230. Applications to teaching and research. PI: Henry, D.J and Dutrow, B. \$58,505

GRANTS: RECEIVED

Louisiana Board of Regents Support Fund, Transmission Electron Microscopy Sample Preparation System for Materials Engineering Research and Education 005ENGB-15; PI: F. Lu with co-PIs W. Meng, D.J. Henry, B. Dutrow, and J. DiTusa. October, 2014 - Sept. 2015, Amount: \$160,870

Louisiana Education Quality Support Fund, Louisiana Board of Regents - Supervised Undergraduate Research Experience (SURE) Program, \$4,000. PI: B. Dutrow.

National Science Foundation - Tectonics, "Collaborative Research: Precambrian Crustal Evolution in Western Laurentia: Implications from the Sawtooth Metamorphic Complex, Idaho." PI: B. Dutrow, \$198,458 (Dutrow's portion).

Louisiana Education Quality Support Fund, "Geothermal Resources: Cross-Disciplinary Research and Student Training". 2011-2014. \$90,000. PIs: Dutrow, B. and Nunn, J. (Geology), Bourdin, B., (Mathematics), White, C.D. (Petr. Eng.).

Ormand, C., Tikoff, B., Manduca, C. Shipley, T. (co-PIs). Dutrow, Goodwin, Hickson as collaborators. Improving Spatial Reasoning Skills in Undergraduate Geoscience Classes. NSF-TUES (2011- 2014).

Dutrow, B., *Department of Energy-EPSCoR*, Thermal-chemical-mechanical feedback during fluid-rock interactions: Implications for chemical transport and scales of equilibria in the crust. DE-FG02-03ER-46041. 2003-2007; \$248,789.

Dominion Oil Co., Provenance Studies of Volcaniclastics in the San Luis Basin, CO. Dutrow, B. and Henry, D. \$5,000.

Louisiana Education Quality Support Fund, " A Century of Earth Science Discoveries in Antarctica: A Tool to Improve and Promote Earth Sciences for College Undergraduate and K-12 Education" PI-Warny, S., Co-PI: Shelton, F, Bao, Bart, Byerly, Dutrow, Schiebout, Wrenn. \$30,000. 2004-2005.

Louisiana Education Quality Support Fund, "Upgrade of Electron Microprobe Facility". ENH-TR-15. PI-Byerly, G., Co-PIs Dutrow, B., Henry, D.J., \$80,000. 2003-2004.

Louisiana Education Quality Support Fund, "Three Dimensional Visualization System for Earth and Environmental Sciences". ENH-TR-26. PI, J. Nunn, Co-PI's Dutrow, B., Henry, D., Byerly, G.; \$20,000. 2003-2004.

National Science Foundation -EAR 9814418, Petrology and Geochemistry. *Collaborative Research: Metamorphism related to plutons in the middle crust: a combined approach involving 3-D thermal models and forward models of metamorphic textures*. Feb. 1998-2001. Dutrow, B., Co-Principal investigator with C.T. Foster, Jr. U Iowa. \$73,000 (Dutrow's portion)

National Science Foundation - Petrology and Geochemistry 2000. ROA supplement to: "Collaborative Research: Metamorphism related to plutons in the middle crust: a combined approach involving 3-D thermal models and forward models of metamorphic textures." Dutrow, B., P.I. for Hannula, Kimberly (faculty member at undergraduate institution). \$7,500.

LSU Student Tech Fee, "Student Access to Interactive and Immersive Virtual Environment". PI's: Raliv Kalia (Physics), Barbara Dutrow, Aiichiro Nakano, Paul Russo, Joel Tohline, Priya Vashishta 1999-2000. (for an Immersadesk); \$161,000.

Institute of Geophysics and Planetary Physics, Los Alamos National Lab. "Coupled fluid flow and chemical transport: Implications of mineral chemistry permeability evolution and thermal-chemical feedback effects". PI: Dutrow, B. and Travis, B. renewal . Oct. 1998-1999. suppliment 2000-2001; \$21,000

Louisiana Educaiton Quality Enhancement Grant, Inductively-coupled plasma spectrometer for geochemical and environmental studies; Chan, L. and Hanor, PIs; CoPI: Dutrow, B. June 1998- June 1999;

Institute of Geophysics and Planetary Physics, Los Alamos National Lab. "Coupled fluid flow and chemical transport: Implications of mineral chemistry permeability evolution and thermal-chemical feedback effects". PIs: Dutrow, B. and Travis, B. (LANL) renewal Oct. 1997-1998;\$14,395.

Institute of Geophysics and Planetary Physics, Los Alamos National Lab. "Coupled fluid flow and chemical transport: Implications of mineral chemistry permeability evolution and thermal-chemical feedback effects". PIs: Dutrow, B., Rosenberg, N and Travis, B. (LANL) Oct. 1996-1997; \$15,352.

National Science Foundation - Instrumentation, EAR-9421065; Dec. 1994-1997. Earth Systems Computational and Visualization Laboratory. Nunn, McCabe, and Lorenzo, PIs, Co-PI: Dutrow, B. \$99,000.

National Science Foundation-Research Experience for Undergraduates. PI: Dutrow, B. 1995-1996. Supplement to EAR-9421065; \$5000.

Louisiana Education Quality Support Fund Enhancement of Computational Facilities, 1995-1996. Nunn, McCabe and Lorenzo, PIs, Co-PI: Dutrow, B. \$62,000.

Council on Research, Louisiana State University, PI: Dutrow, B. July, 1995. \$4000.

LEQSF Enhancement of Electron Microprobe Facilities. Byerly, Ferrell, Henry and Wrenn, P.I.s. Dutrow, B. Faculty Associate. 1995-1996; \$161,000.

National Science Foundation, 1994-1996. Tourmaline in metamorphic rocks: polar asymmetry, episodic growth and petrogenesis. D.J. Henry, P.I. Dutrow, B., Faculty Associate: \$70,406

National Science Foundation - Research Experience for Undergraduates Supplement, 1993-1994. Fractures and Dynamic Fluids in Contact Metamorphic Environments. EAR-9205078, PI: Dutrow, B. \$4,000.

National Science Foundation, 1992-1995. Fractures and Dynamic Fluids in Contact Metamorphic Environments. EAR-9205078; PI: Dutrow, B. \$65,000.

LEQSF - Enhancement Grant, 1993-1994. An ultraclean isotope preparation laboratory: Enhancement of research and training in isotope geochemistry. Chan, L., CoPI: Dutrow, B. \$75,000.

National Science Foundation, 1990-1991 CAREER Award. Application of Fluid Dynamics and Geochemistry: The Essence of Processes in the Earth's Crust. EAR-9011034; PI: Dutrow, B. \$57,000

National Science Foundation, *EpsCOR-LaSER* program, 1990. The effect of advective metasomatism on crustal processes: Integration of fluid dynamics, theoretical geochemistry, irreversible thermodynamics and computer graphics. PI: Dutrow, B. \$6900.

LEQSF, 1990-1991. Thermal ionization mass spectrometer for isotopic studies at LSU. PI: L. Chan, Co-PI: Dutrow, B. \$355,500.

National Science Foundation, 1988-1989. Tourmaline as a petrogenetic indicator mineral in metamorphic rocks. EAR-88005220, PIs: Henry, DJ and Dutrow, B. \$64,966.

Cave Research Foundation, 1978. A study of mammoths from a karst faunal trap, Hot Springs, South Dakota. \$1000.

Chadron State College-Research Institute, 1977. Comparative measurements of Mammuthus columbi: American Museum of Natural History and University of Nebraska Proboscidean collections: a post cranial analysis. \$1000.

Travel GRANTS

LSU - Office of Research, Faculty Travel Grant to SEC institution, \$750. Travel to U Florida for collaborative studies.

Campus Federal Credit Union - Teaching Enhancement, LSU, \$500. December, 2010. Participation in the Stella Modeling workshop, AGU, San Francisco, CA.

Office of Sponsored Research Travel Grant, LSU, \$750. December, 2009. Attendance of American Geophysical Union Meeting, San Francisco, CA., to present invited presentation.

Office of Sponsored Research Travel Grant, LSU, \$1000. August, 2007. Attendance of Goldschmidt Meeting, Cologne, Germany, to present invited presentation.

Office of Sponsored Research Travel Grant, LSU, \$750. May, 2005. Attendance of Goldschmidt Meeting, Moscow, Idaho.

American Geophysical Union - Chapman Conference, 1994. Travel grant to participate in conference on Hydrogeologic Processes. \$700.

American Geophysical Union - Chapman Conference, 1990. Travel grant to participate in conference on large scale fluid flow. \$500.

Alexander von Humboldt Foundation, 1986-87. Travel grants for participation in international meetings and attend field conferences throughout Europe. DM 7000.

Institute for the Study of Earth and Man, SMU. 1978-1984. Numerous awards for thesis and dissertation research and for participation in national and international meetings. \$6000.

INVITED and KEYNOTE LECTURES

Keynote

2014 GSA Annual Meeting, session on Gemstones in the 21st Century, Vancouver, B.C. Canada. (11-14) Gemstones with Tourmaline as an Accessory.

Keynote in the Union session Elements: Ten Years. 2014 Goldschmidt Geochemistry Meeting, Sacramento (June 2014) Tourmaline: The Perfect Accessory

GSA Annual meeting, Session honoring the MSA Roebling Medalist F.C. Hawthorne (Oct. 2013) Making Minerals in Contact Aureoles.

Batholith Formation in 4-D: The Adamello Conference 2012. Bagolino, Italy. (Sept. 2012) Impact of flow flow on the Development of Contact Metamorphic Aureoles: 4-D Numerical Experiments of Heat and Mass Transport

Dallas Mineral Collecting Symposium. Tourmaline: More than another pretty face. SMU, Dallas, TX. August, 2011.

Opening Keynote for the Cutting Edge Workshop on "Teaching Mineralogy, Petrology and Geochemistry in the 21st Century". My presentation: Teaching MPG in Context: the Earth, Rocks, and Society. Accessible at: <http://serc.carleton.edu/NAGTWorkshops/mpg/workshop2011/program.html> (August 2011)

Presentation for Session on MPG and Society at "Teaching Mineralogy, Petrology and Geochemistry in the 21st Century". My presentation: Earth Materials and Society. Accessible at: <http://serc.carleton.edu/NAGTWorkshops/mpg/workshop2011/program.html> (August 2011)

Mineral in Context: The Earth, Rocks, and Society. Keynote presentation for Teaching Mineralogy Session at the 2010 International Mineralogical Association meeting, Budapest, Hungary. (August 2010)

On the Cutting Edge Workshop on Complex Systems, Carleton College, MN (04-2010). Invited presentation or *Developing Student Understanding of Complex Systems in the Geosciences*; my presentation: *Developing visual interpretation of complex geosystems*

MSA Presidential Address: *Modeling Metamorphism: Energy, Fluids and Feedbacks* Geological Society of America Annual Meeting, MSA Awards Lectures, October 30, 2007.

Keynote 7th V.M. Goldschmidt Geochemistry conference, Cologne, Germany. Session Introduction, *From field observations to experimental petrology and back, in memory of Werner Schreyer - A US Perspective.*

Henry, D., Sun. H., Dutrow, B., and Slack, J. (Dutrow presented). Scientific Keynote: *Tourmaline in evaporites and meta-evaporites: perspectives from Namibian metasediments* in the session "From field observations to experimental petrology and back, in memory of Werner Schreyer", 7th V.M. Goldschmidt Geochemistry conference, Cologne, Germany.

The Impact of fluid flow on mineral development: Three-dimensional modeling as a predictor of spatial distribution patterns. Fifth IMA Conference on Modelling Permeable Rocks. Edinburgh, Scotland, March 2007.

Geological Society of America, Topical Session on Metamorphic Petrology, *Evolution of thermal, mechanical, and chemical processes during contact metamorphism.* Oct. 2005.

GSA Penrose Conference on Mass Redistribution in Continental Magmatic-Hydrothermal Systems. *Aspects of 3D heat transfer and fluid flow on mineral growth surrounding plutons.* Sept. 2004.

Mineralogical Society Winter Meeting, Bath, England, 2004. *Thermal and mineral textural modeling of contact metamorphism as a guide to fluid-rock interactions and hydrothermal activity.*

Expanding your Horizons, Science, Math and Technology Workshop for 5th-12th grade girls. Chadron State College, Chadron, NE, March 2002

Inaugural Carroll C. Hall Lecture Series for Science Education, Illinois State Museum, Springfield, IL *100 Mammoths in a Hot Tub*; April 2000

Invited - Includes lectures presented at Universities as well as those presented as part of my Sigma Xi and MSA distinguished lectureship.

Ruhr-Universität, Bochum, West Germany (1-86). *Staurolite revisited: crystal chemistry and phase relations.*

Mineralogical Society of Great Britain, London, England (1-87). *Use of the SEM for determination of reaction direction for refractory silicates.*

University of Bern, Bern, Switzerland (2-87). *A new view of the structure, crystal chemistry and phase relations of Fe-Staurolite.*

Cambridge University, Cambridge, England (3-87). *Staurolite revisited.*

University of Hannover, Hannover, West Germany (5-87). *Upper thermal stability of Fe-staurolite and the effects of crystal chemistry.*

Technisches Universität, Braunschweig, West Germany (6-87). *Staurolite chemistry and the staurolite breakdown reaction.*

Ruhr-Universität, Bochum, West Germany (9-87). *An experimental redetermination of the staurolite and quartz equilibrium at high pressures.*

Ruhr-Universität, Bochum, West Germany (9-87). *Polymetamorphism in west-central Maine*

University of Arizona, Tucson, Arizona (2-88). *Evidence for multiple metamorphic episodes in the Farmington Quadrangle, Maine.*

Eastern Illinois University, Charleston, IL (3-88). *Experimental petrology: a window into the earth.*

Louisiana State Museum, Baton Rouge, LA (11-88). *Understanding the Earth through Experimental Petrology.*

University of Iowa, Iowa City, Iowa (4-89). *The Staurolite enigma: crystal chemistry and phase relations.*

University of Iowa, Iowa City, IA (4-89). *Fluid flow and mass transfer in metapelites.*

Louisiana State University, Baton Rouge, LA (2-90). *Experimental petrology: Techniques and Applications.*

Rice University, Houston, TX (3-90). *Blueberries, Blackflies and Tourmaline: Fluid flow in metapelites.*

New Mexico State University, Las Cruces, NM (3-90). *Fluid flow and Tourmaline Development in Metapelitic Schists.*

New Mexico State University, Las Cruces, NM (3-90). *Mineral Textures as a function of Metamorphic Grade.*

Shell Oil Company, Houston, TX (5-90). *Aqueous ion activities and fluid flow associated with polymetamorphism: Constraints from observations and thermal modeling.*

Southern Methodist University, Dallas, TX (11-91). *Tourmaline as a Monitor of the Evolution of Metapelites.*

Mineralogical Society of America Session: Contact Metamorphism. at Geological Society of America Annual Meeting. San Diego, CA. 10-91). *The generation of a percolation network: fluid pressure, fracture propagation and fluid flow.*

Brigham Young University, Provo, UT (11-91). *Tourmaline Crystal Chemistry.*

Idaho State University, Pocatello, ID (11-91). *Dynamic Fluids in Metamorphic Rocks.*

University of Idaho, Moscow, ID (11-91). *Tourmaline as a Monitor of Metamorphism: Low to High Grade.*

University of Idaho, Moscow, ID (11-91). *Fracture propagation and Fluids in Metamorphic Rocks.*

University of Alabama, Tuscaloosa, AL (1-92). *Monitoring Metamorphism through Tourmaline Chemistry.*

University of Alabama, Tuscaloosa, AL (1-92) *Dynamic Fluids in Metamorphic Rocks.*

University of New Orleans, New Orleans, LA (1-92). *Fractures and Dynamic Fluids in Metamorphic Rocks.*

Florida State University, Tallahassee, FL (2-92). *Tourmaline as a guide to metamorphism.*

Bryn Mawr College, Bryn Mawr, PA (2-92). *Staurolite revisited: structure, crystal chemistry and phase relations.*

Bryn Mawr College, Bryn Mawr, PA (2-92). *Tourmaline as a Monitor of Metamorphism: Low to High Grade.*

Bryn Mawr College, PA and the University of Pennsylvania(2-92), *Fractures and Dynamic Fluids in Metamorphic contact aureoles.*

Mt. Holyoke College, Amherst, MA (2-92). *Tourmaline as a Monitor of Metamorphism: Low to High Grade.*

Lafayette College, Easton, PA (2-92). *Mechanical and chemical consequences of fluids in Metamorphic Rocks.*

Louisiana State University, Baton Rouge, LA (2-92). *Fracture propagation and fluid-rock interactions during metamorphism.*

University of Massachusetts, Amherst, MA (2-92). *Dynamic Fluids in Metamorphic Rocks.*

Iowa State University, Ames, IA (4-92). *Tourmaline as a Monitor of Metamorphism: Low to High Grade.*

- Washington University, St. Louis, MO (4-93). *Fracture propagation in contact metamorphic aureoles.*
- Geochemical Symposium: Fluids and Fluid Flow in the Crust. Geological Society of America (10-93).
The Role of Porosity and Chemical Buoyancy on Fluid Flow Regimes in the Crust.
- University of Colorado - Boulder, Boulder, CO (11-93), *Fractures and Dynamic Fluids in Contact Metamorphic Rocks.*
- International Mineralogical Association, Pisa, Italy. (9-94). *Crystal Chemistry of Tourmaline: A Guide to metamorphic evolution of metapelites.* in Session: Recent Advances in the Crystal Chemistry of Rock forming minerals.
- International Mineralogical Association, Pisa, Italy. Mukhopadhyay, B., Holdaway, M.J., Guidotti, C., Dyar, M, and Dutrow, B., (9-94). *Garnet-biotite geothermometer: a recalibration.*
- International Mineralogical Association. Pisa, Italy. Holdaway, M.J., Mukhopadhyay, B., Dyar, M., Guidotti, C., and Dutrow, B., (9-94). *A re-examination of the muscovite-almandine-biotite-sillimanite geobarometer.*
- Mineralogical Society of America, symposium on: Boron. Henry, D.J., and Dutrow, B.L., (10-94). *Tourmaline in metamorphic rocks: A monitor of boron flux.*
- Los Alamos National Lab, Los Alamos, NM, (7-95). *Dynamic Fluids in Metamorphic Rocks: fracture propagation and textural alteration.*
- University of Iowa, Iowa City, IA (10-95). *A Salty Tale: The dynamics of double diffusive convection.*
- Geological Society of America, Society of Economic Geologists symposium: (11-95). *Duration of Hydrothermal Events. Dynamics of Hydrothermal Convection in Layered Brine Systems: Implications for Mineralization.*
- Arizona State University, Tempe, AZ. (2-96). *A Salty Tale: Double diffusive convection in hydrothermal systems.*
- Tucson Gem and Mineral Show, Mineralogical Society Symposium, Tucson, AZ (2-96). *Cathodoluminescence in charoite and associated minerals.*
- Louisiana State University, Baton Rouge, LA. (3-96). *A hundred mammoths in a hot tub.*
- Louisiana Tech University, Monroe, LA, (3-96). *A hundred mammoths in a hot tub. Sigma Xi National Lecture.*
- Kongsbergseminar, Kongsberg, Norway, (8-10 May 1996). *Evolution of fluid pressure and fracture propagation in contact metamorphic aureoles.*
- Ruhr-Universität, Bochum, Germany (5-96). *Fluid pressure and fracture propagation in contact metamorphic aureoles, effects on metamorphic mineral assemblages.*
- NSF Teaching Mineralogy Workshop, Amherst, MA (6-96). Presentation of my lab: *Better Living through Minerals, X-Ray Diffraction of Household Products.*
- University of Oklahoma, Norman, OK (12-96). *Fluid Pressure and fracture propagation in a contact metamorphic aureole.*
- Carnegie Mellon University, University of Pittsburgh, Pittsburgh, PA. (4-97) *Are Diamonds Forever? The Natural History of Gemstones. Sigma Xi National Lecture.*
- Texas A & M University, College Station, TX. (4-97) *One hundred mammoths in a hot tub. Sigma Xi National Lecture.*
- University of Texas Medical Branch, Galveston, TX. (5-97). *Are Diamonds Forever? The Natural History of Gemstones. Sigma Xi National Lecture.*
- U.S. Department of Agriculture, New Orleans, LA. (5-97) *One hundred mammoths in a hot tub. Sigma Xi National Lecture.*
- Tourmaline 1997. *Fibrous tourmaline: monitor of pegmatitic processes.* Plenary lecture. Prague, Czech Republic. (6-97)

Hoffman-LaRoche Pharmaceutical Company, Nutley, NJ. (3-98) *One Hundred Mammoths in Hot Tub, Sigma Xi National Lecture.*

South Dakota State University, Brookings, SD, (4-98). *Better Living through Minerals. Sigma Xi National Lecture,*

South Dakota State University, Brookings, SD, (4-98) *One hundred mammoths in a hot tub. Sigma Xi National Lecture, Sigma Xi Banquet Lecture*

University of South Dakota, Vermillion, SD; (4-98) *Are Diamonds Forever? The Natural History of Gemstones. Sigma Xi National Lecture.*

University of South Dakota, Vermillion, SD. (4-98) *One hundred mammoths in a hot tub. Sigma Xi National Lecture, Sigma Xi Banquet Lecture*

Tennessee Technological University, Cookeville, TN; (4-98) *Are Diamonds Forever? The Natural History of Gemstones. Sigma Xi National Lecture*

Tennessee Technological University, Cookeville, TN; (4-98) *One hundred mammoths in a hot tub. Sigma Xi National Lecture, Sigma Xi Banquet Lecture.*

Corning Glass, Corning, NY; (5-98). *Are Diamonds Forever? The Natural History of Gemstones. Sigma Xi National Lecture, Sigma Xi Banquet Lecture*

Louisiana State University, Baton Rouge, LA; (5-98) *Rock Stars, Science Saturday*, sponsored by Physics Dept.

International Mineralogical Association meeting, Toronto, ON, Canada; (8-98). *Deciphering signatures of fluid infiltration using 3D thermal and textural modeling.*

International Mineralogical Association meeting, Toronto, ON, Canada; *Thermal evolution and fluid infiltration: development of metasomatic mineralogy adjacent to an alkalic dike.* (8-98)

Louisiana State University, Business Law Class; Baton Rouge, LA (8-98). *Strategies for 500Km NonStop; Competing in the 1996 Eco-Challenge*

University of Texas, Austin, TX; (12-98). *Fluid flow and chemical transport surrounding an alkalic dike in subsurface Louisiana: Implications for oil and gas generation.*

University of Texas, Austin, TX; (12-98) *Deciphering the Evolution of Metamorphic Terranes.* University of Texas, Austin, TX.

LSU Museum of Natural History, Baton Rouge, LA; (9-99) *One Hundred Mammoths in a Hot Tub.*

Illinois State Museum, Springfield, IL; (4-00) *Gemstones as Guides to the Earth's Evolution.*

Illinois State Museum, Springfield, IL; (4-00) *One Hundred Mammoths in a Hot Tub. Inaugural Speaker in the Carroll C. Hall Lecture Series*

University of North Dakota, Grand Forks, ND (01-2001) *Deciphering the evolution of metamorphic terranes: Insights from 3d thermal and textural modeling.*

University of North Dakota, Grand Forks, ND (01-2001) *Where has all the silica gone? Metasomatism associated with dike intrusion in subsurface Louisiana, effect on flow dynamics and isograd morphology.*

University of Arizona, Tucson, AZ (02-2001) *Deciphering the evolution of metamorphic terranes: Insights from 3d thermal and textural modeling.*

Southern Methodist University, Dallas, TX (04-2001) *Deciphering the evolution of metamorphic terranes: Insights from 3d thermal and textural modeling.*

Expanding your Horizons (2003) see Keynote

Ohio State University (10-2003) *Blackened Smackover: Fluid flow and chemical transport surrounding an alkalic dike in subsurface Louisiana.*

Mineralogical Society (01-2004) see Keynote

GSA Penrose Conference, on Magma-Hydrothermal Systems (09-2004). *Aspects of 3D heat transfer and fluid flow on mineral growth surrounding plutons.*

Louisiana State University, Sigma Xi Chapter (02-2005) *One Hundred Mammoths in a Hot Tub*

Los Alamos National Lab, NM (08-2005). *Geology of the Grand Canyon: From the bottom up.*

University of Tennessee, Knoxville. (09-2006). *Metamorphic mineral textures: Ghosts of Plutons Past.*

University of Tennessee, Knoxville. (09-2006). *Scientific Visualization: do you see what I see?*

Louisiana St. University, Dept. Petroleum Engineering (11-2006). *Heat and mass transport in metamorphic systems: The impact on mineral chemistry and textures.*

University of Iowa (11-2006). *Metamorphic Hydrology: Impact on mineral textures.*

2007 NSG IGERT joint workshop between Los Alamos National Lab and LSU. *Modeling heat and mass transport in hydrothermal systems.*

Southern Methodist University, Dallas, TX. (11-2008) *Modeling Metamorphism.*

Mineralogical Association of Dallas, Dallas, TX. (11-2008) *The geologic attributes of tourmaline.*

Murray State University, KY. (American Women in Geoscience Speaker). (03-2009) *Tourmaline as a Geologic DVD.*

SERC Workshop, Carleton College, MN (04-2010). Invited discussant for *Developing Student Understanding of Complex Systems in the Geosciences*; my presentation: *Developing visual interpretation of complex geosystems*

University of Louisiana, Monroe. (2-2011) *One Hundred Mammoths in a Hot Tub: Excavations at the Hot Springs Mammoth Site, SD*

Portland State University, Oregon (3-2014) AWG speaker. *Mineral Textures: The Ghosts of Plutons Past).*

Midwestern State University, Wichita Falls, TX. (11-2014) AWG speaker. *Tourmaline: A mineral for all reasons.*

Sporting Events - Motivational

What being a geologist can do for you! Eco-Challenge 1996. LSU Dept. of Geology and Geophysics. (02-97).

Sourcing the inner reserves; participating in the 1996 Discovery Eco-Challenge. Womens Faculty Club, LSU. (10-97).

Surviving the World's Toughest Adventure Race: The 1996 Eco-Challenge. Sponsored by Club South Runners and LSU Recreational Sports Group. (10-98).

Strategies for 500Km NonStop; Competing in the 1996 Eco-Challenge Louisiana State University, Business Law Class; Baton Rouge, LA (8-98).

The Prequel to Survivor: Competing in Expedition Adventure Races. Baton Rouge Sierra Club. (10-2001).

Expedition Adventure Racing: Challenging yourself. Baton Rouge YWCA. (04-2005).

TEACHING ACTIVITIES

Teaching Workshops

Teaching Mineralogy, 1996. Presentation of module for teaching X-Ray diffraction; contribution to SERC on-line resources.

SERC-On The Cutting Edge: Teaching Petrology, 2003. Attendance and contribution to on-line resources.

SERC-On The Cutting Edge: Analytical Methods, 2007. Attendance and contribution to on-line resources.

SERC-On The Cutting Edge; Teaching Geoscience with Visualization, 2008. Invited but declined due to scheduling conflict

SERC-On The Cutting Edge: Developing Students Understanding of Complex Systems in the Geosciences, 2010. Invited presentation (posted on-line), essay and teaching activities (on-line).

SERC- On the Cutting Edge: Teaching About Complex Systems Using the STELLA Modeling Software. Dec. 2010.

SERC-On The Cutting Edge; Teaching Mineralogy, Petrology and Geochemistry in the 21st Century. Invited keynote speaker, invited presentation, and panel discussant.

COURSES Taught

Geology 2081 Mineralogy: each Fall - 1992- 2012; Spring - 2013 - present

Mineralogy Lab; Wrote lab manual for class, complete reorganization of traditional course into an Earth Systems approach. Syllabus: <http://www.geol.lsu.edu/dutrow/mingy>

Geology 3909 Undergraduate Research (one on one)

2015 - Elly Smith, Megan Borel, Shelby Richardson, 2014 - Elly Smith, 2012 - Austin Bennett, 2009 - Brent Vu, 2008 - Katy Jensen-Dorscher, 2005 - Catherine Macris, 1995 - Susan Anderson

Geology 4002.1 Petrologic Mineralogy, and as Geol 7900 (Graduate Student). Syllabus: <http://www.geol.lsu.edu/min>

Geology 4002. Geothermal Energy, Spring 2012 Team taught, developed new course: Syllabus: <http://www.geol.lsu.edu/dutrow/geothermal/class>

Geology 4043: Earth Materials and The Environment; Spring -even years; 94- present, 2013; environmental issues; asbestos, zeolites, silica, hazardous waste disposal, mining, critical thinking related to environmental issues. Syllabus: <http://www.geol.lsu.edu/dutrow/env>

Geology 7043: Advanced Metamorphic Petrology; Fall, 2003, 2008

Syllabus: <http://www.geol.lsu.edu/dutrow/advmm>

Geol. 7900.x, Geol 7200: Scientific Communication and Visualization, Written and Oral communication), Spring, odd years since 2001 Syllabus: <http://www.geol.lsu.edu/dutrow/presn>

Geology 7981: Special Topics in Geochemistry; Fluids in the Crust,

Geology 1001: Physical Geology, Spring, 1997, 1998

Additional Courses taught:

- Field Camp: one week on metamorphic petrology, Summer, 1995.
- Fluid-Rock Interactions: Effects of Fluids in the Crust (U of Iowa)
- X-Ray Diffraction and Clay Mineralogy (U of Iowa)

Selected Innovations in Teaching

Pet Mineral Project:

Each year, students in beginning Mineralogy receive a mineral, theirs to keep, that we do not cover in class. Throughout the semester various projects are assigned commensurate with learning outcomes in the course. These assignments include, for example, the history and origin of its name (thus they learn about naming minerals), crystallography, physical properties (they measure them), environment of formation, and journal articles that dealt with their mineral (requiring library use, either electronic or physical) followed by a discussion of 'peer-reviewed' publications vs. 'gray literature' non-reviewed material such as that found on the web. Prizes were given for the oldest reference, the longest title, the least useful, etc. such that it kept the

exercises fun and enjoyable. Because this exercise is accomplished in steps, it did not seem as daunting of a task.

To provide each student with the ability to acquire original data, thus giving them more ownership of their work and the ability to experience aspects of research, data collection and interpretation, each student analyzed their mineral with the SEM. This final project provides students with access to sophisticated equipment, research techniques and a unique research experience. By the end of the semester they had compiled a rather comprehensive report on the mineral. The finale is a short oral presentation on their mineral to the class.

Reorganization of Mineralogy course to a "whole earth" approach

Mineralogy is now taught on the basis of the "whole Earth" approach, from the Earth's core to the crust. Systematic mineralogy, crystallography and crystal chemical relationships are woven into a more whole Earth approach to teaching mineralogy. This organization reinforces the importance and fundamental role minerals play in composing our Planet and others. Since 1990, I have used crossword puzzles as a learning technique which is especially useful for review of geologic terms and new vocabulary that fills a mineralogy course.

<http://www.geol.lsu.edu/dutrow/mingy/index.html>

Course development: Earth Materials and the Environment

This course focuses on minerals as problems and solutions to many environmental problems. It focuses on the need to understand minerals as related to environmental issues. We study crystal chemistry of minerals, the relationship to the issue, and use critical-thinking skills to determine an outcome. The course relies on various texts, newspaper articles, peer reviewed publications and my work as an expert witness. In addition, we take sides for or against an issue and argue the points on a fact basis. Of immense interest is the 'green' energy issue and its role in mining of rare earth elements in countries where few environmental laws exist. Segments linking energy consumption to the carbon cycle caused the students to think carefully about energy use, the need for resources, and how this impacts societies role in these issues.

<http://www.geol.lsu.edu/dutrow/env/>

Course development: Petrologic Mineralogy

Minerals are a primary tool for deciphering the geologic history of the Earth and Planets. At the request of students, I developed this course to explore minerals that are used to unravel geologic processes. Crystal chemistry of petrologically important minerals that tell us about time, pressure-temperature conditions and provenance were covered in detail. Thermodynamic properties associated with the minerals were discussed and related to their chemistry. A semester-long project was undertaken by all students.

http://www.geol.lsu.edu/dutrow/petro_min/index.html

Course development: Scientific Communication and Visualization

This course incorporated elements of visualization, graphical analyses of large datasets, oral and written communication. Students complete an original research project, related to their thesis.

<http://www.geol.lsu.edu/dutrow/presn/>

Undergraduate Research

Many of our undergraduate students desire to participate in research projects.

Richardson, Shelby, 2014 -. Garnet amphibolites from the Sawtooth Metamorphic Complex, ID.

- Borel, Megan*, 2014 -. Tertiary Granites of the Sawtooth Mountains, ID.
- Smith, Elly*, 2013 - 2015. Metamorphic History of Metapelites in the Pioneer Core Complex, ID and the Sawtooth Metamorphic Complex, ID.
- Bennett, Austin*, 2012 - 2013. Conditions of high grade metamorphism in the Sawtooth Metamorphic Complex, ID.
- Vu, Brent*, 2009. Epidote as geologic flow-zone indicators in hydrothermal systems.
- Jensen-Dorsher, Katy*. 2008. Cathodoluminescence studies of calcite-graphite mylonites from the Sawtooth Mtns, Id. Implications for deformational events.
- Armstrong, C.*, Dutrow, B., Henry, D.J., 2005. When bivalves get the blues: vivianite replacement of bivalves from the Kerch iron-ore deposits, Ukraine. *Geological Society of America, Abstracts with Programs*, v. 37, p. 300.
- Anderson, S.*, Dutrow, B., Henry, D., Mueller, P., and Giaramita, M. 1995. High grade metamorphic roof pendants in the Sawtooth Mountains, ID: A missing peice of the accretionary puzzle? GSA abstracts with program, 27:A437.
- Dutrow, B., *Anderson, S.*, Henry, D., Mueller, P., and Giaramita, M. 1995. A new Precambrian crustal province in south-central Idaho? EOS, Transactions, American Geophysical Union, 76:F678.
- Dutrow, B., *Cash, T.*, and Henry, D., 1994. Crystal chemistry of charoite: A product of intense metasomatic processes. GSA abstract with program, 26:A481.

Other students and projects include:

- Corine Anderson, Undergraduate Research, *Vivanite replacement of clam shells*. 2005 - 2006.
- Danielle Duhe, Undergraduate Research, *Pseudomorph replacement mechanisms*, 2005-.
- Kim Gunderson, Undergraduate Research (Senior Thesis), 1999-2001 *Petrology of rhyolitic dikes of the Sawtooth Mtns, Idaho and their relationship to the Sawtooth Granite*
- Rebecca Tedford, Undergraduate Research, 1999-2000 *Clinozoisite + margarite psuedomorphs; a P-T indicator from the Sawtooth Mountains, ID*
- Eric Zimmermann, M.S., LSU, 1998 *Tourmaline as a Petrogenetic Indicator Mineral*
- Gian Constantine, Undergraduate Research, 1998-1999 *Petrology of dikes from the Sawtooth Mtns, Idaho*
- Susan Anderson, Undergraduate Research, Senior Honor's Thesis, LSU, 1993-1996.
Second place at Sigma Xi's Undergraduate Research Symposium, LSU. *Metamorphic Petrology of the Sawtooth Mtns, Idaho*
- Traci Cash, Undergraduate Research, LSU, 1993-1995. *Crystal chemistry of charoite*
- Rick Langel, Honor's Thesis, Univ. of Iowa, 1990-1993. *Mineralogy of Duhme Cave*

THESES/DISSERTATIONS DIRECTED

Major Advisor to:—

- Tasha Hoffmann, M.S., 2014 - Diffusion modeling of plagioclase halo formation around garnets
- Tessa Hermes, M.S., 2012 - 2015. Geothermal Energy production.
- Austin Bennett, M.S., 2012 - 2013. Metamorphic Petrology
- Isis Fukai, M.S., 2011 - 2013; Calc-silicates in the Sawtooth Metamorphic Complex, ID; (employed by Battelle)
- Philip Bergeron, M.S., 2010 - 2012; Detrital zircon studies in the Sawtooth Metamorphic Complex, ID (Marathon Oil Company)
- Kyle Metz, M.S., 2007-2010; Metapelites in the Sawtooth Metamorphic Complex, ID (Marathon Oil Company)

Corine Armstrong, M.S., 2006-2009; Provenance Studies of Volcanic Clasts (employed by Chevron-Texaco)

Jennifer Whittington, M.S., 2003-2006; Muscovite pseudomorph developement (employed by Encana Gas Company)

Connie Christensen, M.S., 1994-1997; Contact metamorphism and metasomatism is subsurface LA (employed by California State University.)

Corine Armstrong, Undergraduate Research (Senior Thesis), 2004-2006

Catherine Macris, Undergraduate Research (Senior thesis), 2000-2003; Ph.D. UCLA, Cal-Tech, Post doc

Kim Gunderson, Undergraduate Research (Senior Thesis), 2000-2002; employed by Louisiana DEQ

Rebecca Tedford, Undergraduate Research, 1999-2000, LSU Ph.D., employed at BP

Gian Constantine, Undergraduate Research, 1998-1999

Susan Anderson, Undergraduate Research, Senior Honor's Thesis, LSU 1993-1996; M.S. UT-Austin.

Traci Cash, Undergraduate Research, LSU, 1993-1995.

Rick Langel, Senior Thesis, Univ. of Iowa, 1990-1991.

Karen Inman, Ph.D., LSU, 1992-1993, Tourmaline studies.

Minor Professor to:

Watheq Al Mudhafar, Ph.D., 2013 - present (Petroleum Engineering; Geology Minor) - Integrated Reservoir Simulation Study of Gas Assisted Gravity Drainage (GAGD) Process in the South Rumaila Oil Field, Iraq.

Milad Ahmadi, Ph.S., 2013 - present; (Petroleum Engineering; Geology Minor) - Failure Analysis in Geomechanical Problems with Significant Temperature Gradient

Mohamed N. Al Riyami 2012 - present (Petroleum Engineering; Geology Minor) - Fluid-fluid interactions in Gas Assisted Gravity Drainage (GAGD) Process in Fractured Reservoirs.

Esmail Ansari, Ph.D., 2011 - present (Petroleum Engineering; Geology Minor) - Geothermal Energy Evaluation in the Louisiana Gulf Coast Region.

Tara Jonnell, Ph.D., 2011 - present; Provenance studies in the Zanskar Basin, Himalayas.

Suraj Bajgain, Ph.D., 2011- ; First Principle Simulations of Silicate Melts

Masoud Safari-Zanjani, Ph.D., 2011 - present; Geothermal energy evaluation in subsurface Louisiana

Dennis Donaldson, Ph.D., 2010 - present: Metamorphic Petrology and Structures in the Himalaya

Richard Varuso, Ph.D., 2008 - 2010 (co-advisor); Civil and Environmental Engineering

Haiting Sun, Ph.D., LSU, 2001-2006; metamorphic petrology (employed by EOG Resources) Employed by US Army Corps of Engineers

Ray Wilhiet, Ph.D., LSU, 1998-2003

Tian-Li Fan, Ph.D., LSU, 1997-present

Guichang Liu, Ph.D., LSU, 1992-1998.

Eileen Herrstrom, Ph.D., U. of Iowa, 1990-1996.

Nick Daigle, M.S., LSU, 2013 - present, metamorphic petrology

Celina Will, M.S., LSU, 2009-2012; metamorphic petrology (employed by Schlumberge)

Andy Maas, M.S., LSU, 2001-2004; metamorphic petrology (employed by ExxonMobil)

David Viator, M.S., LSU, 2000-2003; metamorphic petrology (employed by ExxonMobil)

Eric Zimmermann, M.S., LSU, 1998-2001; provenance studies (employed by LOGS)

Gina Waters, Senior Thesis, LSU, 1993-1994.

Member of Graduate Committee for Following Students:

Thomas Schramm, Ph.D., Geology, 2014 - present, Paleomagnetism
Greg McCandless, Ph.D., Chemistry, 2010-2012, Crystallography
Lindsay Yann, M.S., LSU 2008-2010, Vertebrate Paleontology
Travis Atwood, M.S., LSU 2006-2009, Vertebrate Paleontology
Mark Hagge, M.S., LSU 2006-2010, Vertebrate Paleontology
Grant Boardman, M.S., LSU, 2004-2006, Vertebrate Paleontology
Feng Weng, Ph.D. LSU, Petroleum Engineering, 2003-2005
Chris McFarlane, Ph.D., Univ. of Texas- Austin, 1999-2003, Metamorphic Petrology
Jeff Harding, Ph.D., LSU, 1997-1999
Lee Esch, Ph.D., LSU, 1992-1995, Low Temperature Geochemistry
Kush Tandon, Ph.D., LSU, 1992-1995
Shaobing Su, M.S., LSU, 1992-1994

Major Advisor for Communication Intensive Distinguished Communicator Certification (B.S.)

Jennifer Kenyon, 2015 -
Philip Bergeron, Fall, 2009
Ivory Iheanacho, Spring, 2010

Other Professional SERVICE

Symposium Organizer

Fluids and Fluid Flow in the Crust, 1993 Geological Society of America Annual Meeting, Boston, MA, with Susan Brantley, Jane Selverstone and Terri Bowers;
Fluids during Metamorphism, 1998 International Mineralogical Association Meeting, Toronto, Ont. CAN; (invited)
Fluids in the Crust I, II; 1998 American Geophysical Union, San Francisco, CA, with Nina Rosenberg;
Metamorphic Petrology from the field to experiments: A Session in honor of M.J. Holdaway, 2000 Geological Society of America Annual Meeting, Reno, NV
Modeling Metamorphism: Petrology, Geochemistry and Tectonics; a Keynote Pardee Symposium, 2003 Geological Society of America Meeting, Seattle; with M. Brown
Modeling Metamorphism: Petrology, Geochemistry and Tectonics; 3 topical sessions and a poster session; 2003 Geological Society of America Meeting, Seattle with M. Brown
Modeling Metamorphism Topical session; 2003 American Geophysical Union Meeting, San Francisco; with M. Brown
Recent Advances in Li Isotope Geochemistry Oral and Poster session; 2008 American Geophysical Union Meeting, San Francisco; with F-Z. Teng
Teaching Mineralogy Topical session; 2010 International Mineralogical Association Meeting, Budapest, Hungary.
Gemological Research in the 21st Century Topical session; 2014 Geological Society of America Meeting, Vancouver, B.C. Canada

REFEREE for Scholarly Publications and Programs

Journal Referee

The American Mineralogist
American Journal of Science
Basin Research
Canadian Mineralogist
Chemical Geology
Contributions to Mineralogy and Petrology
Earth and Planetary Science Letters
Economic Geology
Elements
European Journal of Mineralogy
Geochimica et Cosmochimica Acta
Geology
Journal of Geology
Journal of Geological Education
Journal of Geophysical Research
Journal of Geoscience (Czech Republic)
Journal of Metamorphic Geology
Journal of Petrology
Journal of Sedimentary Petrology
Journal of Structural Geology
Lithos
Mineralogical Magazine
Nature
Reviews of Geophysics
Solid State Communications
Tectonophysics

Referee to Funding Agencies

American Chemical Society - Petroleum Research Fund
Czech Republic National Science Foundation
Department of Energy (DOE)
Fond de recherche du Quebec-Nature et technologies, Canada
International Science Foundation
Institute for Geophysics and Planetary Physics, Los Alamos Ntl. Lab.
National Academy of Sciences
NSERC - CRSNG, Canada
National Science Foundation
Smithsonian Institution
Los Alamos National Lab, LDRD grants
Killam Foundation, Canada
Villium Foundation, Denmark

Judge, Student Presentations

American Geophysical Union, Hydrology section, 1998
American Geophysical Union, Volcanology & Petrology, 2000, Spring 2006, Fall 2006, Fall 2007, 2010, 2011
Goldschmidt Geochemistry Conference, 2012

SESSIONS in MEETINGS chaired by Prof. Dutrow (*Session; Meeting*)

Mineralogical Society of America - Metamorphic Petrology III: Chemical, Textural and Thermal Aspects, Geological Society of America Annual Meeting; St. Louis, MO; Nov. 5-9, 1989.

Mineralogical Society of America - Metamorphic Petrology III: Metamorphic Fluid-Rock Interactions and Fluid Flow Studies, Geological Society of America Annual Meeting; Dallas, TX; Oct. 29-Nov. 1, 1990.

Mineralogical Society of America - Metamorphic Petrology I: Minerals, Textures, Temperatures, and Facies, Geological Society of America Annual Meeting; Cincinnati, OH; Oct. 1992

Geochemical Society - Symposium: Fluids and Fluid Flow in the Crust; Geological Society of America Annual Meeting; Boston, MA; Oct. 1993. Co-convener.

Scaling Relations; AGU Chapman Conference - Hydrogeologic Processes; Lincoln, NH; June 6-10, 1994.

Experimental Tourmaline Studies, Tourmaline 1997 - International Symposium on Tourmaline, Moravian Museum, Brno, Czech Republic, June 10-18, 1997.

Metamorphic Petrology I: Fluids; Geological Society of America Annual Meeting; Salt Lake City, UT; Oct. 1997.

Metamorphism, Tectonics and Geochronology; American Geophysical Union Fall Meeting; San Francisco, CA; Dec. 1997.

Materials and Microsystems for Extreme Environments; Mardi Gras '98 Physics Conference, Baton Rouge, LA; Feb. 1998.

Fluid Flow during Metamorphism; International Mineralogical Association, Toronto, Ont. Can., Aug. 1998.

Fluid Flow in the Crust - I; American Geophysical Union, San Francisco, CA, Dec. 1998.

Fluid Flow in the Crust - II; American Geophysical Union, San Francisco, CA, Dec. 1998.

Metamorphic Petrology II; Geological Society of America, Denver, CO; Oct. 1999.

Metamorphic Petrology from the Field to Experiments: A Session in Honor of M.J. Holdaway, (organizer) *Geological Society of America Annual Meeting*; Reno, NV, Nov. 2000.

Magma and Metamorphism; American Geophysical Union, San Francisco, CA, Dec. 2000. Judge of Student poster sessions.

IMA, Metamorphic Petrology

AGU, Metamorphic Petrology

Modeling Metamorphism; Pardee Session Geological Society of America, Seattle, WA. Nov. 2003

Modeling Metamorphism; Topical Sessions (3) Geological Society of America, Seattle, WA. Nov. 2003

Modeling Metamorphism; Poster Session Geological Society of America, Seattle, WA. Nov. 2003; Session organizer

Modeling Metamorphism; Session American Geophysical Union Meeting, San Francisco, CA, Dec. 2003; Session organizer.

Dana Medal Session; Oral session Goldschmidt 2005, Moscow, ID, May, 2005

MSA Awards Lectures, Oral session, *Geological Society of America Annual Meeting*, Philadelphia, PA, Oct. 2006

Recent Advances in Li isotope Geochemistry, Oral and poster session, *American Geophysical Union Meeting*, San Francisco, CA, Dec. 2008 Session Organizer.

Other Synergistic Activities

Radio Interview on Rare Earth Elements for Garland Robinette's Think Tank WWL 870 am and WWL 105.3 fm; New Orleans radio station, 2011

Development of Educational Displays for the Tucson Gem and Mineral Society Show through the LSU Museum of Natural Science.

2009 - "Fibrous Tourmaline: Mats, Hats and Cracks", for the show theme "Mineral Oddities"

2010 - "Geologic Gems" for the theme "Gems".

2011 - "What's in a Name? The Tourmaline Supergroup Revisited"

Winner - Friends of Mineralogy Best Educational Exhibit by an Institution.

Provided photographs for the educational DVD *O2: the molecule that changed the world*. Produced by the BBC and Burning Gold Productions.

Art Exhibit "Jade"

For the opening of the new Art Museum (Shaw Center) in downtown Baton Rouge, I worked with the Education Director at the Art Museum to prepare an exhibit on natural "Jade". I acquired loans of jade specimens from classic localities from the American Museum of Natural History, and together with specimens from the Geology and Geophysics collection, provided a wide variety of natural materials for their educational exhibit. Both types of Jade (nephrite and jadeite) were shown, together with photomicrographs of each material and thin sections for viewing. A natural linkage between science and art was created. Participants could feel and compare natural materials to carved sculptures.

Rocks of Antartica

With a colleague in outreach, we received funding for a new exhibit at the Museum of Natural Science that focuses on Antartica. I was responsible for the display panel on "rocks and minerals"; developing the content, writing the story, securing photomicrographs of specimens from petrologists working in Antartica, and describing the specimens for display.

M.J. Holdaway Collection

My Ph.D. advisor retired in March, 2000. His outstanding research collection of over 500 metamorphic rocks from NW Maine was collected over a twenty year interval. Now, many of these classic, and some controversial, localities are closed by private landowners. Because my research involves areas in Maine, I asked Mike to donate his collection to LSU, which he did. These classic specimens now curated, cataloged and are available via a searchable database through the Museum of Natural Science at LSU.

Solicited and received donations in excess of \$21,000 of minerals for the improvement of LSU laboratory teaching collections and museum display. This is an ongoing, yearly activity. It provides minerals for laboratory exercises and minerals to give away to the public and for my pet mineral project.

Collaboration across Disciplines

Educating the Populus-Reno Gem and Mineral Show

At the request of a physicist colleague at Univ. Nevada-Reno (Dr. McCall), I prepared a display for her to demonstrate at the Reno Gem and Mineral Show. She was asked to help with the gem show; they needed something a physicist could understand/enjoy/explain about minerals, and she contacted me. I prepared "Light through Crystals", a display of numerous minerals that exhibited unusual optical properties (together with an explanation of the phenomena) such as ulexite, calcite, etc.

SERVICE, LSU - 1992-present.

University:

- Member, Search Committee for Chief Information Officer, 2011-2013
- Member, Search Committee for High Performance Computing Director, 2011-2012
- Chair, IT Research Enablement and Development Group, 2011 - present
- Member, Educational Curriculum Committee for Materials Sciences and Engineering, 2012 -
- Executive Committee, Materials Science and Engineering Program at LSU, 2012 - present
- Member of the Flagship IT Strategy Research Enablement Task Force. (2005-present) Chair, 2010-2011. Reports to the CIO - Vice Chancellor. Updated IT strategy and action items.
- Faculty Senate Benefits Committee - 2008 - present
- Research and Development Council-Physical Sciences (under Vice Chancellor for Research) - 2000-present
- Reviewer, Summer Stipend Grant Selection Committee, Council on Research, Physical Sciences Group (2008)
- Member, selection committee for University Wide Awards, Office of the Vice Chancellor (2006)
- Member of the IGERT group for Computational Fluid Dynamics (2005-2012)
2008 Hosted and participated in joint LSU-LANL Workshop for CFD
- Council on Research (advisory to VC- Research), 2000-2003
Reviewer - Summer Stipend Research Program
Reviewer - Chancellor's Distinguished Lecture Series
Selection committee for "Distinguished Research Master"
- Program Review Council, LSU, 1999-2004 (Chair, Marketing Review, March 2001; Food Science Review, 2002; Chemical Engineering, 2003)
- Curator, LA Museum of Natural History, Mineralogy - Petrology collections, 1998-present. Develop exhibits.
- Search Committee - Dean of Basic Sciences, 1999-2000
- Graduate council member - 1995-present
- Host, Chancellor's Lecture Series, Prof. Sue Keiffer, March, 2000; Amos Nur, 2004
- Search Committee - Vice Chancellor for Research and Dean of the Graduate School, 1998-1999
- Dean's representative - for Ph.D. exams outside Geology Dept.
- Amir Shahkarami, Nuclear Science & Engineering, 2001
- Advisor for Spring Testing, 1994.
- Present lectures in other University Departments and colleges: Business Law; Woman's Faculty Club, Chemistry
- Team member for LSU, LSU Corporate Cup racing team, 1993, 1995-6, 98, 00, 01, 02, 03, 06 (first place six times)

College of Basic Sciences/Science:

- Member, College of Science Policy Committee, Department of Geology and Geophysics, 2010-present
- Member, Best Dissertation Award Committee, College of Basic Sciences, 2007, 2008
- College of Basic Sciences Advising Committee, 1995-2003
- Dean's Advisory Committee, 1997-1999
- Committee member; College Material Science Committee, 1997-2001
- Committee member: College Distinguished Dissertation Committee, 1995-1996
- Committee member: College of Basic Sciences Distinguished Non-tenure Faculty Research Award, 1995-1996

- Served as the Departmental Representative on the College of Basic Sciences Computing Sciences Committee, 1993-1994.
- Provide research materials (such as minerals specimens and analytical chemical data) for faculty in other College Departments.

Department of Geology and Geophysics:

- Member, Search Committee for Endowed Chairs, 2011-2013; Chair, 2013-2014.
- Member, Executive Committee, 2012 - 2013
- Wilbert Lecture Series Coordinator, 2011-present
- Supervisor, XRD laboratory, 2011-present
- Chair, Graduate Curriculum Committee, 2005-2006; 2009-2011
developed Assessment Matrix for the Ph.D. and M.S. Programs, these were used as templates for other departments in BASC Wrote 2010 Assessment report for M.S. and Ph.D. programs.
- Chair, Departmental Faculty Awards Committee, 2008-2010
- successfully nominated Distinguished Faculty member
- Executive Committee, advising the Chair, 2009.
- Chair, Geochemistry Search Committee, 2008-2009
- Chair, Computer Committee, 2001- 2004, 2012-2013, member 2005-present
- Chair, Search committee: Computer Systems Administrator, 2002, 2003, 2009
- Director/Trainer, Getting in Shape for Field Camp, 2004 - present developed and taught exercise for students, 3 months prior to field camp.
- Field Camp Committee, 2002-2004
- Surface Processes Search Committee, 2001
- Structural Geology Search Committee, 2001
- Structural Geology Search Committee, 2000
- Chair, Facilities Committee, 1999-2001
- Undergraduate Advisor, 1995-1999; alternate advisor 2000-2006
- Search Committee for Chair of Dept., 1998-1999
- Board of Directors, Museum of Natural Science, 1999-2003
- Undergraduate Curriculum Committee, 1992-1994, 1995-2003
- Sedimentology Search Committee, 1998
- Departmental Student Learning Outcomes Report Author (undergrad program), 1997
- Curator, Supervisor of Mineralogy Collections, 1994-present
- Field Camp Development Committee, 1994-1996
- Undergraduate Awards Committee, 1994-1995, 1998-99
- Departmental Public Relations, 1993-1994, 1995-1996
- Hydrogeology Search Committee, 1993-1994
- Faculty Sponsor, *Sigma Gamma Epsilon* Earth Science Honorary, 1993-present (currently inactive).
- Wilbert Lecture Series Coordinator, 1992-1993
- Faculty representative to NOGS Scholarship Banquet, 1992
- Host numerous Departmental speakers, including:

Dr. Horst Marschall, WHOI (2015)

Prof. Paul Spry, Iowa State University (2015)

Dr. Richard Wirth, GFZ, Potsdam, MSA Distinguished Lecturer (2014)

Prof. Nancy McMillan, New Mexico State University (2013)
 Dr. Elizabeth Catlos, University of Texas-Austin (2013)
 Dr. Clara Chan, University of Delaware (2013)
 Prof. Donald DePaolo, Lawrence Berkeley National Laboratory (2012)
 Prof. Jeffrey Vervoort, Washington State University (2012)
 Prof. Abby Kavner, UCLA *COMPRES Distinguished Lecturer* (2012)
 Prof. Andreas Luttmann, Rice University (2012)
 Prof. Norman MacLeod, The Natural History Museum London (2011)
 Prof. James van Orman, Case Western Reserve Univ. *COMPRES Distinguished Lecturer* (2011)
 Dr. Suzanne Carbotte, Lamont-Doherty Earth Observatory; *RIDGE Distinguished Lecturer* (2010)
 Prof. Bruce Yardley, Leeds University, UK; *MSA Distinguished Lecturer* (2010)
 Prof. John Ruben, Oregon State University (joint with Zoology), (2008)
 Prof. Konstantin Podlesskiy, Fulbright Fellow, Russian Academy of Science (2008)
 prof. Bob Bodnar, Virginia Tech (2007)
 Dr. Nita Sahai, University of Wisconsin (2006)
 Prof. Grant Garven, Johns Hopkins Univ (2005)
 Prof. Tom Foster, University of Iowa (2005)
 Prof. Bob Tracy, Virginia Tech (2005)
 Prof. Rod Ewing, University of Michigan (2004)
 Prof. Mickey Gunter, University of Idaho, *Mineralogical Society of America Distinguished Lecturer*, (2002)
 Dr. Susan Kieffer, MacArthur Fellow, Kieffer & Woo, Inc. (1-2000) *Chancellor's Distinguished Lecturer*
 Prof. Alexandra Navrotsky, UC-Davis, (1-2000) *for the Materials Science group*
 Dr. Peggy O'Day, *Mineralogical Society of America Distinguished Lecturer*, Arizona State University (1-1995)
 Dr. Adrienne Laroque, University of Manitoba (11-1995)
 Prof. Skip Simmons, University of New Orleans (4-1995)
 Prof. Susan Brantley, Penn State University (3-1995)
 Prof. C.T. Foster, Jr., University of Iowa (2-1995)
 Dr. Jillian Banfield, *Mineralogical Society of America Distinguished Lecturer*, University of Wisconsin (1-1995)
 Dr. Ren Thompson, US Geological Survey, Denver, CO (11-1994)
 Prof. F. C. Hawthorne, University of Manitoba (9-1994)
 Prof. Ann Budd, University of Iowa (3-1994)
 Dr. Vicki Hansen, Southern Methodist University, Dallas, TX (9-1993)
 Dr. Sorena Sorensen, *Mineralogical Society of America Distinguished Lecturer*, Smithsonian Institution (10-1993)
 Dr. Susan Beck, University of Arizona (10-1993)
 Prof. John Holloway, Arizona State University (11-1993)

- Reorganized and upgraded departmental mineral display cabinets; developed mineral displays.
- Nominate outstanding mineralogy students for recognition by the Mineralogical Society of America, Outstanding Undergraduate Mineralogy Award.

Additional Interests

My extracurricular activities in adventure racing and running improve my physical fitness and are a bridge to discussions with colleagues and students. Many students appear to be inspired and tell me they take up running, are doing a marathon or are just improving the quality of life. In turn, this inspires me to strive for more.

- Expedition Adventure Racing - *2003 North American Eco-Challenge*, 100 miles - open water kayaking, 50 miles canoeing, 100 miles mtn. biking, 25 miles trekking/orienteering. Four days.
- Expedition Adventure Racing - Finisher *2002 Subaru Primal Quest*, 28th place of 70 teams. 350 miles in six days, trekking/orienteering, mtn. biking, kayaking and ropes. Finished with a fractured arm.
- Expedition Adventure Racing - Finisher *1996 Eco-Challenge*, 11th place, member of Team New Mexico. 500K (300 miles) non-stop adventure race through British Columbia; also covering 31,000' of vertical ascent using the combined skills of running, horseback riding, mountain biking, flat and white water canoeing, rafting, mountaineering, orienteering, glacier travel and technical rope work. Only 14 teams of the original 73 finished the course, Barb was member of Team New Mexico that finished the course as a complete team in 8 days, 10 hrs, 19 min. Discovery Channel aired a five hour series on the race.
- Long Distance, High Altitude Trailing Running/Racing
 - Transrockies Run; 110 miles, 15,000' ascent, 5-day staged race; 7th mixed open, 2007; 22/58 teams
 - Leadville 100- Mile Trail Run - 9th age group, 2004. 29 h 29m.
 - Old Pueblo 50 miler - 4th age group, 2005; Zane Grey 50 mile - 5th age group, 2005;
 - Carl Touchstone Mississippi 50 mile - 3rd place, 2004;
 - To Bone and Back Ultramarathon (40 miles), Idaho; 3rd overall F. 1st Masters, 2008.
 - Great Mississippi 50Km - 1st Female overall, 2004.
 - Colorado Relay, 170 nonstop miles, 5 person team; Winner - Ultra division - 2000; third place, 2001; first place 2002.
 - Master's Winner, Pikes Peak marathon, 2000; 1st place (45-49 age group) 2001; 2th place (40-44 age group), 1999 Pike's Peak Ascent (13.32 miles with 7810' of vertical gain to finish at the Summit of Pikes' Peak; marathon is round trip). 5th place - *1997 Imogene Pass Race*, 18 miles over 13,100'
 - for more information see: http://www.teamsantafe.org/html/race_results.shtml
- Road Racing, 5K-50K
 - USA Track and Field* - 1996 second place Master in 50 K; Sunmart, TX. Winner, 2000 Rocky Raccoon 50K, Huntsville, TX, 1999 Wilderness Run 50K, St. Francisville, LA, Ole Man River Half Marathon, 1999; Master's Winner, 1999 Duke City Marathon; Boston Maraton, 1996, 1999 (33rd Masters finisher - 3:18; 40th Master 2000 (3:16 time); 24th Master 2001 (3:14); 42nd Master 2002 (3:15); 2007 Mardi Gras Marathon, Masters winner.
 - Several age group awards at all distances.
- Captain, LSU Corporate Cup Team, Division III, Winner, 1996, 1998, 1999, 2000, 2002, 2003 (also 1995 - 3rd).
- Also enjoy downhill skiing, sea kayaking, sewing, keeping in shape for field work.