DAVID LAWRENCE SHUSTER

Curriculum Vitae

Dept. Earth and Planetary Science
University of California
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Education

California Institute of Technology, Pasadena, CA
- Ph.D., Geochemistry 2005
  Thesis: *Application of spallogenic noble gases induced by energetic proton irradiation to problems in geochemistry and thermochronology*
- M.S., Geochemistry 2003

University of California, Berkeley, CA 1992-1996
- A.B., Geology 1996

Professional Appointments

Professor, Dept. Earth & Planetary Science, U.C. Berkeley 2016-present
Associate Professor, Dept. Earth & Planetary Science, U. C. Berkeley 2012-2016
Geochemist, Berkeley Geochronology Center 2005-present
Associate Adjunct Professor, Dept. Earth & Planetary Science, U. C. Berkeley 2010-2012
Lecturer, Dept. Earth and Planetary Science, UC Berkeley 2008, 2010
Research Assistant, California Institute of Technology 2000-2005
Teaching Assistant, California Institute of Technology 2000-2005
Research Associate, Berkeley Center for Isotope Geochemistry
Lawrence Berkeley National Laboratory 1996-2000

Honors and Awards

Fellow of the American Geophysical Union, 2014
James B. Macelwane Medal of the American Geophysical Union, 2014
Keynote speaker, 14th International Conference on Thermochronology, 2014
Fulbright Specialist, Council for International Exchange of Scholars, 2012
Invited Instructor, Mineralogical Society of American Short Course, 2005
Harry Hess Postdoctoral Fellowship in Geosciences (Princeton), 2005 (*declined*)
Reginald A. Daly Postdoctoral Fellowship (Harvard), 2005 (*declined*)
National Science Foundation Graduate Research Fellowship, 2001-2004
Caltech Special Institute Fellowship, 2000-2001
California Federation of Mineralogical Societies Award, 1995
UC Berkeley Alumni Scholar, 1992

External Service and Professional Activities

Journal Referee:

American Journal of Science, American Mineralogist, Chemical Geology, Earth and Planetary Science Letters, Geochimica et Cosmochimica Acta, Geosphere, G- cubed, Geology, International Journal of Earth Sciences, Journal of Geophysical Research, Geopshere, Quaternary Geochronology, Nature, Nature Geoscience, Science, Terra Nova

Journal Editorship:

Associate editor – Geochimica et Cosmochimica Acta (2012-present)
Associate editor - Journal of Geophysical Research (2011-present)

NSF Referee:

Geomorphology and Land-Use Dynamics, *Geophysics*, *Petrology and Geochemistry, Sedimentary Geology and Paleobiology, Tectonics* Programs

NSF Panelist 2011-2014; 2016

NSF *Steering Committee on Geochronology* 2014-2015

Report presented to NSF:
Harrison T.M., Baldwin S.L., Caffee M., Gehrels G.E., Schoene B., Shuster D.L., and Singer B.S. (2015) It's About Time: Opportunities and Challenges for U.S. Geochronology, *Department of Earth, Planetary and Space Sciences, UCLA*, 54 pp.

Numbers of publications and proposals reviewed by year:

2004:3, *2005*:2, *2006*:8, *2007*:7, *2008*:6, *2009*:9, *2010*:12, *2011*:31, *2012*:43, *2013*:39, *2014*:15, *2015*:17, *2016*:11 (to date)

Affiliations:

American Geophysical Union, Geochemical Society, Meteoritical Society

Theme Coordinator, "*Weathering and Erosion*," 26th Annual V.M. Goldschmidt Conference, 2016

Session Convener, *"New Developments in Analytical Techniques and Applications of Noble Gas Observations,"* 23rd Annual V.M. Goldschmidt Conference, 2013

Session Convener, "*Quantifying Surface Processes using Noble Gases*," Fall Meeting, American Geophysical Union, 2008

Session Convener, "*The Physics and Chemistry of Thermochronology*," 18th Annual V.M. Goldschmidt Conference, 2008

Session Convener: "*New developments in geochronology*," Fall Meeting, American Geophysical Union, 2007

Session Convener: "*Chemical weathering and mineralogy of the Martian surface and Earth analogs*," 16th Annual V.M. Goldschmidt Conference, 2006

Departmental Service (Dept. Earth and Planetary Science, UC Berkeley)

Strategic Planning committee member: *Earth and Planetary Science* 2016-2017
Faculty search committee member: *Earth and Planetary Science* 2016-17
Equity Advisor: 2015-
Graduate Student Advisor: 2015-
Faculty search committee member: *Earth and Planetary Science* 2014-15
Faculty search committee member: *Earth and Planetary Science* 2013-14
Faculty search committee member: *Earth resources or surface processes* 2013
Faculty search committee member: *Earth materials & near-surface processes* 2012
EPS Department Seminar committee: 2012-2013

University Service (UC Berkeley)

Faculty search committee member: *Environmental Geochemistry, EPSM* 2013

Teaching

EPS 124 Isotope Geochemistry, UC Berkeley 2017
Undergraduate level course in Dept. Earth and Planetary Science
EPS 224 Isotope Geochemistry, UC Berkeley 2017
Graduate level course in Dept. Earth and Planetary Science
EPS 50 Planet Earth, UC Berkeley 2016
Undergraduate level course in Dept. Earth and Planetary Science
EPS 131 General Geochemistry, UC Berkeley 2015
Undergraduate level course in Dept. Earth and Planetary Science
EPS 124 Isotope Geochemistry, UC Berkeley 2015
Undergraduate level course in Dept. Earth and Planetary Science
EPS 224 Isotope Geochemistry, UC Berkeley 2015
Graduate level course in Dept. Earth and Planetary Science
EPS 131 General Geochemistry, UC Berkeley 2014
Undergraduate level course in Dept. Earth and Planetary Science
EPS 290 Reading group on the gradual development of low relief landscapes 2014
EPS 124 Isotope Geochemistry, UC Berkeley 2013
Undergraduate level course in Dept. Earth and Planetary Science
EPS 224 Isotope Geochemistry, UC Berkeley 2013
Graduate level course in Dept. Earth and Planetary Science
EPS 131 General Geochemistry, UC Berkeley 2013
Undergraduate level course in Dept. Earth and Planetary Science
EPS 255 Advanced Topics in Earth and Planetary Science, UC Berkeley 2013
EPS 290 Reading group 2013
EPS 224 Isotope Geochemistry, UC Berkeley 2012
Graduate level course in Dept. Earth and Planetary Science
EPS 255 Advanced Topics in Earth and Planetary Science, UC Berkeley 2012
EPS 290 Reading group 2012

EPS 124 Isotope Geochemistry, UC Berkeley 2012
Undergraduate level course in Dept. Earth and Planetary Science
EPS 224 Isotope Geochemistry, UC Berkeley 2010
Graduate level course in Dept. Earth and Planetary Science
EPS 124 Isotope Geochemistry, UC Berkeley 2010
Undergraduate level course in Dept. Earth and Planetary Science
EPS 224 Isotope Geochemistry, UC Berkeley 2008
Graduate level course in Dept. Earth and Planetary Science
EPS 124 Isotope Geochemistry, UC Berkeley 2008
Undergraduate level course in Dept. Earth and Planetary Science

Undergraduate Students Supervised in Research

Maura Eubner (2015-)
Ian Ekblaw (2014)
Robert Nicklas (2013-2014)
Trevor Hillebrand (2011-2012)
Curtis Baden (2012-2013)

Bachelor of Arts Theses Supervised

Curtis Baden, "Deducing Erosion Rates of the Mt. Langley Summit Flat using ^{21}Ne in Quartz," 2013
Trevor Hillebrand, "A comparison of tectonics of the eastern Sierra Nevada, CA in the vicinity of Mt. Whitney and Lee Vining, using (U-Th)/He and ^{4}He/^{3}He thermochronometry: Preliminary results and thermal modeling," 2012

Masters of Arts Theses Supervised

Anisa Ahmadzai, (Exam committee member), 2013

Masters of Science Theses Supervised

John Grimsich, (Thesis committee member), 2012-2013

Ph.D. Theses Supervised

Anna Clinger, (Co-advisor, EPS), 2016-present
Chelsea Willett, (Primary advisor, EPS), 2014-present
Marissa Tremblay, (Primary advisor, EPS), 2012-present
Kari Finstad, (Thesis committee member, ESPM), 2016
Marco Pfeiffer, (Thesis committee member, ESPM), 2015-present
Patrick Boehnke, (Thesis committee member, UCLA), 2014-2016
Noah Randolph-Flagg, (Advisor, qualifying exam committee, EPS), 2013-present
Stephanie Wuerth, (Oral qualifying exam committee member, EPS), 2014
Jacob Edman, (Oral qualifying exam committee member, EPS), 2013
Sirine Fakra, (Oral qualifying exam chair, EPS), 2013
Benjamin Nault, (Oral qualifying exam committee member), 2012-2013
Erik Oerter, (Thesis committee member), 2012-2015
Claire Lukens, (Thesis committee member, U. Wyoming), 2012-present
Jennifer Schmidt, (Thesis committee member, Lehigh University), 2012-present

Postdoctoral Researchers Supervised

Xiaodong Deng, 2014-present.
Sonia Tikoo, 2014-2016, presently Assistant Professor.
Matthew Fox, 2013-present
Rebecca Reverman, 2013-2014, presently in Zurich, Switzerland
Alka Tripathy, 2012-present
Greg Balco, 2007-2009, presently staff Geochronologist at BGC

Refereed Publications

* denotes student contribution at time of contribution
** denotes post-doctoral associate
Total citations: 3103
h-index: 32

Manuscripts:

[81] Weiss B.P., Wang H., **Shuster D.L.,** Downey B., Gattacceca J., Sharp T.G., Hu J., Fu R.R., Kuan A.T., Sauvet C., Irving A.J. (2016) A nonmagnetic differentiated early planetary body

[80] Stockli D.F., Surpless B.E., **Shuster D.L.** (2016) Implications of low temperature thermochronologic data for central Sierran uplift and fault evolution in the Lake Tahoe area

In Review/Press:

[79] *Tremblay M.M., **Shuster D.L.,** Balco, G., Cassata, W.S. (2016) Neon diffusion kinetics and implications for cosmogenic neon paleothermometry in feldspars, *in review*.

[78] *Garcia V.H., Reiners P.W., **Shuster D.L.,** Idleman B., Zeitler P.K. (2016) Thermochronology of sandstone-hosted secondary Fe- and Mn-oxides near Moab, Utah: Record of paleo-fluid flow along a fault, *in review*.

[77] *Fame M.L., Spotila J.A., Owen L.A., Dortch J.M., **Shuster D.L.** (2016) Cenozoic exhumation and topographic evolution of the Scottish Highlands along the post-glacial North Atlantic Passive Margin, *in review*.

[76] **Tikoo S.M., Weiss B.P., **Shuster D.L.**, Sauvet C., Wang, H., Grove T.L. (2016) A three billion-year history for the lunar dynamo, *in review*.

[75] *Christeleit E.C., Brandon M.T., **Shuster D.L.** (2016) Early development of alpine glacial relief in the Central Patagonian Andes revealed by low-temperature thermochronometry.

[74] Dai J., **Fox M., Wang C., **Shuster D.L.** (2016) Episodic exhumation of the Tibetan Plateau: constrained by detrital (U-Th)/He ages of the Hoh Xil basin, northern Tibet, *in review*.

[73] **Deng X., Li J., **Shuster D.L.** (2016) Asian summer monsoon controlled long-term chemical weathering in East Asia since late Miocene, *in review*.

[72] **Valla P.G., Herman F., **Simon-Labric T., Braun J., **Shuster D.L.,** Reiners P.W., Fellin M.G., Champagnac J.-D. and Baumgartner L.P. (2016) Latitudinal migration of alpine glaciations and mountain erosion, *in review*.

[71] Garrick-Bethell I., Weiss B.P., **Shuster D.L.,** **Tikoo, S. (2016) Further evidence for early lunar magnetism from troctolite 76535, *in press*.

In Print:

[70] **Gourbet L., Mahéo G., Shuster D.L., **Tripathy-Lang A., Leloup P.H., Paquette J-L. (2016) River network evolution as a major control for orogenic exhumation: Case study from the western Tibetan plateau, *Earth and Planetary Science Letters*, http://dx.doi.org/10.1016/j.epsl.2016.09.037

[69] **Valla P.G., Rahn M., **Shuster D.L.,** van der Beek P.A. (2016) Multi-phase late Neogene exhumation history and hydrothermal activity in the Swiss central Alps, *Terra Nova*, DOI:

10.1111/ter.12231.
[68] *Bibby T., Putkonen J., Morgan D., Balco G., **Shuster D.L.** (2016) Million-year old ice found under meter-thick debris layer in Antarctica, *Geophysical Research Letters,* 43(13), 6995-7001.
[67] *Lukens C.E., Riebe C.S., Sklar L.S, **Shuster D.L**. (2016) Potential for grain-size bias in cosmogenic nuclide studies of stream sediment in steep terrain *Journal of Geophysical Research: Earth Surface*, 121, 978-999.
[66] Amidon W.H., Roden-Tice M.K., Anderson A.J., McKeon R., **Shuster D.L.** (2016) Late Cretaceous unroofing of the White Mountains, NH: part of a circum-Atlantic tectonic event? *Geology*, 44(6), 415-418.
[65] Schaefer J.M., Winckler G., Blard P.-H., Balco G., **Shuster D.L.,** Friedrich R., Jull A.T.J., Wieler R., Schluechter C., (2016) Performance of CRONUS-P - a pyroxene reference material for helium isotope analysis, *Quaternary Geochronology*, 31, 237-239.
[64] **Jackson C.R.M., **Shuster D.L.**, Parman S.W., Smye A.J. (2016) Noble gas mobility hindered by low energy sites in amphibole, *Geochimica Et Cosmochimica Acta, 172, 65-78*.
[63] Harrison T. M., Baldwin, S.L., Caffee M., Gehrels G.E., Schoene B., **Shuster D.L.,** and Singer B.S. (2015) Geochronology: It's About Time, *EOS* 96, doi:10.1029/2015EO041901.
[62] Riebe C.S., Sklar L.S, *Lukens C.E., **Shuster D.L**. (2015) Climate and topography control the size and flux of sediment produced on steep mountain slopes, *Proceedings of the National Academy of Sciences,* **112**(51), 15574-15579.
[61] *Buz J., Weiss B.P., Tikoo S.M., **Shuster D.L.,** Gattacceca J., Grove T.L. (2015) Magnetism of a very young lunar glass, *Journal of Geophysical Research: Planets*, *120, 1720–1735*
[60] Vasconcelos, P.M., Reich, M., **Shuster D.L.,** (2015) The paleoclimate signatures of supergene metal deposits, *Elements*, **11**(5) 317-322.
[59] *Schmidt J.L., Zeitler P.K., Pazzaglia F.J., *Tremblay M.M., **Shuster D.L.,** **Fox M., (2015) Knickpoint Evolution on the Yarlung River: Evidence for late Cenozoic Uplift of the Southeastern Tibetan Plateau Margin, *Earth and Planetary Science Letters*, **430**, 448-457.
[58] *Tremblay M.M., **Fox M., Schmidt J.L., **Tripathy-Lang A., Wielicki, M.M., Harrison T.M., Zeitler P.M., **Shuster D.L.** (2015) Erosion in southern Tibet shut down at ~10 Ma due to enhanced rock uplift within the Himalaya, *Proceedings of the National Academy of Sciences,* **112**(39), 12030-12035.
[57] **Tripathy-Lang A., **Fox M., **Shuster D.L.** (2015) Zircon ^{4}He/^{3}He thermochronometry, *Geochimica Et Cosmochimica Acta,* **166**, 1-14.
[56] Vermeesch P., Balco G., Blard P.-H., Dunai T., Kober F., Niedermann S., **Shuster D.L.**, Strasky S., Stuart F., Wieler R., Zimmermann L. (2015) Interlaboratory comparison of cosmogenic ^{21}Ne in quartz, *Quaternary Geochronology,* **26**, 20-28
[55] Blard P.H., Balco G., Burnard P.G., Farley K.A., Fenton, C.R., Friedrich, R. Jull A.J.T., Niedermann S., Pik R., Schaefer J.M., Scott E.M., **Shuster D.L.**, Stuart, F.M., Stute, M., Tibari B., Winckler G., Zimmermann L. (2015) An inter-laboratory comparison of cosmogenic ^{3}He and radiogenic ^{4}He in CRONUS-P pyroxene standard, *Quaternary Geochronology,* **26**, 11-19.
[54] **Fox M., Bodin T., **Shuster D.L.** (2015) Changes in the rate of Andean Plateau uplift from reversible jump Markov Chain Monte Carlo inversion of river profiles, *Geomorphology*, **238**, 1-14.
[53] **Shuster D.L.,** Cassata W.C. (2015) Paleotemperatures at the lunar surfaces from open system behavior of cosmogenic ^{38}Ar and radiogenic ^{40}Ar, *Geochimica Et Cosmochimica Acta*, **155**, 154-171.
[52] **Fox M., Leith K., Bodin T., Balco G., **Shuster D.L.** (2015) Rate of fluvial incision in the Central Alps constrained through joint inversion of detrital ^{10}Be and thermochronometric data, *Earth and Planetary Science Letters*, **411**, 27-36.
[51] *Evenson N.S., Reiners P.W., Spencer, J. **Shuster D.L.** (2014) Hematite and Mn oxide (U-Th)/He dates from the Buckskin-Rawhide detachment system western Arizona: constraining the timing of mineralization and gaining insights into hematite (U-Th)/He systematics, *American Journal of Science*, **314**, 1373-1435.

[50] **Fox M., McKeon R.E., **Shuster D.L.** (2014) Incorporating 3-D parent nuclide zonation for apatite $^{4}He/^{3}He$ thermochronometry: An example from the Appalachian Mountains, *Geochemistry Geophysics Geosystems* **15**(11), 4217-4229.

[49] **Simon-Labric T., Brocard G.Y., Teyssier C., van der Beek P.A., Reiners P.W., **Shuster D.L.**, Murray K., Shitney D.L. (2014) Low-temperature thermochronologic signature of range-divide migration and breaching in the North Cascades, *Lithosphere,* **6**(6), 473-482.

[48] *Tremblay M.M., **Shuster D.L.,** and Balco G. (2014) Diffusion kinetics of ^{3}He and ^{21}Ne in quartz and implications for cosmogenic noble gas paleothermometry, *Geochimica Et Cosmochimica Acta,* **142**, 186-204.

[47] **Tikoo S.M., Weiss B.P., Cassata W.S., **Shuster D.L.,** Gattacceca J., Lima E.A., Sauvet C., Nimmo F., Fuller M.D. (2014) Decline of the lunar core dynamo, *Earth and Planetary Science Letters*, **404**, 89-97.

[46] *Tremblay M.M., **Shuster D.L.,** and Balco G. (2014) Cosmogenic noble gas paleothermometry, *Earth and Planetary Science Letters*, **400**, 195-205.

[45] **Fox M., **Shuster D.L.** (2014) The influence of burial heating on the (U-Th)/He system in apatite: Grand Canyon case study, *Earth and Planetary Science Letters,* **397**, 174-183.

[44] Karlstrom, K.E., Lee, J.P., Kelley, S.A., Crow, R.S., Crossey, L.J., Young, R.A., Lazear, G., Beard, L.S., Ricketts, J.W., **Fox, M., **Shuster D.L.** (2014) Formation of the Grand Canyon 5 to 6 million years ago through integration of older palaeocanyons. *Nature Geoscience,* **7**, 239-244.

[43] *Jungers, M.C., Heimsath, A.M., Amundson, R., Balco, G., **Shuster, D.L.**, Guillermo, C. (2013) Active erosion–deposition cycles in the hyperarid Atacama Desert of Northern Chile, *Earth and Planetary Science Letters,* **371-372**, 125-133.

[42] **Suavet C, Weiss B.P, Cassata W.S.**, **Shuster D.L.**, Gattacceca J., Chan L., Garrick-Bethell I., Head, J.W., Grove T.L., and Fuller M.D. (2013) Persistence of the Lunar Core Dynamo, *Proceedings of the National Academy of Sciences,* **110**(21), 8453-8458.

[41] **Fernandes, V.A., Fritz, J., Weiss, B.P, *Garrick-Bethell, I., **Shuster, D.L.** (2013) The bombardment history of the moon as recorded by $^{40}Ar/^{39}Ar$ chronometry, *Meteoritics and Planetary Science,* **48**, 241-269.

[40] Min K., Reiners P.W., **Shuster D.L.** (2013) (U-Th)/He ages of phosphates from St. Severin LL6 chondrite, *Geochimica Et Cosmochimica Acta,* **100**, 282-296.

[39] *Fu R.R., Weiss B.P., **Shuster D.L.,** Gattacceca J., Grove T.L., Suavet C., Lima E.A., Li L., Kuan A.T. (2012) An Ancient Core Dynamo in Asteroid Vesta, *Science*, **338**, 238-241.

[38] *Cassata, W.S., **Shuster, D.L.**, Renne, P.R., Weiss, B.P., (2012) Meteorite constraints on Martian paleoatmospheric pressures. *Icarus*, **221**, 461-465.

[37] *Gourbet L, **Shuster D.L.**, Balco G., *Cassata W.S., Renne, P.R., Rood, D. (2012) Neon diffusion kinetics in olivine, pyroxene and feldspar: Retentivity of cosmogenic and nucleogenic neon. *Geochimica Et Cosmochimica Acta,* **86**, 21-36.

[36] **Shuster D.L.**, Farley K.A., Vasconcelos P.M., Balco G., *Monterio H.S., *Waltenberg K., Stone J.O., (2012) Cosmogenic ^{3}He in hematite and goethite from Brazilian "canga" duricrust demonstrates the extreme stability of these surfaces. *Earth and Planetary Science Letters,* **329**, 41-50.

[35] *Shea E., Weiss B.P., *Cassata W.S., **Shuster D.L.**, Tikoo S.M., Gattacceca J., Grove T.L., Fuller M.D. (2012), A long-lived lunar core dynamo, *Science*, **335**(6067), 453-456.

[34] *Valla P.G., van der Beek P.A., **Shuster D.L.**, Braun J., Herman F., Tassan-Got L., Gautheron C. (2012) Late Neogene exhumation and relief development of the Aar and Aiguilles Rouges massifs (Swiss Alps) from low-temperature thermochronology modeling and $^{4}He/^{3}He$ thermochronometry, *Journal of Geophysical Research – Earth Surface*, **117**, F01004.

[33] *Valla P.G., **Shuster D.L.**, van der Beek P.A. (2011) Significant increase in relief of the European Alps during Mid-Pleistocene glaciations, *Nature Geoscience,* **4**(10), 688-692.

[32] Farley K.A., **Shuster D.L.**, Ketcham R.A. (2011) U and Th zonation in apatite observed by

laser ablation ICPMS, and implications for the (U-Th)/He system, *Geochimica Et Cosmochimica Acta,* **75**(16), 4515-4530.

[31] Yapp C.J., **Shuster D.L.,** (2011) Environmental memory and a possible seasonal bias in the stable isotope composition of (U-Th)/He-dated goethite from the Canadian arctic, *Geochimica Et Cosmochimica Acta,* **75**(15), 4194-4215.

[30] Carporzen L., Weiss B.P., Elkins-Tanton L.T., **Shuster D.L.,** Ebel D., Gattacceca J. (2011) Magnetic evidence for a partially differentiated carbonaceous chrondrite parent body, *Proceedings of the National Academy of Sciences,* **108**(16), 6386-6389.

[29] *Cassata W.S., Renne P.R., **Shuster D.L.** (2011) Argon diffusion in pyroxenes: Implications for thermochronometry and mantle degassing, *Earth and Planetary Science Letters,* **304**(3-4), 407-416.

[28] **Shuster D.L.**, Cuffey K.M.,*Sanders J.W., Balco G. (2011) Thermochronometry reveals headward propagation of erosion in an alpine landscape, *Science*, **332**(6025), 84-88.

[27] *Cassata W.S., **Shuster D.L.**, Renne P.R., Weiss B.P., (2010) Evidence for shock heating and constraints on Martian surface temperatures revealed by $^{40}Ar/^{39}Ar$ thermochronometry of Martian meteorites, *Geochimica Et Cosmochimica Acta*, **74**(23), 6900-6920

[26] Farley K.A., **Shuster D.L.**, Watson E.B., Wanser K.H., Balco G. (2010) Numerical investigations of apatite $^{4}He/^{3}He$ thermochronometry, *Geochemistry Geophysics Geosystems* **11**(10), Q10001, doi:10.1029/2010GC003243

[25] **Schildgen T.F., **Balco G, **Shuster D.L.**, (2010) Canyon incision and knickpoint propagation recorded by apatite $^{4}He/^{3}He$ thermochronometry, *Earth and Planetary Science Letters,* **293**(3-4), 377-387.

[24] **Shuster D. L., ****Balco G, *Cassata W.S., **Fernandes V.A., Garrick-Bethell I., Weiss B.P. (2010) A record of impacts preserved in the lunar regolith, *Earth and Planetary Science Letters,* **290**(1-2), 155-165.

[23] *Cassata W.S., Renne P.R., **Shuster D.L.**, (2009) Argon diffusion in plagioclase and implications for thermochronometry: A case study from the Bushveld Complex, South Africa, *Geochimica Et Cosmochimica Acta,* **73**(21), 6600-6612.

[22] **Balco G., **Shuster D. L.**, (2009b) ^{26}Al - ^{10}Be - ^{21}Ne burial dating, *Earth and Planetary Science Letters,* **286**(3-4), 570-575.

[21] Reiners P.W., **Shuster D. L.**, (2009) Thermochronology and Landscape Evolution, *Physics Today*, **62**(9), 31-36.

[20] **Balco G., **Shuster D. L.**, (2009a) Production rate of cosmogenic ^{21}Ne in quartz estimated by comparison of ^{21}Ne, ^{10}Be, and ^{26}Al concentrations in slowly eroding Antarctica sandstone surfaces, *Earth and Planetary Science Letters,* **281**(1-2), 48-58.

[19] Flowers R.M., Ketcham R.A., **Shuster D.L.**, Farley K.A., (2009) Apatite (U-Th)/He thermochronometry using a radiation damage accumulation and annealing model, *Geochimica Et Cosmochimica Acta*, **73**(8), 2347-2365.

[18] *Garrick-Bethell I., Weiss B.P., **Shuster D.L.**, Buz J., (2009) Early lunar magnetism, *Science* **323**(5912), 356-359.

[17] **Shuster D. L.** and Farley, K. A., (2009) The influence of artificial radiation damage and thermal annealing on helium diffusion kinetics in apatite, *Geochimica Et Cosmochimica Acta* **73**(1), 6183-196

[16] **Colgan J.P., **Shuster D. L.,** Reiners, P. W. (2008) Two-phase Neogene extension in the northwest Basin and Range recorded in a single thermochronology sample, *Geology* **36**(8), 631-634.

[15] Flowers R. M., **Shuster D. L.**, Wernicke B. P., and Farley K. A. (2007) Radiation damage control on apatite (U-Th)/He dates from the Grand Canyon region, Colorado Plateau, *Geology* **35**(5), 447-450.

[14] **Shuster D. L**., Flowers R. M., and Farley K. A. (2006) The influence of natural radiation damage on helium diffusion kinetics in apatite, *Earth and Planetary Science Letters*

249(3-4), 148-161.

[13] Heim J. A., Vasconcelos P. M., **Shuster D. L.**, Farley K. A., and Broadbent G. (2006) Dating palaeochannel iron ore by (U-Th)/He analysis of supergene goethite, Hamersley Province, Australia, *Geology* **34**(3), 173-176.

[12] **Shuster D. L.**, Ehlers T. A., Rusmore M. E., and Farley K. A. (2005) Rapid glacial erosion at 1.8 Ma revealed by $^{4}He/^{3}He$ thermochronometry, *Science* **310**(5754), 1668-1670.

[11] **Shuster D. L.** and Farley K. A. (2005b) $^{4}He/^{3}He$ thermochronometry: Theory, practice and potential complications. In *Low-Temperature Thermochronology: Techniques, Interpretations, and Applications*, Vol. **58** (ed. P. W. Reiners and T. A. Ehlers), pp. 181-202. Mineralogical Society of America.

[10] **Shuster D. L.** and Weiss B. P. (2005) Martian surface paleotemperatures from thermochronology of meterorites, *Science* **309**(5734), 594-597.

[9] **Shuster D. L.**, Vasconcelos P. M., Heim J. A., and Farley K. A. (2005) Weathering geochronology by (U-Th)/He dating of goethite, *Geochimica Et Cosmochimica Acta* **69**(3), 659-673.

[8] **Shuster D. L.** and Farley K. A. (2005a) Diffusion kinetics of proton-induced ^{21}Ne, ^{3}He, and ^{4}He in quartz, *Geochimica Et Cosmochimica Acta* **69**(9), 2349-2359.

[7] **Shuster D. L.**, Farley K. A., Sisterson J. M., and Burnett D. S. (2004) Quantifying the diffusion kinetics and spatial distributions of radiogenic ^{4}He in minerals containing proton-induced ^{3}He, *Earth and Planetary Science Letters* **217**(1-2), 19-32.

[6] **Shuster D. L.** and Farley K. A. (2004) $^{4}He/^{3}He$ thermochronometry, *Earth and Planetary Science Letters* **217**(1-2), 1-17.

[5] Weiss B. P., **Shuster D. L.**, and Stewart S. T. (2002) Temperatures on Mars from $^{40}Ar/^{39}Ar$ thermochronology of ALH84001, *Earth and Planetary Science Letters* **201**(3-4), 465-472.

[4] Weiss B. P., Vali H., Baudenbacher F. J., Kirschvink J. L., Stewart S. T., and **Shuster D. L.** (2002) Records of an ancient Martian magnetic field in ALH84001, *Earth and Planetary Science Letters* **201**(3-4), 449-463.

[3] Evans W. C., Sorey M. L., Cook A. C., Kennedy B. M., **Shuster D. L.**, Colvard E. M., White L. D., and Huebner M. A. (2002) Tracing and quantifying magmatic carbon discharge in cold groundwaters: lessons learned from Mammoth Mountain, USA, *Journal of Volcanology and Geothermal Research* **114**(3-4), 291-312.

[2] DePaolo D. J., Bryce J. G., Dodson A., **Shuster D. L.**, and Kennedy B. M. (2001) Isotopic evolution of Mauna Loa and the chemical structure of the Hawaiian plume, *Geochemistry Geophysics Geosystems* **2,** 2000GC000139.

[1] Evans W. C., Sorey M. L., Kennedy B. M., Stonestrom D. A., Rogie J. D., and **Shuster D. L.** (2001) High CO_2 emissions through porous media: transport mechanisms and implications for flux measurement and fractionation, *Chemical Geology* **177**(1-2), 15-29.

Other publications

[R1] Vasconcelos P. M., Heim J. A., Farley K. A., **Shuster D. L.**, and Broadbent G. (2006) Dating palaeochannel iron ore by (U-Th)/He analysis of supergene goethite, Hamersley province, Australia: Reply to Comment by Morris R. C., Kneeshaw M., and Ramanaidou E.R., *Geology: Online Forum*, Published Online: April 2007, DOI: 10.1130/G22755Y.1, page e119.

Invited Lectures

Harvard University, Dept. of Earth and Planetary Sci., Cambridge, MA, April 2014
The University of Chicago, Dept. of the Geophysical Sciences, Chicago, IL, April 2014

Peninsula Geological Society, 444th Lecture since 1954, Stanford, CA, February 2014
University of Texas, Austin, Jackson School of Geosciences, Austin, TX, October 2012
Stanford University, Dept. of Geo. and Environmental Sciences, Stanford, CA, June 2012
China University of Geosciences, Beijing, China, May 2012
Lehigh University, Dept. Earth and Environmental Science, Bethlehem, PA, March 2012
U. Católica del Norte, Dept. Ciencias Geológicas Antofagasta, Chile, January 2012
University of Chile, Department of Geology, Santiago, Chile, January 2012
Yale University, Dept. of Geology and Geophysics, New Haven, CT, October 2011
Caltech, Division of Geological and Planetary Sciences, Pasadena, CA, April 2011
E.T.H, Dept. of Earth Sciences, Zurich, Switzerland, March 2011
U.C.L.A., Dept. of Earth and Space Sciences, Los Angeles, CA, January 2011
Rice University, Department of Earth Science, Houston, TX, September 2007
Johannes Gutenberg Universitat, Dep. of Geology, Mainz, Germany, June 2007
University of Washington, Dept. Earth and Space Sciences, Seattle, WA, April 2007
Yale University, Dept. of Geology and Geophysics, New Haven, CT, April 2007
C.U. Boulder, Dept. of Geological Science, Boulder, CO, January 2007
Petrobras, Cenpes, Rio de Janeiro, Brazil, December 2006
ExxonMobil Upstream Research Company, Houston, TX, September 2006
MIT, Dept. Earth, Atmospheric and Planetary Sci., Cambridge, MA, September 2006
U.C. Santa Cruz Earth Sciences Department, Santa Cruz, CA, May 2006
Southern Methodist University Dept. of Geological Sciences, Dallas, TX, April 2006
Stanford University Dept. of Geo. and Environmental Sciences, Stanford, CA, April 2006
U.C. Berkeley Dept. of Earth and Planetary Science, Berkeley, CA, March 2006
Universidade Federal do Rio Grande do Norte, Natal, Brazil, January 2006
Berkeley Geochronology Center, Berkeley, CA, December 2005
Mineralogical Soc. of America. Short Course, Salt Lake City, UT, October 2005
Caltech Division of Geological and Planetary Sciences, Pasadena, CA, May 2005
Washington University Dept. of Earth and Planetary Sci., St. Louis, MO, March 2005
Princeton University Dept. of Geosciences, Princeton, NJ, February 2005
U.C. Berkeley Center for Isotope Geochemistry, Berkeley, CA, February 2005
Harvard University, Dept. of Earth and Planetary Sci., Cambridge, MA, February 2005

Externally Funded Projects

Source: National Science Foundation
Title: Antarctic Peninsula Exhumation and Landscape Development Investigated by Low-Temperature Detrital Thermochronometry
Total Award Amount: $366,898
Total Award Period Covered: 05/01/16 – 04/30/19

Source: National Aeronautics and Space Administration (NASA funded via MIT subaward)
Title: Investigating the ancient Lunar Dynamo
Total Award Amount: $84,074
Total Award Period Covered: 07/25/15 – 07/24/18

Source: National Science Foundation
Title: Collaborative Research: Development of hematite (U-Th)/He chronology to directly date fault slip and ancient seismicity
Total Award Amount: $31,058

Total Award Period Covered: 09/01/14 – 08/31/17

Source: National Science Foundation
Title: Collaborative Research: The age of Grand Canyon: applying new tests to resolve the 150-year-old debate
Total Award Amount: $134,116
Total Award Period Covered: 05/01/14 – 04/30/16

Source: UC Berkeley – CONICYT Grant
Title: Long-Term Evolution of Alpine Glaciation and Topography of the Patagonian Andes; PIs: David Shuster and Kurt Cuffey
Total Award Amount: $27,500
Total Award Period Covered: 01/01/14-03/30/2015

Source: National Science Foundation, Geomorphology and Landuse Dynamics
Title: Collaborative Research: Spatial Variability in Eroded Sediment Size and Geomorphic Processes Inferred From Detrital Thermochronometry and Cosmogenic Nuclides
Total Award Amount: $84,040
Total Award Period Covered: 08/15/13-07/31/15

Source: National Science Foundation, Petrology and Geochemistry, Geomorphology and Landuse Dynamics
Title: Production and Diffusion of Cosmogenic Noble Gases: Using Open-system Behavior to Study Surface Processes; PI: David Shuster, Co-PI: Greg Balco
Total Award Amount: $ 309,966
Total Award Period Covered: 7/1/13-6/30/15

Source: National Science Foundation, Geophysics
Title: Collaborative Research: Testing the shock remanent magnetization hypothesis in the Slate Island impact structure; PI: David Shuster (with Lead PI: Nick Swanson-Hysell)
Total Award Amount: $ 80,124
Total Award Period Covered: 7/1/13-6/30/15

Source: National Science Foundation, Antarctic Earth Science
Title: Antarctic Peninsula Exhumation and Landscape Development Investigated by Low-temperature Detrital Thermochronometry; PI: Greg Balco, Co-PI: David Shuster
Total Award Amount: $ 101,315
Total Award Period Covered: 12/1/12-11/30/13

Source: National Science Foundation, Instrumentation and Facilities
Title: Acquisition of a noble gas analysis facility for surface process studies at the Berkeley Geochronology Center; PI: David Shuster, Co-PI: Greg Balco
Total Award Amount: $ 137,108
Total Award Period Covered: 2/1/12-1/31/13

Source: National Science Foundation, Continental Dynamics
Title: Collaborative Research: Lhasa Block Top to Bottom – Lithospheric Evolution of Asia's Leading Edge; PIs: Don DePaolo, T. Mark Harrison, An Yin, David Shuster, Peter Zeitler, Anne Meltzer, David Rowley
Total Award Amount: $ 3,100,000

Total Award Period Covered: 9/1/11-8/31/15

Source: France-Berkeley Fund
Title: Catastrophic gorge incision (Skagit River Gorge) induced by glacial lake overspill assessed through high-resolution $^{4}He/^{3}He$ thermochronology; PIs: David Shuster and Jean Braun
Total Award Amount: $9,500
Total Award Period Covered: 7/1/11-7/30/12

Source: National Science Foundation, Petrology and Geochemistry
Title: Collaborative Research: Little Devil's Postpile Revisited: Intercalibration of Thermochronometer Kinetics in a Contact Aureole; PIs: Peter Zeitler, David Shuster, Peter Reiners, Richard Ketcham
Total Award Amount: $ 340,000
Total Award Period Covered: 3/1/11-2/18/13

Source: National Science Foundation, Antarctic Earth Sciences
Title: Collaborative Research: Systematic Analysis of Landscape Evolution and Surface Ages in Transantarctic Mountains; PI: Gregory Balco, Co-PI: David Shuster
Total Award Amount: $ 119,028
Total Award Period Covered: 9/1/09-8/31/12

Source: National Science Foundation, Major Research Instrumentation
Title: Acquisition of a Single-Collector, Magnetic-Sector ICP-MS for Research in U- Series and (U/Th)/He Chronometry at the Berkeley Geochronology Center; PI: Warren Sharp, Co-PI: David Shuster
Total Award Amount: $ 482,030
Total Award Period Covered: 8/1/09-7/31/10

Source: National Science Foundation, Antarctic Earth Sciences
Title: Extending the record of Antarctic landscape evolution into the Pliocene with ^{21}Ne measurements; PI: Gregory Balco, Co-PI: David Shuster
Total Award Amount: $ 47,652
Total Award Period Covered: 6/1/09-5/31/10

Source: National Science Foundation, Petrology and Geochemistry
Title: Experimental Determination of Argon Diffusion Kinetics and Mechanisms in Plagioclase; PI: Paul Renne, Co-PI: David Shuster
Total Award Amount: $ 258,280
Total Award Period Covered: 3/1/09-2/29/12

Source: France-Berkeley Fund
Title: Relief development in the Western Alps (France, Switzerland) in response to Quaternary glaciations assessed through high-resolution ^{4}He /^{3}He thermochronology; PIs: David Shuster and Kurt Cuffey
Total Award Amount: $9,500
Total Award Period Covered: 7/1/08-7/30/10

Source: National Aeronautics and Space Administration, LASER

Title: Measuring Paleomagnetism and Orienting Samples on the Moon; PI: Ben Weiss, Co-I David Shuster
Total Award Amount: $356,579
Total Award Period Covered: 7/1/08-6/30/12

Source: France-Berkeley Fund
Title: Relief development in the Western Alps (France, Switzerland) in response to Quaternary glaciations assessed through high-resolution $^{4}He/^{3}He$ thermochronology; PIs: David Shuster and Kurt Cuffey
Total Award Amount: $9,500
Total Award Period Covered: 7/1/08-7/30/10

Source: National Science Foundation, Petrology and Geochemistry
Title: Collaborative Research: Controls on He Diffusion from Minerals; PIs: David Shuster, Ken Farley
Total Award Amount: $377,000
Total Award Period Covered: 1/1/08-12/31/11

Source: National Science Foundation, Geomorphology and Land Use Dynamics
Title: Collaborative Research: The Pleistocene erosion history of glaciated alpine valleys interrogated by apatite $^{4}He/^{3}He$ thermochronometry; PIs: David Shuster, Kurt Cuffey
Total Award Amount: $198,000
Total Award Period Covered: 12/1/07-11/30/11

Source: National Science Foundation, Geomorphology and Land Use Dynamics
Title: Collaborative Research: Probing the Role of Rock Type in the Evolution of Glacial Landscapes; PIs: Bob Anderson, David Shuster
Total Award Amount: $263,000
Total Award Period Covered: 6/1/07-5/31/10

Source: PetroBras
Title: Thermochronology by the (U-Th)/He and $^{4}He/^{3}He$ methods: Quantifying denudation rates in deeply incised valleys and fault scarps in Southeastern Brazil; PIs: David Shuster, Paulo Vasconcelos
Total Award Amount: $76,800
Total Award Period Covered: 12/1/06-11/30/07

Source: National Science Foundation, Geobiology and Low-Temperature Geochemistry, and Global Change
Title: Ancient environments and the geochemistry of low temperature Fe(III) and Al oxides, PI: Crayton Yapp
Subcontract: $6,000 (to David Shuster)
Total Award Period Covered: 10/1/06-9/31/07

Source: National Science Foundation, Geomorphology and Land Use Dynamics
Title: SGER: Using $^{4}He/^{3}He$ thermochronometry to quantify the rate and timing of Canadian Shield fjord incision; PI: Jason Briner
Subcontract: $11,000 (to David Shuster)

Total Award Period Covered: 8/15/06 – 8/14/07

Source: National Science Foundation, Major Research Instrumentation
Title: Acquisition of a noble gas thermochronometry laboratory at Berkeley Geochronology Center; PI: David Shuster
Total Award Amount: $149,757
Total Award Period Covered: 7/1/06-6/30/08

Source: National Aeronautics and Space Administration, Mars Fundamental Research
Title: Thermal and magnetic history of mars from meteorites; PI: Ben Weiss, Co-I David Shuster
Total Award Amount: $470,380
Total Award Period Covered: 5/1/06-4/30/10