

# Curriculum Vitae – Thomas J. Lapen

## Professor

Department of Earth and Atmospheric Sciences, University of Houston  
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### **Education:**

- **Central Washington University, Ellensburg WA**                      **BS Geology**    **1995**  
**Senior thesis:** *Geology of the Selah Butte Anticline and Vicinity, Yakima Fold Belt, Central Washington*  
**Advisor:** Robert Bentley, Retired
- **Western Washington University, Bellingham WA**                      **MS Geology**    **1998**  
**MS Thesis:** *Structure and Metamorphism of the Southern Lillooet River-Northern Breakenridge Area, Southern Coast Mountains, British Columbia, Canada*  
**Advisor:** Edwin H. Brown, Retired
- **University of Wisconsin-Madison, Madison WI**                      **PhD Geology**    **2005**  
**PhD Dissertation:** *Radiogenic Isotopes as Records of Tectonic and Metamorphic Processes: Examples from the Western Alps, Italy, and the Western Gneiss Region, Norway.*  
**Advisor:** Clark M. Johnson

### **Appointments:**

- 9/16-present                      Professor, EAS Department, University of Houston, TX
- 9/11-8/16                      Associate Professor, EAS Department, University of Houston, TX
- 8/05-8/11                      Assistant Professor, EAS Department, University of Houston, TX
- 8/01-7/05                      Research Assistant, University of Wisconsin-Madison, Madison, WI
- 7/98-7/00                      Geologist, WA State Div. Geology and Earth Resources, Olympia WA
- 4/95-8/95                      Geologist, Kittitas Co. Reclamation District, Ellensburg, WA

### **Awards:**

- Fellow of the Geological Society of America (2018)
- Recipient of the John C. Butler Excellence in Teaching Award; UH (2008)
- Morgridge Distinguished Graduate Fellowship; UW-Madison (2004-2005 academic year)
- Best Graduate Research Paper Award; Dept. Geology and Geophysics, UW-Madison (2004)
- Farrell Merit Undergraduate Research Scholarship; Central Washington University (1994-1995)

### **Peer-reviewed Papers (up until 11/2018):**

- Shaulis, B.J., Kring D., Lapen T.J., Righter M., *In revision*, U-Pb chronology of Miller Range (MIL) 13317 and potential link to the South Pole-Aitken impact basin. **Meteoritics and Planetary Science**.
- Lobprijs T.A., Lapen T.J., 2019, Remote sensing evidence for a possible 10 kilometer in diameter impact structure in north-central Niger. **J. African Earth Sci.**  
<https://doi.org/10.1016/j.jafrearsci.2018.09.020>
- Li J., Zheng Y., Thompson L., Lapen T.J., Fang X., 2018, Deep earthquakes in subducting slabs hosted in highly anisotropic rock fabric. **Nature Geoscience**. doi:10.1038/s41561-018-0188-3
- Sundell, K.E., Saylor, J.E., Lapen, T.J., Styron, R.H., Villarreal, D., Usnayo, P., Cardenas, J., 2018, Peruvian Altiplano stratigraphy highlights along-strike variability in foreland basin evolution of the Cenozoic central Andes, **Tectonics**, 37, 1876–1904.  
doi:10.1029/2017TC004775
- Bartschi, N.C., Saylor, J.E., Lapen, T.J., Blum, M.D., Pettit, B., and Andrea, R.A., 2018, Tectonic controls on Late Cretaceous sediment provenance and stratigraphic architecture in

the Book Cliffs, Utah, Geological Society of America Bulletin 1–19. doi:10.1130/B31927.1.

- Reagan, M., Heywood, L., Goff, K., Michibayashi, K., Foster, T.C., Jicha, B., Lapen, T.J., McClelland, W.C., Ohara, Y., Righter, M., Scott, S., Sims, K.W.W., 2018, Geodynamic implications of crustal lithologies from the southeast Mariana fore-arc. **Geosphere**.
- Righter, K., Pando, K., Marin, N., Ross, D. K., Righter, M., Danielson, L., Lapen, T. J. and Lee, C-T., 2018, Volatile element signatures in the mantles of Earth, Moon, and Mars: Core formation fingerprints from Bi, Cd, In, and Sn. **Meteoritics and Planetary Science**. doi:10.1111/maps.13005.
- Schmieder, M., Shaulis, B.J., Lapen, T.J., Kring, D.A., 2017, U-Th-Pb systematics in zircon and apatite from the Chixulub impact crater, Yucatan, Mexico. **Geological Magazine**, DOI: 10.1017/S0016756817000255.
- Shaulis, B.J, Righter, M., Lapen, T.J., Jolliff, B.L., Irving, A.J., 2017, 3.1 Ga crystallization age for magnesian and ferroan gabbro lithologies in the Northwest Africa 773 clan of lunar meteorites. **Geochimica et Cosmochimica Acta**, 213, 435-456.
- Sarafian, A.R., Hauri, E.H., McCubbin, F.M., Lapen, T.J., Berger, E., Nielsen, S.G., Marschall, H.R., Gaetani, G.A., Righter, K., Sarafian, E., 2017, Early accretion of water and volatile elements to the inner solar system: Evidence from angrites. **Phil. Trans. R. Soc. A**. DOI: 10.1098/rsta.2016.0209
- Udry, A., Howarth, G.H., Lapen, T.J., Righter, M., 2017, Petrogenesis of the NWA 7320 enriched martian gabbroic shergottite: Insight into the martian crust, **Geochimica et Cosmochimica Acta**. doi: <http://dx.doi.org/10.1016/j.gca.2017.01.032>
- Kent, J.J., Brandon, A.D., Joy, K.H., Peslier, A.H., Lapen, T.J., Irving, A.J., Coleff, D.M., 2017, Mineralogy and petrogenesis of lunar magnesian granulitic meteorite Northwest Africa 5744. **Meteoritics and Planetary Sciences**, DOI: 10.1111/maps.12898.
- Righter K., Nickodem K., Pando K., Danielson L., Boujibar A., Righter M., Lapen T. J., 2017, Distribution of Sb, As, Ge, and In between metal and silicate during accretion and core formation in the Earth. **Geochimica et Cosmochimica Acta**, 198, 1-16.
- Lapen, T.J, Righter, M., Andreasen, R., Irving, A.J., Satkoski, A.M., Beard, B.L., Nishiizumi, K., Jull, A.J.T., Caffee, M.W., 2017, 2 Billion years of magmatism recorded from a single Mars ejection site. **Science Advances**, 3, e1600922
- Chen, X., Lapen T.J., Andreasen, R., Chafetz H.S., 2017, Accurate and precise silicon isotope analysis of sulfur and iron-rich samples by MC-ICP-MS. **Geostandards and Geoanalytical Research**, doi:10.1111/ggr.12158
- McLeod C, Brandon AD, Fernandes, VA, Peslier AH, Shafer J, Lapen TJ, Butcher A, Irving A, 2016, Constraints on Formation and Evolution of the Lunar Crust from Feldspathic Granulitic Breccias NWA 3163 and 4881. **Geochimica et Cosmochimica Acta**, 187, 350-374.
- Chen, X., Chafetz, H.S., Andreasen, R., Lapen T.J., 2016, Silicon isotope compositions of euhedral authigenic quartz crystals: Implications for abiotic fractionation at surface temperatures. **Chemical Geology**, 423, 61-73.
- Fernandez A, Lapen TJ, Andreasen R, Swart PK, White CD, Rosenheim BE, 2015, Ventilation time scales of the North Atlantic subtropical cell revealed by coral radiocarbon from the Cape Verde Islands, **Paleoceanography**, 30, doi:10.1002/2015PA002790.
- Armytage RMG, Brandon AD, Andreasen R, Lapen TJ, 2015, Evolution of Mojavian mantle lithosphere influenced by Farallon plate subduction: evidence from Hf and Nd isotopes in peridotite xenoliths from Dish Hill, CA. **Geochimica et Cosmochimica Acta**, 159, 264-284.
- Skora S, Mahlen NJ, Johnson CM, Baumgartner L, Lapen TJ, Beard BL, Szilvagy ET, 2015, Evidence for protracted prograde metamorphism followed by rapid exhumation of the Zermatt-Saas Fee Ophiolite. **Journal of Metamorphic Geology**, doi:10.1111/jmg.12148

- Armytage, R. M. G., Brandon, A. D., Peslier, A. H., Lapen, T. J., 2014. Osmium isotope evidence for Early to Middle Proterozoic lithosphere stabilization and concomitant production of juvenile crust in Dish hill, CA peridotite xenoliths. **Geochim. Cosmochim. Acta** 137, 113-133.
- Joy, K.H., Nemchin, A., Grange, M., Lapen, T.J., Peslier, A.H., Ross, D.K., Zolensky, M.E., Kring, D.A., 2014, Petrography, geochronology and source terrain characteristics of lunar meteorites Dhofar 925, 961 and Sayh al Uhaymir 449, **Geochimica et Cosmochimica Acta**, doi:[10.1016/j.gca.2014.08.013](https://doi.org/10.1016/j.gca.2014.08.013)
- Wittmann A., Korotev R.L., Jolliff B.L., Lapen T.J., Irving A.J., 2014, The petrogenesis of impact basin melt rocks in lunar meteorite Shişr 161. **American Mineralogist**, **99**. 1626-1647, doi: 10.2138/am.2014.4837
- McClelland W.C., Lapen T.J., 2013, Linking time to the pressure-temperature path for ultrahigh-pressure rocks. **Elements**, 9, 273-279.
- Tomlinson D.W., Copeland P., Murphy M.A., Lapen T.J., 2013, Oligocene shortening in the Little Burro Mountains of southwest New Mexico. **Rocky Mountain Geology**, v. 48, 169–183.
- Beard B.L., Ludois J.M., Lapen T.J., Johnson C.M., 2013, Pre-4.0 billion year weathering on Mars constrained by Rb-Sr geochronology on meteorite ALH 84001. **Earth and Planetary Science Letters**. 361, 173-182.
- Sanchez VI, Murphy MA, Robinson AC, Lapen TJ, Heizler MT, 2013, Tectonic evolution of the India-Asia suture zone since Middle Eocene time, Lopukangri area, south-central Tibet. **Journal of Asian Earth Sciences**. V. 62, 205-220. doi:10.1016/j.jseaes.2012.09.004
- Ahmad, I., Khan, S. D., Lapen, T., and Jehan, N., 2013, U-Pb zircon ages for the porphyritic microgranite of the Shewa-Shahbazgarhi Complex, district Mardan, North Pakistan. **Journal of Himalayan Earth Sciences** 46 (1), 13-18.
- Ahmad I, Khan S, Lapen TJ, Burke K, 2013, Isotopic ages for alkaline igneous rocks, including a 26 Ma ignimbrite, from the Peshawar Plain of northern Pakistan and their tectonic implications. **Journal of Asian Earth Sciences**. V. 62, 414-424. doi:/10.1016/j.jseaes.2012.10.025
- Shaulis B.J., Lapen T.J., Casey J.F., Reid D.R., 2012, Timing and rates of flysch sedimentation in the Stanley Group, Ouachita Mountains, Oklahoma and Arkansas, U.S.A.: Constraints from U-Pb zircon ages of subaqueous ash-flow tuffs. **Journal of Sedimentary Research – Current Ripples**. v. 82, 833-840. doi:10.2110/jsr.2012.68
- van Acken D., Brandon A.D., Lapen T.J., 2012, Highly siderophile element and osmium isotope evidence for post-core formation magmatic and impact processes on the aubrite parent body. **Meteoritics and Planetary Science**. V. 47, 1606-1623. doi:10.1111/j.1945-5100.2012.01425.x
- Peslier A.H., Woodland A.B., Bell D.R., Lazarov M., Lapen T.J., 2012, Metasomatic control of water contents in the Kaapvaal cratonic mantle. **Geochimica et Cosmochimica Acta**. 97, 213-246. doi:10.1016/j.gca.2012.08.028
- Robinson AC, Ducea M, Lapen TJ, 2012, Detrital Zircon and Isotopic Constraints on the Crustal Architecture and Tectonic Evolution of the Northeastern Pamir. **Tectonics**. **Tectonics**, V 31, doi:10.1029/2011TC003013
- Zhu Y, Bhattacharya JP, Li W, Lapen TJ, Jicha BR, Singer BS, 2012, Milankovitch-Scale Sequence Stratigraphy and Stepped Forced Regressions of the Turonian Ferron Notom Deltaic Complex, South-Central Utah, U.S.A **Journal of Sedimentary Research**, v. 82, 723-746.
- Copeland P., Murphy M.A., Dupre W.R., Lapen T.J., 2011, Oligocene deformation in southern New Mexico and its implications for Farallon plate geodynamics. **Geosphere**, 7, 1209-1219; doi: 10.1130/GES00672.1.
- Hui, H., Peslier, A.H., Lapen, T.J., Shafer, J.T., Brandon, A.D., Irving, A.J., 2011, Petrogenesis of basaltic shergottite Northwest Africa 5298: Closed system crystallization of an oxidized mafic melt. **Meteoritics and Planetary Science**, 46, 1313-1328; doi: 10.1111/j.1945-5100.2011.01231.x.

- Zhang R, Murphy MA, Lapen TJ, Sanchez V, Heizler M, 2011, Late Eocene crustal thickening followed by Early-Late Oligocene Extension along the India-Asia suture zone: Evidence for cyclicity in the Tibet-Himalayan orogen. **Geosphere**, 7, 1249-1268; doi: 10.1130/GES00643.1.
- Shaulis, B., Lapen, T.J., Toms, A., 2010, Signal linearity of an extended range pulse counting detector: Applications to accurate and precise U - Pb dating of zircon by laser ablation quadrupole ICP - MS, **Geochem. Geophys. Geosyst.**, 11, Q0AA11, doi:10.1029/2010GC003198.
- Shafer, J.T., Brandon, A.D., Lapen, T.J., Righter, M., Peslier, A.H., Beard, B.L., 2010, Trace element systematics and  $^{147}\text{Sm}$ - $^{143}\text{Nd}$  and  $^{176}\text{Lu}$ - $^{176}\text{Hf}$  ages of Larkman Nunatak 06319: Closed-system fractional crystallization of an enriched shergottite magma, **Geochimica et Cosmochimica Acta**, 74, 7307-7328, DOI: 10.1016/j.gca.2010.09.009.
- Peslier A.H., Hnatyshin D., Herd, C.D.K., Walton E.L., Brandon A.D., Lapen T.J., Shafer J.T., 2010, Crystallization, melt inclusion, and redox history of a new Martian meteorite: olivine phyric shergottite LAR 06319. **Geochimica et Cosmochimica Acta**. 74:4543-4576.
- Lapen T.J., Righter M., Brandon A.D., Debaille V., Beard B.L., Shafer J.T., and Peslier A.H., 2010, A younger age for ALH 84001 and its geochemical link to shergottite sources in Mars. **Science**, 328, 347 – 351. doi: 10.1126/science.1185395
- Skora, S, Lapen, TJ, Baumgartner, LP, Johnson, CM, Hellenbrand, E, and Mahlen, NJ., 2009, The duration of prograde garnet crystallization in the UHP eclogites at Lago di Cignana, Italy. **Earth Planet. Sci. Lett.** 287:402-411.
- Brandon, AD, Lapen, TJ, Debaille, V, Beard, BL, Rankenburg, K, and Neal, C., 2009, Re-evaluating  $^{142}\text{Nd}/^{144}\text{Nd}$  in Lunar Mare basalts with implications for the early evolution and bulk Sm/Nd of the Moon. **Geochim. Cosmochim. Acta** 73:6421-6445.
- Lapen, T.J., Medaris, L.G.Jr., Beard, B.L., Johnson, C.M., 2009, The Sandvik peridotite, Gurskøy, Norway: Three billion years of mantle evolution in the Baltica lithosphere. **Lithos**, doi:10.1016/j.lithos.2008.08.007.
- Skora, S., Baumgartner, L.P., Mahlen, N.J., Lapen, T.J., Bussy, F., 2008, Estimation of a maximum Lu diffusion rate in a natural eclogite garnet. **Swiss Journal of Geosciences**, DOI: 10.1007/s00015-008-1268-y.
- Chafetz, H.S., Wu, Z., Lapen, T.J., Milliken, K.L., 2008, Geochemistry of preserved Permian aragonitic cements in the tepees of the Guadalupe Mountains, West Texas and New Mexico, U.S.A.; **Journal Sedimentary Research**, 78, 187-198
- Mahlen, N.J., Beard, B.L., Johnson, C.M., Lapen, T.J., 2008, An investigation of dissolution methods for Lu-Hf and Sm-Nd isotope studies in zircon and garnet bearing whole rock samples. **Geochemistry, Geophysics, and Geosystems** (G3) 9, Q01002, doi:10.1029/2007GC001605
- Copeland, P., Watson, E.B., Urizar, S.C., Patterson, D., Lapen, T.J., 2007, Alpha thermochronology of carbonates I: Experimental data, **Geochimica et Cosmochimica Acta**, 71, 4488-4511.
- Kylander-Clark, A.R.C., Hacker, B.R., Johnson, C.M., Beard, B.L., Mahlen, N.J., Lapen, T.J., 2007, Coupled Lu-Hf and Sm-Nd geochronology constrains prograde and exhumation histories of high- and ultrahigh-pressure eclogites from western Norway. **Chemical Geology**, 242:137-154.
- Lapen, T.J., Johnson, C.M., Baumgartner, L.P., Dal Piaz, G.V., Skora, S., Beard, B.L., 2007, Coupling of oceanic and continental crust during Eocene eclogite facies metamorphism: Evidence from the Monte Rosa nappe, Western Alps, Italy. **Contributions to Mineralogy Petrology**, 153:139-157.
- Lapen, TJ, Medaris, LG Jr, Johnson, CM, and Beard, BL, 2005, Archean to Middle Proterozoic evolution of Baltica subcontinental lithosphere: evidence from combined Sm- Nd and Lu-Hf isotope analyses of the Sandvik ultramafic body, Norway. **Contrib. Mineral. Petrol.** 150:131-145.

- Brown, E.H., Lapen, T.J., Leckie, M.R., Silva, P.I., Verga, D., Singer, B.S., 2005, Revised ages of blueschist metamorphism and the youngest pre-thrusting rocks in the San Juan Islands, Washington. **Canadian Journal of Earth Sciences**, 42:1389-1400.
- Jicha, B.R., Singer, B., Brophy, J.G., Fournelle, J.H., Johnson, C.M., Beard, B.L., Lapen, T.J., and Mahlen, N.J., 2004, Variable impact of the subducted slab on Aleutian island arc magma sources: evidence from Sr, Nd, Pb, and Hf isotopes and trace element abundances. **Jour. Petrol.** 45:1845-1875.
- Lapen, T.J., Mahlen, N.J., Johnson, C.M., Beard, B.L., 2004, High precision Lu and Hf isotope analyses of both spiked and unspiked samples: A new approach, **Geochem Geophys Geosyst**, 5, Q01010, doi: 10.1029/2003GC000582
- Lapen, T.J., Johnson, C.M., Baumgartner, L.P., Mahlen, N.J., Beard, B.L., Amato, J.M., 2003, Burial rates during prograde metamorphism of an ultra-high pressure terrane: an example from Lago di Cignana, Western Alps, Italy, **Earth Planet Sci Lett**, 215, 57-72.
- Brown, E.H., Talbot, J.L., McClelland, W.C., Feltman, J.A., Lapen, T.J., Bennett, J.D., Hettinga, M.A., Troost, M.L., Alvarez, K.M., Calvert, A.T., 2000, Interplay of plutonism and regional deformation in an obliquely convergent arc, southern Coast Belt, British Columbia: **Tectonics**, vol. 19, no. 3, p. 493-511.

### ***Peer-reviewed Geologic Maps and other reports:***

- Lapen T.J., Cuthbert, S., Dobrzynetskaya, L., 2008, International Eclogite Field Symposium and Workshop of the Task Force IV, International Lithosphere Program; **Episodes**, v. 31, 1-3.
- Dragovich, J.D., Logan, R.L., Schasse, H.W., Walsh, T.J., Lingley, W.S. Jr., Norman, D.K., Gerstel, W.J., Lapen, T.J., Schuster, J.E., and Meyers, K.D., 2002, Geologic map of Washington. Northwest quadrant: **Washington Division of Geology and Earth Resources** Geologic Map GM-50, 72 p., 3 pl., scale 1:250,000.
- Loen, J.S., Lingley, W.S., Jr., Anderson, Garth, Lapen, T.J., 2001, Reconnaissance investigation of sand, gravel, and quarried bedrock resources in the Bellingham 1:100,000 quadrangle, Washington: **Washington Division of Geology and Earth Resources** Information Circular 91, 45 p., 1 plate.
- Lapen, T.J., 2000, Geologic map of the Bellingham 1:100,000-scale quadrangle, Washington: **Washington Division of Geology and Earth Resources** Open-File-Report 00-5, 35 p., 2 plates.
- Dragovich, J.D., Norman, D.K., Lapen, T.J., Anderson, G., 1999, Geologic map of the Sedro-Woolley North and Lyman 7.5-minute quadrangles, western Skagit County, Washington: **Washington Division of Geology and Earth Resources** Open-File-Report 99-3, 37 p., 4 plates.

### ***Funded Grant Proposals (since 8/2005):***

- **NASA – Emerging Worlds:** 17-EW17\_2-0124 - **\$408,969**. U-Th-Pb chronology of HED meteorites: Implications for the magmatic evolution and early thermal history of asteroid 4 Vesta. **PI: Thomas Lapen; Co-Is: Mark Schmitz, James Crowley.** 5/1/2018 – 4/30/2021.
- **NASA – Solar System Workings:** 16-SSW16\_2-0167 - **\$349,520**. The nature and timing of magmatism on Mars: A petrologic and Lu-Hf, Sm-Nd and Rb-Sr chronology and isotope tracer study of shergottites and nakhlites. **PI: Thomas Lapen; Co-I: Brian Beard.** 1/1/2018 – 12/31/2021.
- **American Chemical Society – Petroleum Research Fund:** PRF# 55770-ND2 - **\$110,000**. Uranium-Thorium-Lead Chronology of Source Rock Deposition and Diagenesis, an in Situ and Whole Rock Study of TOC-Rich Shales. **PI: Thomas Lapen.** 6/1/2015 – 5/31/2018

- **NASA Earth and Space Science Fellowship: \$60,000.** In situ investigations of Al-Mg isotopes in Type B1 CAIs. **Student: Andrew Kerekgyarto, Institutional PI: Thomas Lapen.** 9/1/2015 – 8/31/2017
- **NASA – Solar System Exploration Research Virtual Institute (SSERVI): \$185,177 - UH PI: Thomas Lapen.** 4/1/2014 – 3/30/2019,
- **NASA – Cosmochemistry: 11-COS11-0080 - \$60,000.** Age and Lu-Hf isotope investigations of eucrite and angrite meteorites: Constraints on excess  $^{176}\text{Hf}$  in early solar system materials. **PI: Thomas Lapen.** 8/1/2012 - 12/31/2013,
- **Shell Oil Company: \$54,105.** Provenance Systematics of Middle Cretaceous Sandstones, Western Canada Sedimentary Basin, Alberta, Canada – PI: Janok Bhattacharya, **Co-PI: Thomas Lapen.** 01/31/2012 – 01/30/2015. **(Lapen PI after Bhattacharya left UH)**
- **NASA – Mars Fundamental Research: 10-MFRP10-0101 - \$222,452.** Coupled Lu-Hf and Sm-Nd isotopic studies of Martian meteorites: constraints on crystallization ages and source compositions – **PI: Thomas Lapen, Co-PI: Rasmus Andreasen.** 3/23/2011 – 10/1/2014.
- **NSF – Petrology and Geochemistry: 1048583 - \$338,147.** Testing Models for Continental Growth and Melt-Rock Interaction from  $^{186}\text{Os}$ - $^{187}\text{Os}$ -Hf-Nd-Sr Isotopes in SW USA Mantle Xenoliths. **PI: Alan Brandon, Co-PI: Thomas Lapen.** 2/15/2011 – 2/14/2012.
- **NSF – Instrumentation and Facilities: 0947220 - \$181,578.** Acquisition of a Thermal Ionization Mass Spectrometer – **PI: Alan Brandon, Co-PI: Thomas Lapen.** 2/15/2011 – 2/14/2014.
- **NASA – Planetary Major Equipment: 09-COS09-0040 - \$181,578.** Acquisition of a Thermal Ionization Mass Spectrometer – **PI: Alan Brandon, Co-PI: Thomas Lapen.** 2/15/2011 – 2/14/2014
- **NASA Cosmochemistry (08-COS08-0064) - \$426,000.** Test of Hf isotope heterogeneity in the early solar system. 11/1/2008 – 10/31/2011 **PI – Thomas Lapen.**
- **State of Texas Advanced Research Program (003652-0140-2007-12) - \$125,000.** U-Pb age and Hf isotope composition of detrital zircons, Ouachita Orogenic Belt, Marathon Uplift, Texas. 8/1/2008 – 7/31/2011. **T.J. Lapen Sole PI.**
- **NSF/IF (0824967) - \$269,658.** Acquisition of a multiple-collector inductively-coupled plasma mass spectrometer, 11/2008 – 11/2009 (1 year extension); **PI – Thomas Lapen, Co-PIs John Casey, Jonathan Snow, Michael Murphy.**
- **NASA Lunar Science Institute - \$158,983 (awarded to Lapen).** Impact Processes in the Origin and Evolution of the Moon: New Sample-driven Perspectives. **PI – David Kring (Lunar and Planetary Science Institute), Co-PI - T.J. Lapen, among many, many others.**
- **NSF/OCE (0619857) - \$142,928 (UH portion).** Collaborative Research: Os, Nd, and Hf isotopes in abyssal peridotites of the Arctic Lena Trough: Continental lithospheric or Asthenospheric mantle origin? **PI – Jonathan Snow, Co-PI – Thomas Lapen (24 months, 5/2007 – 5/2009; extended)**
- **NSF/EAR (0711527) – \$299,829.** The Deformation History of the India-Asia Suture Zone, Lopukangri Rift, South-Central Tibet. **PI – Michael Murphy, Co-PI – Thomas Lapen, Co-PI – Alexander Robinson (36 months, 9/2007 – 9/2010)**
- **UH New faculty grants program - \$6,000.** What is the metamorphic history of the ultra-high pressure Dora Maira massif? A Lu-Hf, Sm-Nd, and trace element study of pyrope whiteschists from the Western Alps, Italy. **PI – Thomas Lapen (12 months, expired)**
- **UH Small grants program - \$3,000.** Method development for UPb analyses of single zircons by laser ablation inductively-coupled plasma mass spectrometry. **PI – Thomas Lapen (12 Months, expired)**
- **American Chemical Society PRF - \$35,000.** U-Pb age and Hf isotope compositions of detrital zircons from strata of the Ouachita Orogenic Belt, Arkansas, Oklahoma, and Texas. **PI – Thomas Lapen (24 months, 8/2006 – 8/2008; expired)**

- **UH GEAR – \$24,424.** Testing Models of Intercontinental Collision, South-Central Tibet. **PI – Michael Murphy, Co-PI – Thomas Lapen (12 months, 9/2007 – 9/2008; expired)**
- **UH Small grants - \$3,000.** Timing of high-pressure metamorphism in the western Alps. **PI - Lapen (4/2008-8/2008; expired)**

### ***Lab visitors and collaborators:***

The lab facilities have supported the research of several UH and external research groups. **University of Houston Faculty:** Rasmus Andreasen, Janok Bhattacharya, Alan Brandon, Kevin Burke, Jack Casey, Hank Chafetz, Shankar Chellam (Civil Engineering), Peter Copeland, Qi Fu, Yongjun Gao, Shuhab Khan, Michael Murphy, Alexander Robinson, Joel Saylor, Juan Silva-Tamayo (planned), Jinny Sisson, Jonathan Snow, Roy Weinstein (Physics).

**UH Students, Researchers, and Postdocs:** Ros Armytage, Nicholas Bartschi, Serdar Bektas, Ayse Bozlaker, Deborah Bradley, Steven Braun, Daniel Buechmann, Abigail Bufkin, Keith Carpenter, Xinyang Chen, Melissa Davidson, Jesse Dietderich, Carmen Dragoi, Thomas Gabel, Yongjun Gao, Adrain Gittens, Therica Grosshans, Daniel Imrecke, Ryan Jeffcoat, Jessica Jordan, Jeremy Kent, Andrew Kerekgyarto, David Konig, Shawn Larkin, Claire McLeod, Minako Righter, Veronica Sanchez, Carlos Sanchez, John Shafer, Barry Shaulis, Samuel Simmons, Kellen Springer, Michael Stevens, Kurt Sundell, Katherine Tilghmann, Donald Tomlinson, Shams Ul-Hadi, David van Acken, and Dustin Villareal.

**External Academic:** Brian Beard (UW-Madison), David Draper (NASA-JSC), Hejui Hui (LPI), Anthony Irving (Univ Washington), Matthew Izawa (Royal Ontario Museum), Clark Johnson (UW-Madison), Katherine Joy (Manchester), Michael Ketterer (Northern AZ Univ), Randy Korotev (Wash Univ), David Kring (LPI), Brian Majestic (Univ Denver), Naomi Matthews (Univ Stavanger), Brent Miller (A&M), Des Moser (Univ Western Ontario), Anne Peslier (NASA-JSC), Jennifer Rapp (NASA-JSC), Mark Reagan (Univ Iowa), Kevin Righter (NASA-JSC), Brad Rosenheim (Tulane/Univ South Florida), D. Kent Ross (NASA-JSC), Adam Sarafian (WHOI), Brad Singer (UW-Madison), Justin Simon (NASA-JSC), Kim Tait (Royal Ontario Museum), Axel Wittmann (Wash Univ), and Udo Zimmerman (Stavanger).

**External Industry:** Heidi Albrecht (Shell), Steve Bergman (Shell), Tim Diggs (Shell), Patrick Laine (Mercury Experts; proposed), Brett Lenz (Grant Co. WA PUD), Daniel Minisini (Shell), Syed Razavi (Tomson Technologies), and Peter Slater (Conoco-Phillips).

### ***Independently written press coverage of recent research:***

- Taylor, G. J. (May, 2017) Two Billion Years of Magmatism in One Place on Mars. *PSRD*, <http://www.psrhawaii.edu/May17/mars-magmatism.html>
- <http://www.houstonpublicmedia.org/articles/shows/uh-moment/2017/02/08/187011/uh-moment-studying-the-red-planet/>
- <http://www.popularmechanics.com/space/moon-mars/a25023/mars-volcanoes-two-billion-years/>
- <http://www.space.com/35528-mars-volcanoes-2-billion-years.html>
- <http://www.csmonitor.com/Science/Spacebound/2017/0202/What-do-Martian-meteorites-tell-us-about-volcanism-on-the-Red-Planet>
- <http://www.usatoday.com/story/tech/sciencefair/2017/02/06/s-lotta-lava-martian-volcano-erupted-2-billion-straight-years/97558702/>
- <http://www.seeker.com/volcanoes-mars-rocks-meteorite-geology-planets-history-olympus-mons-2231187733.html>
- <https://www.sciencenews.org/article/red-planets-interior-may-not-churn-much>
- <https://cosmosmagazine.com/geoscience/mars-was-volcanically-active-more-than-two-billion-years-ago>

- <http://www.smithsonianmag.com/smart-news/martian-volcano-may-have-continuously-erupted-billions-years-180962068/>
- <https://www.inverse.com/article/27193-mars-2-billion-volcanic-activity-meteorite>
- Taylor, G. J. (May, 2010) A Younger Age for the Oldest Martian Meteorite. Planetary Science Research Discoveries.  
<http://www.psr.d.hawaii.edu/May10/YoungerALH84001.html>
- Wayman, E (July, 2010) Oldest martian meteorite not quite so old. Earth, vol. 55, No. 7, 9.
- Brindley, L., (May 2010) Mars meteorite gets a boost of youth. Chemistry World, vol. 7, 24.  
<http://www.rsc.org/chemistryworld/News/2010/April/15041003.asp>
- Grossman, L., (May 2010) Famous Martian meteorite younger than thought. Science News, vol. 177, 10.  
[http://www.sciencenews.org/view/generic/id/58322/title/Famous\\_Martian\\_meteorite\\_younger\\_than\\_thought](http://www.sciencenews.org/view/generic/id/58322/title/Famous_Martian_meteorite_younger_than_thought)
- Thompson, A., (April 2010) Oldest Mars Meteorite Younger Than Thought. Space.com.  
<http://www.space.com/scienceastronomy/oldest-mars-meteorite-younger-100415.html>
- Staff writers, Martian meteorite younger than thought. CBC News, April 15, 2010.  
<http://www.cbc.ca/technology/story/2010/04/15/tech-mars-meteorite.html>

### Teaching

Below are instructor evaluation data summarized for the courses taught to date. Values for 'excellent' to 'poor' are percent of total responses.

*Overall assessment of instructor: Entries for "The instructor is an effective teacher"*

Semester/ year	Course	Enrollment	Responses	Excellent	V. Good	Good	Fair	Poor	Average score out of 5	
Fall 2005	Rocks and Minerals	34	24	45.8	45.8	0.0	4.2	4.2	4.25	major
Spring 2006	Petrogenesis	16	14	71.4	21.4	0.0	0.0	7.1	4.50	major
Fall 2006	Mineralogy	53	37	54.1	32.4	8.1	2.7	2.7	4.32	major
Spring 2007	Physical Geology	106	82	15.9	32.9	29.3	13.4	8.5	3.34	non-major
Spring 2007	Metamorphic Petrology	7	7	83.0	17.0	0.0	0.0	0.0	4.83	grad
Fall 2007	Igneous and Meta. Pet.	31	29	66.0	31.0	0.0	0.0	3.0	4.55	major
Spring 2008	Physical Geology	31	23	52.2	26.1	13.0	4.3	4.3	4.17	non-major
Fall 2008	Mineralogy	84	47	36.2	27.7	34.0	0.0	2.1	3.96	major
Spring 2009	Physical Geology	51	41	39.0	26.8	26.8	4.9	2.4	3.95	non-major
Spring 2009	Metamorphic Petrology	5	5	100.0	0.0	0.0	0.0	0.0	5.00	grad
Fall 2009	Igneous and Meta. Pet.	46	44	54.5	27.3	18.2	0.0	0.0	4.36	major
Fall 2010	Mineralogy	85	49	63.3	28.6	8.2	0.0	0.0	4.55	major
Spring 2011	Metamorphic Petrology	8	8	87.5	12.5	0.0	0.0	0.0	4.88	grad
Fall 2011	Igneous and Meta. Pet.	52	38	65.8	28.9	5.3	0.0	0.0	4.61	major
Spring 2012	Physical Geology	128	120	27.5	40.8	28.3	1.7	1.7	3.91	non-major
Fall 2012	Mineralogy	130	115	59.1	29.6	10.4	0.9	0.0	4.47	major
Spring 2013	Physical Geology	175	168	34.5	38.1	25.0	1.2	1.2	4.04	non-major
Fall 2013	Igneous and Meta. Pet.	58	57	66.7	28.1	5.3	0.0	0.0	4.61	major
Spring 2014	Physical Geology	90	78	58.4	33.8	5.2	2.6	0.0	4.50	non-major
Fall 2014	Mineralogy	196	128	52.3	41.4	4.7	0.0	1.6	4.40	major
Spring 2015	Metamorphic Petrology	10	8	75.0	25.0	0.0	0.0	0.0	4.80	grad
Fall 2015	Igneous and Meta. Pet.	60	40	70.0	17.5	12.5	0.0	0.0	4.60	major
Spring 2016	Geologic Field Methods	75	57	66.7	29.8	3.5	0.0	0.0	4.60	major
Fall 2016	Rocks and Minerals	26	23	78.3	17.4	4.3	0.0	0.0	4.70	major
Average for courses required by Geo majors				66.4	25.6	6.4	0.4	1.2	4.56	
									Department average	4.02

### Courses Taught

- GEOL 1330 Physical Geology
- GEOL 3325 Rocks and Minerals
- GEOL 3335 Petrogenesis
- GEOL 3370 Mineralogy
- GEOL 3340 Geological Field Methods
- GEOL 3373 Igneous and Metamorphic Petrogenesis
- GEOL 3360 Field Geology (Field Camp)
- GEOL 6397 Metamorphic petrology
- GEOL 6397 Planetary Materials



**New courses developed or heavily revised:**

- GEOL 6397 Metamorphic petrology (NEW)
- GEOL 6397 Planetary Materials (NEW)
- GEOL 3373 Igneous and Metamorphic Petrology (REVISED)
- GEOL 3325 Rocks and Minerals (REVISED)

**Post-Doctoral Researchers advised since 2005:**

- Dr. Minako Righter (2007-2009; presently 0.5-time lab manager for Lapen's isotope geochemistry lab)
- Xinyang Chen (9/2016 – 8/2017; Now at U. Washington)

**Graduate students (Lapen as main advisor):**

- Barry Shaulis (MS 2010; PhD 2012; Post-Doctoral Researcher at the Lunar and Planetary Institute, Houston, TX)
  - **MS:** *Provenance of detrital zircons from the Ouachita Mountains of Oklahoma and Arkansas, USA*
  - **PhD:** *Terrestrial and cosmochemical applications of U-Pb zircon, baddeleyite, and phosphate chronology*
- Kellen Springer (MS 2010; Pacific Northwest National Laboratory, Richland, WA USA)
  - **MS:** *Sm-Nd geochronology of the Zermatt-Saas ophiolite, St. Marcel, Italy*
- Jesse Dietderich (MS 2012; Shell Oil Company)
  - **MS:** *Isotope systematics of the eucrite Jonzac*
- Samuel Simmons (MS 2012; Statoil)
  - **MS:** *Lu-Hf and Sm-Nd systematics of Apollo 17 sample 78236: Ages, evolution, and investigations into the neutron fluence correction on the Lu-Hf system*
- Daniel Buechmann (MS 2012; Statoil)
  - **MS:** *Provenance, detrital zircon U-Pb geochronology, and tectonic significance of middle Cretaceous sandstones from the Alberta Foreland Basin*
- Therica Grosshans (MS 2013; EOG Resources)
  - **MS:** *Lu-Hf and Sm-Nd ages and source compositions for depleted shergottite Tissint*
- Katherine Tilghman (MS 2014; Bureau of Ocean Energy Management)
  - **MS:** *Constraining the age of metamorphism in the Dora Maira, Western Alps: Implications of U-Th-Pb ages and REE concentrations in phosphates*
- Shawn Larkin (MS 2015; TBD)
  - **MS:** *Geochemical characterization and "sourcing" of chalcedony artifacts from the Beezley chalcedony, Roza Member, Columbia River Basalt Group, Washington*
- Curtis Calva (**MS**, In Progress)
- Stephanie Suarez (**MS**; In progress)
- Debbie Bradley (**PhD**; In Progress)
- Carlos Andrade (**PhD**; In Progress)
- Joanna Hogancamp (**PhD**; In Progress)

**Undergraduate researchers who worked in Lapen's lab (\* Current student):**

- Samuel Simmons
- Therica Grosshans
- Calvin Silver
- Antonio Sierra
- Daniella Carpio
- Charis Hall
- Darshan Ghandi

- Alicia Staszyc
- Elizabeth Thompson
- \*Ane Slabic (**Honor's Thesis**)
- \*Tyler Tanner
- Devin McQuaig
- Christian Martinez

**PhD students on whose committees Lapen served (\* Current student):**

- Ran Zhang (Geosciences)
- Xinyang Chen (Geosciences) – **Lapen Co-Advisor**
- Pranav Kulkarni (Civil and Environmental Engineering)
- Divagar Lakshmanan (Civil and Environmental Engineering)
- Shams ul-Hadi (Geosciences)
- Sergio Sarmiento (Geosciences)
- Veronica Sanchez (Geosciences)
- Daniel Imrecke (Geosciences)
- Kurt Sundell (Geosciences)
- \*Tyson Smith (Geosciences)
- \*Trey Lobpries (Geosciences)

**MS students on whose committees Lapen served:**

- Sepani Chandima Wickramasinghe (Chemistry)
- Carmen Barzoi (Geosciences)
- Adrian Gittens (Geosciences)
- Raul Benavidez (Geosciences)
- Jeremy Kent (Geosciences)
- Steven Braun (Geosciences)
- Kimberly Mead (Geosciences)
- Jeremy Krimmel (Geosciences)
- Jennifer Campo (Geosciences)
- Nick Bartschi (Geosciences)

## *Service*

**Committees (past and present):**

*In the Department*

- Associate Chair, EAS Department (09/2016 – 09/2018)
- Geology Graduate Advisor (01/2012 – 08/2016)
- Geology Ph.D. Candidacy Examination Committee
- Geophysics Ph.D. Candidacy Examination Committee
- Scholarship and Awards Committee
- Structural Geology, Stable Isotope, and Isotope Geochemistry Search Committees
- Ph.D. Placement Examination Committee
- Material Committee
- Personnel Committee
- Merit and yearly review committee

*In the College/University*

- Faculty Senate – Graduate Studies Committee

- NSM Graduate Studies Committee
- Member of the NSM Research Strategic Planning Committee Meeting
- Member of the College of Natural Sciences and Mathematics Faculty Leave Committee
- Member of the College of Natural Sciences and Mathematics Awards Committee
- Steering committee member of the Rice University-University of Houston Alliances for Graduate Education and the Professoriate (AGEP)

***Outside of the University***

- NASA panel member (2010, 2011, 2012, 2017, 2018)
- 44<sup>th</sup> Lunar and Planetary Science Conference Committee
- 45<sup>th</sup> Lunar and Planetary Science Conference Committee
- 46<sup>th</sup> Lunar and Planetary Science Conference Committee
- 47<sup>th</sup> Lunar and Planetary Science Conference Committee

**Journal article reviewer**

- *Earth and Planetary Science Letters*
- *Journal of Maps*
- *Journal of Petrology*
- *Chemical Geology*
- *Geochimica et Cosmochimica Acta*
- *Contributions Mineralogy and Petrology*
- *Lithos*
- *Journal of Metamorphic Petrology*
- *G-Cubed*
- *Elements*
- *Astrophysical Journal*
- *Nature*

**Research proposal reviewer**

- NSF Instrumentation and Facilities
- NSF Tectonics
- NSF Petrology and Geochemistry
- NASA Cosmochemistry
- NASA Mars Fundamental Research
- Swiss NSF
- Austrian NSF