

Kevin H. Mahan

Department of Geosciences
University of Massachusetts-Amherst
611 North Pleasant St., Amherst, MA 01003
Email: kmahan@geo.umass.edu
Phone: 978-870-7476 Fax: 413-545-1200

Education

University of Massachusetts-Amherst

Amherst, MA

PhD candidate, *Geosciences*

Dissertation: Structural, metamorphic, and geochronological investigation of the evolution and exhumation history of a deep crustal granulite terrane, western Churchill Province, Canadian Shield

2000-present

Expected completion: Spring 2005

Advisor: Dr. Michael L. Williams

University of Utah

Salt Lake City, UT

M.Sc., *Geology*

Thesis: Wallrock deformation and emplacement of the McDoogie pluton, central Sierra Nevada, California

1997-2000

Advisor: Dr. John Bartley

Appalachian State University

Boone, NC

Geological Field Camp

1997

Southern Alps, northern Italy

Auburn University

Auburn, AL

B.Sc., *Geological Engineering*
(*Cum Laude*)

1990-1996

Advisors: Dr. Mark Steltenpohl

Dr. Lorraine Wolf

Research Experience

University of Massachusetts-Amherst

2000-present

Methods: Four 3-8 week seasons of field mapping, map-scale structural and microstructural analysis, metamorphic petrologic (major and accessory phase) analysis and modeling, and electron microprobe monazite (UMass) and ID-TIMS U-Pb (MIT) geochronological techniques. **Project goal:** To investigate the P-T-t-D evolution and exhumation history of a high-pressure granulite-facies terrane in the Archean-Paleoproterozoic Canadian Shield.

Additional research topics while at UMASS include:

- 1)Hydrous fluid flow in shear zones and effects on metamorphism and accessory phase petrogenesis including the use of monazite to date metamorphic and deformation processes.
- 2)Metamorphic and structural evolution, including monazite geochronological investigations, of Proterozoic basement, Mohave-Yavapai transition zone, Upper Granite Gorge, Grand Canyon, Arizona
- 3)Developing techniques and strategies for electron microprobe Th-U-Pb monazite geochronology

University of Utah

1997-2000

Methods: Two 5-week seasons of field mapping in igneous and metamorphic terrain in Cretaceous Sierra Nevada batholith, structural and microstructural analysis, and U-Pb TIMS geochronology (zircon and titanite)

Project goal: To investigate the style, mechanisms, and timing of emplacement of a sheeted granodioritic pluton and its relationship to a mylonitic shear zone in the wallrocks, central Sierra Nevada batholith, California.

University of Alaska-Fairbanks**1996****Summer research intern:** GPS continental deformation studies on the Kenai Peninsula, Alaska**Auburn University****1996****Undergraduate research activities:** Use of shallow subsurface geophysical methods (gravity, conductivity, resistivity, seismic surveys) to image earthquake liquefaction features (New Madrid seismic zone, Missouri, Tennessee) and meteorite impact structures (Wetumpka impact structure, Wetumpka, AL)**Successful Competitive Research Funding**

2002 Geological Society of America Student Research Grant	\$1,900
1998 Geological Society of America Student Research Grant	\$1,600

Teaching and Research Development

University of Massachusetts-Amherst
Teaching2003
Co-lecturer, Structural GeologyUniversity of Utah
Teaching Assistant1997-1999
Intro level courses: Tales of the Earth
Architecture of the Earth
Upper level courses: Global Geophysics
Applied Physical GeologyIntegrated Solid Earth Sciences Forum II
San Francisco, CA

2004

Workshop participant

ISES, EarthScope, and Rheology of Continental Lithosphere

Rocky Mountain Earthscope Workshop I
Workshop participant2004
Catalyzing New Collaborations and Advancing Fundamental Understanding of Past and Present Geological and Geophysical Processes in the Rocky Mountain RegionOn the Cutting Edge-Workshops
for Geoscience Faculty, Smith College
Workshop assistant and participant2004
Teaching Structural Geology in the 21st CenturyOn the Cutting Edge-Workshops
for Geoscience Faculty, Stanford University
Workshop participant2003
Preparing for an Academic Career in the GeosciencesGSA Annual Meeting
Toronto, Canada
Workshop Participant1998
Deformation Mechanisms and Microstructures

Awards, Honors, and Service

2002-03 Served as graduate representative on new faculty search committee
 2002 Univ. of Massachusetts Graduate Council Fellowship (\$12,000)
 1998 Geological Society of America Outstanding Student Research Award from the
 Structural Geology and Tectonics Division
 1998 Outstanding M.Sc. student, Dept. of Geology and Geophysics, Univ. of Utah
 1996 Dean's List, Auburn University
 1995 Dean's List, Auburn University
 1990 Avondale Textile Engineering Scholarship (\$10,000), Auburn University

Professional Societies

Geological Society of America
 Geological Association of Canada
 American Geophysical Union
 Mineralogical Society of America

Industry and Government Experience

Exxon-Mobil Exploration Company 2000
 Houston, TX
Summer internship project: Structural integrity of core and efficiency of core retrieval in exploration wells

Pacific Northwest National Laboratories 1995
 Hanford Reservation, Richland, WA
Summer internship project: Soil hydraulic conductivity testing: applications to the Hanford Reservation

Pacific Northwest National Laboratories 1994
 Hanford Reservation, Richland, WA
Summer internship project: Environmental restoration planning for DOE sites

United States Marine Corps Reserve 1989-1997

Publications (peer reviewed)

- Mahan, K.H.** and Williams, M.L., **In press**, Reconstruction of a large deep-crustal exposure: Implications for the nature of the Snowbird Tectonic Zone and early growth of Laurentia, *Geology*.
- Mahan, K.H.**, Williams, M.L., and Baldwin, J.A., **2003**, Contractional uplift of deep crustal rocks along the Legs Lake shear zone, western Churchill Province, Canadian Shield. *Canadian Journal of Earth Sciences*, v. 40, p. 1085-1110.
- Mahan, K.H.**, Bartley, J.M., Coleman, D.S., Glazner, A.F., Carl, B.S., **2003**, Sheeted intrusion of the synkinematic McDoogie pluton, Sierra Nevada, California, *Geological Society of America Bulletin*, v. 115, p. 1570-1582.
- Mahan, K.H.**, Williams, M.L., Baldwin, J.A., and Bowring, S.A., **2001**, Juxtaposition of deep crustal and middle crustal rocks across the Legs Lake shear zone in northern Saskatchewan. In *Summary of Investigations, Vol. 2*. Saskatchewan Geological Survey, Saskatchewan Energy Mines, Regina, Sask. 2001-4.2.

Publications (in preparation)

- Mahan, K.H.**, Goncalves, P., Williams, M.L., and Jercinovic, M.J., In Preparation, Hydrous fluid flow in a crustal-scale shear zone: relations to monazite growth and the timing of retrograde metamorphic reactions, East Lake Athabasca region, Canadian Shield, to be submitted to *Journal of Metamorphic Geology*
- Mahan, K.H.**, Williams, M.L., Flowers, R.M., Baldwin, J.A., Jercinovic, M.J., Bowring, S.A., In Preparation, Timing of shear zone deformation, metamorphism, and regional exhumation of lower crust, Canadian Shield, from integrated electron microprobe monazite and U-Pb TIMS geochronology, to be submitted to *Contributions to Mineralogy and Petrology*
- Baldwin, J.A., Bowring, S.A., Williams, M.L., and **Mahan, K.H.**, In Review, Geochronological constraints on the crustal evolution of felsic high-pressure granulites, Snowbird tectonic zone, Canada, to be submitted to *Lithos (Accessory Phase special issue)*
- Dumond, G., **Mahan, K.H.**, Williams, M.L., and Karlstrom, K., In Preparation, Metamorphic history of Proterozoic basement, Upper Granite Gorge, Grand Canyon, Arizona, to be submitted to *Geological Society of America Bulletin*
- Williams, M.L., Jercinovic, M.J., Goncalves, P., and **Mahan, K.H.**, In Review, Format and Philosophy for Collecting, Compiling, and Reporting Microprobe Monazite Ages, to be submitted to *Chemical Geology*

Abstracts

- Mahan, K.H.**, Dumond, G., and Williams, M.L., **2004**, Metamorphic history of the Upper Granite Gorge, Grand Canyon, Arizona. Geological Society of America (GSA) Annual meeting, Denver, CO.
- Mahan, K.H.**, Goncalves, P., and Williams, M.L., **2004**, Dating Metamorphism and hydrous fluid flow in shear zones, Gordon Conference on the Role of Fluids in Deformation, Holyoke College, South Hadley, MA.
- Mahan, K.H.**, Goncalves, P., Williams, M.L., and Jercinovic, M.J., **2004**, Using monazite to date metamorphism, deformation, and fluid infiltration during exhumation of deep crustal rocks in the Snowbird Tectonic Zone, northern Saskatchewan, AGU-CGU spring meeting, Montreal, Canada
- Mahan, K.H.**, Williams, M.L., Goncalves, P., and Flowers, R.M., **2004**, Deformation and metamorphism in high strain zones in a deep-crustal exposure, Snowbird Tectonic Zone, northern Saskatchewan, Canada. Geological Association of Canada-Mineralogical Association of Canada (GAC-MAC) Annual meeting, St. Catherines, Canada
- Dumond, G., Williams, M.L., **Mahan, K.H.**, Karlstrom, K.E., Heizler, M.T., **2004**, Tectonic heredity in the Grand Canyon and implications for Tibetan-scale Mesoproterozoic intra-continental deformation in the southwestern United States. Geological Society of America (GSA) Annual meeting, Denver, CO.
- Williams, M.L., Jercinovic, M.J., Karlstrom, K., **Mahan, K.H.**, Dumond, G., **2004**, Adding "time" to the Earthscope image: petrologic analysis, structural analysis, and monazite geochronology of the Proterozoic crust. Geological Society of America (GSA) Annual meeting, Denver, CO.
- Williams, M.L., **Mahan, K.H.**, Jercinovic, M.J., Goncalves, P., and Karlstrom, K., **2004**, Linking deformation and

metamorphism: Interpreting tectonics from metamorphic rocks, 23rd International Geological Congress, Florence, Italy.

Mahan, K.H., Williams, M.L., Goncalves, P., **2003**, Using deformation and metamorphism in high strain zones to track the exhumation history of deep-crustal rocks in the Canadian Shield. GSA Annual meeting, Seattle, WA.

Mahan, K.H., Hoffman-Setka, D., Williams, M.L., Goncalves, P., **2003**, Contrasting lithotectonic domain boundaries within a deep crustal exposure, northern Saskatchewan, western Canadian Shield. GAC-MAC Annual meeting, Vancouver, B.C.

Dumond, G., **Mahan, K.H.**, Williams, **2003**, Elucidating the evolution of fundamental tectonic boundaries using "relative" thermobarometry and monazite geochronology: a case study from the Upper Granite Gorge, Grand Canyon, Arizona. GSA Annual meeting, Seattle, WA.

Dumond, G., Williams, M.L., Karlstrom, K., Heizler, M., **Mahan, K.H.**, **2003**, Constraining the tectonic history of the Proterozoic Mojave-Yavapai Province boundary: Insights from detailed metamorphic petrology and monazite geochronology along a transect across the 96 mile and Crystal shear zones of the Upper Granite Gorge, Grand Canyon, Arizona. GSA Rocky Mountain Section meeting, May 7-9, Albuquerque, NM.

Williams, M.L., Jercinovic, M.J., Karlstrom, K., **Mahan, K.H.**, **2003**, Interactions between deformation and metamorphism: new techniques for interpreting P-T paths from metamorphic rocks. GSA Annual meeting, Seattle, WA.

Williams, M.L., Jercinovic, M.J., **Mahan, K.H.**, Kopera, J. P., **2003**, Microprobe monazite geochronology: new refinements and new tectonic applications, GSA NE Section meeting, March 27-29, Nova Scotia, Canada.

Mahan, K.H. and Williams, M.L., **2002**, Constraints on the timing and conditions in the Legs Lake shear zone and uplift of high pressure rocks in the East Athabasca mylonite triangle, northern Saskatchewan, GAC-MAC Annual Meeting, 27, p. 72.

Bartley, J.M., Glazner, A.F., **Mahan, K.H.**, Grasse, S., Taylor, R.Z., **2002**, Thin wallrock screens and intrusive processes in the Sierra Nevada, GSA Annual meeting, October 27-30, Denver, CO.

Low, P., Buczkowski, D., Griffith, W. A., Kopera, J. P., Lewis, J., **Mahan, K. H.**, Scheltema, K., Weiss, G., and Williams, M. L., **2002**, Relative timing of deformation and magmatism in the Moretown Formation of western Massachusetts, GSA NE Section meeting, March 25-27, 2002, Springfield, MA.

Mahan, K. H., Williams, M. L. and Baldwin, J. A., **2001**, The Legs Lake shear zone, northern Saskatchewan, exhumation of lower crustal rocks of the Western Churchill Province, Canadian Shield. GAC-MAC Joint Annual Meeting, St. John's, Newfoundland.

Glazner, A.F., Bartley, J.M., **Mahan, K.H.**, **2001**, Are some plutons crypted sheeted dike complexes?, Penrose Conference: Longevity and Dynamics of Rhyolitic Magma Systems, *Conveners: Kurt Knesel, George Bergantz, Jon Davidson* June 7-12, 2001, Mammoth, California.

Mahan, K.H. and Bartley, J.M., **2000**. Emplacement of the McDoogle pluton, central Sierra Nevada, via sheeted diking into a contractional shear zone: GSA Cordilleran Section meeting, Vancouver, BC.

Mahan, K.H. and Bartley, J.M., **1999**. Relation of wallrock mylonitization to emplacement of the McDoogle pluton, central Sierra Nevada, California: GSA Cordilleran section meeting, Long Beach, Ca.