

James Lawford Anderson

**Professor, Department of Earth and Environment
Boston University
685 Commonwealth Avenue, Boston, MA 02215**

e-mail: lawford@bu.edu telephone: 617-358-6668

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Personal Information

Research Interest: Igneous and metamorphic petrology; mineral equilibria

Born: December 2, 1947 – Goose Creek (now Baytown), Texas

Married to Jean Morrison, Professor of Earth and Environment and University Provost, BU

Education

B.A. (Geology, minor in History) Trinity University, San Antonio, 1970

M.S. (Geology) University of Wisconsin, Madison, 1972

Ph.D. (Geology, minor in Chemistry) University of Wisconsin, Madison, 1975

Military Experience

Commission: 2nd Lieutenant, U.S. Army, Field Artillery, May 1970; 1st Lieutenant, U.S. Army Reserve, June 1973-77; Captain, U.S. Army Reserve, June 1977-78

Professional Experience

Professor of Earth Sciences, Department of Earth & Environment, Boston University, 2011 – present
Professor (1989-2011), Associate Professor (1981-1989), Assistant Professor (1975-1981), Department of Earth Sciences, University of Southern California

Director of Undergraduate Studies, Department of Earth and Environment, Boston University, 2012-present.

Director of the USC Center for Excellence in Teaching, Office of the Provost (2007-2011)

Director of Faculty Affairs, Office of the Dean, College of Letters, Arts, and Sciences, USC (2002-2005)

Faculty Fellow, USC Center for Excellence in Teaching (2002-2011)

Chair (1998-2003), Department of Earth Sciences, USC

President of the Faculty of USC and the USC Academic Senate (1997-1998)

President, Faculty Council of the College of Letters, Arts, and Sciences, USC (1995-1996)

Technical Advisor, PBS television series, "Earth Revealed" (1988-1992)

Technical advisor, GameDesk (2011-present; a non profit with NSF funding to make games for teaching science, K-12)

Professional Societies and Affiliations

American Geophysical Union

Geological Society of America (Fellow)

Mineralogical Society of America (Fellow)

Awards

1989, USC Associates Award for Excellence in Teaching, Office of the Provost

1992, USC Innovative Teaching Award, Office of the Provost

1994, Hewlett Teaching Award, USC College

1998, Outstanding Teacher Award, University Student Association

1998, General Education Teaching Award, USC College of Letters, Arts, and Sciences

1999, Professor of the Year, Gamma Sigma Alpha National Honor Society

1999, Greek Women of USC Faculty Recognition Award

2000, Professor of the Year, Gamma Sigma Alpha National Honor Society

2000, University Distinctive Service Recognition Award, USC Academic Senate

2001, Faculty Member of the Year, USC Panhellenic Council

2003, Professor of the Year, USC Gamma Sigma Alpha National Honor Society

2006, Faculty Recognition Award, USC Gamma Sigma Alpha National Honor Society
2007, Faculty Innovative Teaching Award, Office of the Provost, USC
2008, Faculty Appreciation Award, Alpha Lambda Delta student honor society, USC
2008, Professor of the Year, Gamma Sigma Alpha National Honor Society, USC
2009, Professor of the Year, Gamma Sigma Alpha National Honor Society, USC
2009, Tapped by the USC Mortar Board Scholars, a National Honor Society, USC
2010, Distinguished Educator Award, Los Angeles Council of Engineers and Scientists

Summary of Research Activities

My principal research interest is the evolution and construction of the Earth's crust. As an igneous petrologist concerned with granitic magma genesis and mineral equilibria, much of my work and that of my students have been devoted to an understanding of the evolution of granite magma from its source to emplacement. The research is both field and lab oriented and has shared interests with other disciplines including geochemistry, structural geology and tectonics, and rock mechanics.

Present research problems are diverse but follow a common theme, one of crustal petrology. Much of my research is focused on the Proterozoic crustal evolution of North America with emphasis on the rapid growth of orogenic crust during the Early Proterozoic (1.7-1.9 Ga) and the Proterozoic-unique, "anorogenic" magmatism of the period 1.0 to 1.5 Ga. The objective is to document the evolution of distinct magmatic suites utilizing exposures in the midcontinent, the Colorado Front Range, and the mountainous regions of Arizona, southern Nevada, and southern California.

The second area of research is related to the Mesozoic and Tertiary magmatism of the western U.S. An exciting aspect of this study has been the identification of middle crust within the southwest Cordillera. Much of this work has centered around the Whipple Mountains region of southeastern California. Since 1990, I have been working on emplacement conditions and magmatic evolution of the Mt. Stuart batholith, north Cascades, Washington and the Tuolumne Intrusion of the Sierra Nevada batholith, California.

During 2006-2011, I was involved in a USC College- and Provost-supported Team Research project to have undergraduate students involved in our NSF-supported research in Yosemite. During the first year (2006-7), we had five undergraduates. For the second year (2007-8), we had 10 undergraduate students, half of whom had majors outside of the sciences and also had no camping experience. Over the next years (2008-10), the students produced geologic maps of two other regions in Yosemite and presented meeting abstracts at the Geological Society of America and American Geophysical Union national meetings. They also presented at the USC Provost Undergraduate Research Symposium during the Spring semesters of 2007-2011.

Admittedly, a full decade of administrative work during 1995-2005 slowed my research activities during that time. Likewise, my position as Director of the Center for Excellence of Teaching at USC also impacted my time, but I continued to enjoy research and collaboration with students and faculty colleagues.

As of 2011 and after 36 years at USC, I have relocated to Boston University where I am enjoying making new colleagues and learning of new research endeavors. However, my research continues in the Sierras and the Washington Cascades.

Statement regarding Teaching and Service

I attempt to offer a balanced program of both teaching and research. Teaching a high quality course is a personal goal, regardless of the level of the class. In recent years, I have strived to make my teaching more learner-centered in recognition that each student learns differently. In my larger classes, I have the students use "clickers" to enable them to assess their learning in real time. The numbers of students in my GE classes at BU are routinely 100 to over 150, however I strive to learn the name of every student and also to know them.

I have had the honor of receiving a number of teaching awards and most of these have come from the large general education courses.

Since 2012, I serve as the Director of Undergraduate Studies for our Department. As we are a new department, I am on a learning curve but am delighted to provide this service. I am also the faculty advisor to 13 undergraduate majors.

At Boston University, I have taught three different 100 level earth science courses and ES 424, Igneous and Metamorphic Petrology.

During our 2012 Spring Break, I took 13 BU undergraduates on an 8-day camping field trip to Death Valley, Joshua Tree, and other geologic wonders of the Mojave Desert of southern California. I am currently the faculty advisor to our department's geology club (Boston University Geological Society or BUGS). On our upcoming 2014 spring break, I will be taking our undergraduates to a camping and geology field trip to Cape Cod. Discussions are underway to take BU undergrads back to the Mojave Desert and Death Valley during next year's Spring Break.

I am also the faculty advisor, and perhaps the first ever at BU I am told, to a campus sorority (Gamma Phi Beta). I was the faculty advisor to the same sorority at USC for many years and upon my departure, the women there wrote those here that I might do the same. I help these women find the right major or double major or minor, seek internships, consider semester abroad opportunities, deal with grades less than their expectations, find research opportunities, and the next step beyond BU, be it jobs or higher education. I also write many letters of recommendation for them as I also do for our EE undergraduate majors, easily over 100 per year. It is a time commitment but I am glad to be of help to our students.

Recent Active Grants

NSF EAR 1019636 "Collaborative Research: Crustal overturn in continental margin arcs during magmatic surges" July 1, 2011 (three years); \$231,132.00 (with Co-PI Scott Paterson; note: I had to leave this at USC).

Publications

Books

Anderson, J. L., editor, *The Nature and Origin of Cordilleran Magmatism: Geological Society of America Memoir 174*, 405 pages, (1990)

Papers (1990-present)

- Anderson, J. L. and Cullers, R. L. (1990). Middle to upper crustal plutonic construction of a magmatic arc, an example from a metamorphic core complex, in Anderson, J. L., editor, *The Nature and Origin of Cordilleran Magmatism, Geological Society of America Memoir 174*, p. 47-69.
- Davis, G. A., and Anderson, J. L. (1991) Low-angle normal faulting and rapid uplift of mid-crustal rocks in the Whipple Mountains metamorphic core complex, southeastern California: in Walawender, M. J., and Hanan, B. B., editors, *Geological Excursions in Southern California and Mexico*, Guidebook for the 1991 Annual Meeting, Geological Society of America, San Diego, p. 417-446.
- Anderson, J. L., Barth, A. P., Young, E. D., Davis, M. J., Farber, D., Hayes, E. M., Johnson, K. A. (1992). Plutonism across the Tujunga-North American terrane boundary: A middle to upper crustal view of two juxtaposed arcs, in Bartholomew, M. J., Hyndman, D. W., Mogk, D. W., and Mason, R., editors, *Characterization and Comparison of Ancient and Mesozoic Continental Margins - Proceedings of the 8th International Conference on Basement Tectonics*, Kluwer Academic Publishers, Dordrecht, Netherlands, p. 205-230.
- Cullers, R. L., Griffin, T., Bickford, M. E., and J. L. Anderson (1992) Origin and chemical evolution of the 1360 Ma-old San Isabel batholith, Wet Mountains, Colorado, USA: A mid-crustal granite of anorogenic affinities: *Geological Society of America Bulletin*, v. 104, p. 316-328.
- Mayo, D. P., Morrison, J., and Anderson, J. L. (1992) Chemical and oxygen isotopic variations in upper plate rocks of the Whipple Mountains detachment system, California, USA, in Kharaka, Y. K. and Maest, A. S. (editors) *Water-Rock Interaction, Proceedings of the 7th International Symposium on Water-Rock Interaction*, v. 2, Moderate and High Temperature Environments, A. A. Balkema Publishers, Rotterdam, Netherlands, p. 1527-1532.
- Anderson, J. L., and Morrison, J. (1992) The role of anorogenic granites in the Proterozoic crustal development of North America, in Condie, K. C., editor, *Proterozoic Crustal Evolution*: Elsevier, p. 263-299.

- Cullers, R. L., Stone, J., Anderson, J. L., Sassarini, N., and Bickford, M. E. (1993) Petrogenesis of Mesoproterozoic Oak Creek and West McCoy Gulch plutons, Colorado: an example of cumulate unmixing of mid-crustal, two mica granite of anorogenic affinity: *Precambrian Research*, v. 62, p. 139-169.
- Anderson, J. L. (1993). The Wolf River Batholith, in Reed, J. C. and others (eds.) *Geology of North America*, Geological Society of America DNAG Volume C-2, Precambrian: Conterminous U.S., p. 69-71.
- Bender, E. E., Morrison, J., Anderson, J. L., and Wooden, J. L. (1993) Early Proterozoic ties between two suspect terranes and the Mojave crustal block of the southwestern United States: *Journal of Geology*, v. 101, p. 715-728.
- Anderson, J. L., Wooden, J. L., and Bender, E. E. (1993) Mojave Province of southern California and vicinity, in Van Schmus, W. R., and Bickford, M. E. (eds.) *Transcontinental Proterozoic Provinces*, Chapter 4, *Geology of North America*, Geological Society of America DNAG Volume C-2, Precambrian: Conterminous U.S., p. 176-188.
- Bickford, M. E., and Anderson, J. L. (1993) Middle Proterozoic magmatism, in Van Schmus, W. R., and Bickford, M. E. (eds.) *Transcontinental Proterozoic Provinces*, Chapter 4, *Geology of North America*, Geological Society of America DNAG Volume C-2, Precambrian: Conterminous U.S., p. 281-292.
- Davis, M. J., Farber, D. L., Wooden, J. L., and Anderson, J. L. (1994) Conflicting tectonics? Contraction and extension at middle and upper crustal levels along the Cordilleran Late Jurassic arc, southeastern California: *Geology*, v. 22, p. 247-250.
- Howard, K. A., John, B. E., Davis, G. A., Anderson, J. L., and Gans, P. B. (1994) A guide to Miocene extension and magmatism in the lower Colorado River region, Nevada, Arizona, and California; Field Trip 3, 8th International Conference on Geochronology, Cosmochronology, and Isotope Geology, U.S.G.S. Open File Report 94-246, 54p.
- Paterson, S. R., Miller, R. B., Anderson, J.L., Lund, S., Bendixen, J., Taylor, N., and Fink, T. (1994) Emplacement and evolution of the Mt. Stuart batholith. In D.A. Swanson and R. A. Haugerud, Eds., *Geologic field trips in the Pacific northwest*, v. 2, p. 2F1-2F27, Department of Geological Sciences, University of Washington in conjunction with the Geological Society of America, Seattle.
- Ekstrom, H., Morrison, J., and Anderson, J. L. (1994) Petrogenetic modeling and stable isotopic evaluation of anorthositic and jotunitic to syenitic magma series in the San Gabriel anorthosite complex, southern California: *Precambrian Research*, v. 70, p. 1-24.
- Anderson, J. L., and Smith, D. R. (1995) The effect of temperature and oxygen fugacity on Al-in-hornblende barometry: *American Mineralogist*, v. 80, p. 549-559.
- Anderson, J. L. (1996) Status of thermobarometry in granitic batholiths: *Transactions of the Royal Society of Edinburgh*, v. 87, 125-138. [also published in GSA Special Paper 315]
- Anderson, J. L. (1997) Regional tilt of the Mount Stuart batholith, Washington, determined using aluminum-in-hornblende barometry, implications for northward translation of Baja British Columbia: Discussion: *Geological Society of America Bulletin*, v. 109, 1223-1225.
- Morrison, J. and Anderson, J. L. (1998) Footwall refrigeration along a detachment fault: Implications for the thermal evolution of core complexes: *Science*, v. 279, 2 January, p. 63-66.
- Mayo, D. P., Anderson, J. L., & Wooden, J. L. (1998) Isotopic constraints on the petrogenesis of Jurassic plutons, southeastern California: *International Geology Review*, v. 40, p. 257-278.
- Anderson, J. L. and Cullers, R. L. (1999) Paleo- and Mesoproterozoic granite plutonism of Colorado and Wyoming. *Rocky Mountain Geology*, v. 34, p. 149-164.
- Tate, M. C., Norman, M.D., Johnson, S. E., Fanning, C. M., and Anderson, J. L. (1999) Generation of tonalite and trondhjemite by subvolcanic fractionation and partial melting in the Zarza intrusive complex, western Peninsular Ranges batholith, northwestern Mexico: *Journal of Petrology*, v. 40, p. 983-1010.
- Anderson, J.L. and Morrison, J. (2005) Ilmenite, magnetite, and peraluminous Mesoproterozoic anorogenic granites of Laurentia and Baltica. *Lithos*, v. 80, p. 45-60.
- Anderson, J.L., Barth, A.P., Wooden, J.L. Mazdab, F. (2008) Thermometers and Thermobarometers in Granitic Systems. In, *Mineralogical Society of America, Reviews in Mineralogy and Petrology*, v. 69, Minerals, Inclusions, and Volcanic Processes, Putirka, K. and Tepley, F. eds., p. 121-142.
- Barth, A. P., Anderson, J.L., Jacobson, C., Paterson. S. R., Wooden, J.L. (2008) Magmatism and tectonics in a tilted crustal section through a continental arc, eastern Transverse Ranges and southern Mojave Desert. *GSA Field Guide 11*, 2008 Cordilleran Section meeting, p. 101-117.

- Needy, S.K., Anderson, J.L., Wooden, J.L., Barth, A.P., Paterson, S.R., Memeti, V., and Pignotta, G.S., 2009, Mesozoic magmatism in an upper- to middle-crustal section through the Cordilleran continental margin arc, eastern Transverse Ranges, California, in Miller, R.B., and Snoke, A.W. (eds.), *Crustal cross-sections from the western North America Cordillera and elsewhere: Implications for tectonic and petrologic processes: Geological Society of America Special Paper 456*, 187-218.
- Pignotta, G.S., Paterson, S.R., Coyne, C., Anderson, J.L. and Onezime, J. (2010) Testing models for the incremental growth of magma chambers: Construction of the Jackass Lakes pluton, central Sierra Nevada batholith., *GSA Geosphere*; v. 6, no. 2, p. 1–30.
- Economos, R.C., Paterson, S.R., Said, L.O., Ducea, M.N., Anderson, J.L., Padilla, A.J. (2012), Gobi-Tianshan connections: Field observations and isotopes from an Early Permian arc complex in southern Mongolia. *Geological Society of America Bulletin*, v. 124, p. 1688-1701.
- Anderson, J.L., Morrison, J., and Paterson, S. (2012) Post-emplacement fluids and pluton thermobarometry: Mt. Stuart batholith, Washington Cascades. *International Geology Review*, v. 54, no. 5, p 491-508.
- Anderson, J. L. (2012) Cold Pegmatites, *Elements*, v. 8, no. 4., p. 248-249
- Paterson, S.R., Memeti, V., Zhang, T., Lackey, J.S., Cao, W., Anderson, J.L., Mundil, R., Pignotta, G., Ducea, M., Thompson, J., Schmidt, K., Whitesides, A., Gelbach, L. B., and Cox, I. (2013) Geologic, geochronologic, and geochemical constraints on the tempo and chemical evolution of the Mesozoic Sierran arc, central California. *Geosphere* (in review)
- Economos, R.C., Barth A.P., Wooden, J. L., Paterson, S.R., Wiegand, B. A., Anderson, J. L., Roell, J. L., Palmer, E. F., Ianno, A. J., Howard, K. A. (2013) Geochemical evolution of a stratified crust of a continental arc crustal section in the eastern Transverse Ranges, California. *Journal of Petrology* (in review)
- Anderson, J. L., Paterson, S. R. Memeti, V., Zhang, T, Wenrong, C. Economos, R., Pignotta, G. S., Mundil, R., Foley, B. Schmidt (2013) Episodic Downward Crustal Flow During Magma Surges in the Central Sierra Nevada Arc. *Lithos* (in review)
- Cao, W., Paterson, S., Memeti, V., Mundil, R. Anderson, J. L., Schmidt, K. (2013) Tracking paleo-deformational fields in a continental arc: a study of incremental and finite strain in Mesozoic plutons and host rocks, respectively in central Sierra Nevada and its implications on intra-arc deformation and arc tempos. *Lithosphere* (in review)

Meeting Abstracts (since 2004)

- Coyne, C.M., Pignotta, G.S., Paterson, S.R, and Anderson, J.L. (2004) Magma Mixing/Mingling In A Heterogeneous Multi-Pulse Magmatic System: Evidence From Jackass Lakes Pluton, Central Sierra Nevada Batholith. *GSA Abstracts with Programs*, Vol. 36, No. 4.
- Needy, S.K., Barth, A.P., Anderson, J.L., and Brown, K.L. (2005), A Comprehensive 3-D geophysical model of the crust in the Eastern Transverse Ranges, SCEC Annual Meeting, Palm Springs, CA.
- Needy, S.K., Barth, Andrew P.1, Anderson, J.L., and Wooden, J. (2006) Geothermobarometry of the eastern Transverse Ranges, southern California. *GSA Abstracts with Programs*, Vol. 38.
- Ball, E.N., Fischer, G.C., Foley, B.R., Thompson, J., Memeti, V., Pignotta, G.S., Anderson, J.L., Paterson, S.R., Matzel, J., Mundil, R. (2007) Magmatic and volcanic plumbing systems, crustal evolution, and the search for the mysterious Mojave-Snow Lake fault: 2006-07 Earth Sciences undergraduate team research in the high Sierra. *USC Undergraduate Research Symposium*
- Foley, B. J., Ball, E. N., Fischer, G.C., Thompson, J.M., Memeti, V., Pignotta, G.S., Anderson, J.L., Paterson, S.R., Matzel, J., Mundil, R. (2007) Downward ductile displacement of volcanic crust during pluton emplacement in the central Sierra Nevada: Undergraduate Team Research at USC: *Geological Society of America Abstracts with Programs* [Bellingham].
- Thompson, J.M., Ball, E. N., Fischer, G.C., Foley, B. J., Memeti, V., Pignotta, G.S., Paterson, S.R., Anderson, J.L., Matzel, J., Mundil, R. (2007) Searching for the Mojave-Snow Lake Fault: Undergraduate Team Research at USC: *Geological Society of America Abstracts with Programs* [Bellingham].
- Paterson, S.R., Memeti, V., Zak, J., Matzel, J., Mundil, R., Miller, J., Miller, R., Burgess, S., Economos, R., Anderson, J.L., (2007) Facing up to the complexity of batholith construction: Using the Tuolumne batholith (TB), Sierra Nevada, California as an example: *Geological Society of America Abstracts with Programs* [Bellingham].

- Anderson, J.L., Foley, B. J., Ball, E. N., Paterson, S.R. Memeti, V., Pignotta, G.S. (2007) Upper crustal overturn during magmatic surges – a potential Sierra-wide process: Geological Society of America Abstracts with Programs [Denver]
- Economos, R., Said, L.O., Paterson, S., Anderson, J.L. (2007) Coeval Intrusion and Batholith-Scale Mingling in the Gobi-Tianshan Intrusive Complex, Southern Mongolia: AGU annual meeting [San Francisco].
- Wagner, R., Anderson, L., Cao, W., Gao, Y., Ikeda, T., Johannesen, K., Jacobs, R., Mai, J., Memeti, V., Padilla, A., Paterson, S., Seyum, S., Shimono, S., Thomas, T., Thompson, J., Zhang, T. (2007), Geologic wonders of Yosemite at Two Miles High: an undergraduate, learner-centered, Team Research program at the University of Southern California: AGU annual meeting [San Francisco].
- Paterson, S, Memeti, V., Anderson, J.L., Miller, R., Zak, J., Jacobs, R., Seyum, S. Shimono, S., and Wenrong, C. (2008) Transpression and Downward Crustal Flow During the Cretaceous High Flux Magmatic Event in the central High Sierra Nevada, California: Geological Society of America Abstracts with Programs [Las Vegas].
- Shimono, S, Mai, J., Ikeda, T., Jacobs, R., Seyum, S., Matloob, J., Memeti, V., Paterson, S., Anderson, J.L., Zhang, T. (2008) Field research and outdoor education in the high Sierra Nevada with Undergraduate Team research at USC: Geological Society of America Abstracts with Programs [Las Vegas].
- Anderson, J.L., Paterson, S., Zhang, T., Economos, R., Memeti, V. (2008) Downward Crustal Flow During Magma Ascent in the Central Sierran Arc, AGU Fall Meeting [San Francisco].
- Padilla, A.J., Economos, R.C., Anderson, J.L., Paterson, S.R. (2008) Mafic-Felsic Magma Interactions in an Enclave Megaplume, Gobi-Tianshan Intrusive Complex, Southern Mongolia, *Eos Trans. AGU*, 89 (53), Fall Meet. Suppl., Abstract V33A-2208
- Memeti, V., Krause, J., Anderson, J.L., Paterson, S.R. (2009) Interpreting Al-in Hornblende and Hbl-Plag thermobarometry results from the Tuolumne batholith and magmatic lobes in conjunction with single mineral element distribution electron microprobe maps: AGU Fall meeting, San Francisco.
- Culbert, K.N., Anderson, J.L., Cao, W., Chang, J., Ehret, P., Enriquez, M., Gross, M.B., Gelbach, L.B., Hardy, J., Paterson, S.R., Ianno, A., Iannone, M., Memeti, V., Morris, M., Lodewyk, J., Davis, J., Stanley, R., Van Guilder, E., Whitesides, A.S., Zhang, T. (2009) USC Undergraduate Team Research, Geological Field Experience and Outdoor Education in the Tuolumne Batholith and Kings Canyon, High Sierra Nevada: *Eos Trans. AGU*, 90 (52), Fall Meet. Suppl., Abstract # ED43B-0579
- Memeti, V., Paterson, S.R., Anderson, J.L., Zhang, T., Mundil, R., Pignotta, G., Schmidt, K., Miller, R. (2010) Mesozoic PTtd histories in plutons and host rocks of the central Sierra Nevada batholith: GSA Penrose Conference on the Origin and Uplift of the Sierra Nevada, California: Bridgeport, CA, Aug. 2010
- Cox, I., Quirk, M., Culbert, K., Paterson, S.R., Anderson, J.L., Memeti, V., Zhang, T., Wenrong, C., Sun, H., and Whitesides, A. (2010) Bringing Students out of the Classroom and into Research Projects: An Undergraduate Team Research (UTR) Program at the University of Southern California: in press, AGU annual meeting, San Francisco.
- Zhang, T., Paterson, S., Pignotta, G., Anderson, J.L., Memeti, V., and Mundil, R. (2010) Temporal and spatial geochemical evolution of Mesozoic magmatism in the central Sierra arc, California: Geological Society of America Abstracts with Programs, v. 42, n. 4, p. 104.
- Anderson, J.L., Paterson, S., Memeti, V., Zhang, T., Economos, R., Barth, A., Pignotta, G., Mundil, R., Foley, B., Schmidt, K. (2010) Episodic downward crustal flow during Triassic to Cretaceous magma surges in the central Sierra arc: Geological Society of America Abstracts with Programs, v. 42, n. 4, p. 51.

Graduate Students

Supervised Masters Theses - 17

Supervised Dissertations - 9

Former graduate students hold tenured faculty positions at UCLA, Oxford, Northern Arizona University, Pomona College, Santa Ana College, Pasadena City College, Indiana University, University of

Arkansas, Orange Coast College, and Cal State University Los Angeles. Others are working in the mineral exploration, petroleum, environmental, or aerospace industry.