

## Sean Patrick Long

Associate professor, School of the Environment, Washington State University

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### **Education:**

Ph.D., Geology	Princeton University, 2010
M.S., Geology	Idaho State University, 2004
B.S., Mathematics	The College of Idaho, 2001

### **Google Scholar citation indices** (as of 8-17-18):

**Total citations:** **1012** (829 since 2013)

**h-index:** **15** (15 since 2013)

**i10-index:** **21** (21 since 2013)

### **Publications:** (*asterisk denotes graduate student advisee author*)

Calle, A.Z., Horton, B.K., Limachi, R., Stockli, D.F., Uzeda-Orellana, G.V., Anderson, R.B.\*, and **Long, S.P.**, in press, Cenozoic provenance and depositional record of the Subandean foreland basin during growth of the central Andean fold-thrust belt, southern Bolivia, *in* Zamora, G., McClay, K., and Ramos, V., Petroleum Basins and Hydrocarbon Potential of the Andes of Peru and Bolivia: American Association of Geologists Memoir 117: accepted 5-23-17.

Anderson, R.B.\*, **Long, S.P.**, Horton, B.K., Thomson, S.N., Calle, A.Z., and Stockli, D.F., 2018, Orogenic wedge evolution of the central Andes, Bolivia (21°S): Implications for Cordilleran cyclicity: *Tectonics*, accepted 8-16-18.

**Long, S.P.**, 2018, Geometry and magnitude of extension in the Basin and Range Province (39°N), California, Nevada, and Utah, U.S.A: Constraints from a province-scale cross section: *Geological Society of America Bulletin*, doi: 10.1130/B31974.1, published online 8-15-18.

**Long, S.P.**, Gordon, S.M., and Soignard, E., 2017, Distributed north-vergent shear and flattening through Greater and Tethyan Himalayan rocks: insights from metamorphic and strain data from the Dang Chu region, central Bhutan: *Lithosphere*, v. 9, p. 774-795, doi: 10.1130/L655.1.

Anderson, R.B.\*, Long, S.P., Horton, B.K., Calle, A.Z., and Ramirez, V., 2017, Shortening and structural architecture of the Andean fold-thrust belt of southern Bolivia (21°S): Implications for kinematic development and crustal thickening of the central Andes: *Geosphere*, v. 13, p. 538-558, doi: 10.1130/GES01433.1.

**Long, S.P.**, Gordon, S.M., Young, J.P., and Soignard, E., 2016, Temperature and strain gradients through Lesser Himalayan rocks and across the Main Central thrust, south-central Bhutan: implications for transport-parallel stretching and inverted metamorphism: *Tectonics*, v. 35, p. 1863-1891, doi: 10.1002/2016TC004242.

- Agustsson, K.M., Gordon, S.M., **Long, S.P.**, Seward, G.G.E., Zeiger, K., and Penfold, M.\*, 2016, Pressure–temperature–structural distance relationships within Greater Himalayan rocks in eastern Bhutan: implications for emplacement models: *Journal of Metamorphic Geology*, v. 34, p. 641-662, doi: 10.1111/jmg.12197.
- Long, S.P.**, and Soignard, E., 2016, Shallow-crustal metamorphism during Late Cretaceous anatexis in the Sevier hinterland plateau: peak temperature conditions from the Grant Range, eastern Nevada, U.S.A.: *Lithosphere*, v. 8, p. 150-164, doi: 10.1130/L501.1.
- Long, S.P.**, and Walker, J.P., 2015, Geometry and kinematics of the Grant Range brittle detachment system, eastern Nevada, U.S.A.: an end-member style of upper-crustal extension: *Tectonics*, v. 34, p. 1837-1862, doi: 10.1002/2015TC003918.
- Zeiger, K., Gordon, S.M., **Long, S.P.**, Kylander-Clark, A.R.C., Agustsson, K., and Penfold, M.\*, 2015, Timing and conditions of metamorphism and melt crystallization in Greater Himalayan rocks, eastern and central Bhutan: insight from U-Pb zircon and monazite geochronology and trace-element analyses: *Contributions to Mineralogy and Petrology*, v. 169, article 47, 19 p., doi: 10.1007/s00410-015-1143-6.
- Di Fiori, R.V.\*, **Long, S.P.**, Muntean, J.L., and Edmondo, G.P., 2015, Structural analysis of gold mineralization in the southern Eureka mining district, Nevada: a predictive structural setting for Carlin-type gold deposits: *in* Pennell, W.M., and Garside, L.J., eds., *New Concepts and Discoveries: Geological Society of Nevada Symposium Proceedings, May 2015, Sparks, Nevada*, v. 1, p. 885-903.
- Long, S.P.**, Thomson, S.N., Reiners, P.W., and Di Fiori, R.V.\*, 2015, Synorogenic extension localized by upper-crustal thickening: an example from the Late Cretaceous Nevadaplano: *Geology*, v. 43, p. 351-354, doi:10.1130/G36431.1.
- Long, S.P.**, 2015, An upper-crustal fold province in the hinterland of the Sevier orogenic belt, eastern Nevada, U.S.A.: a Cordilleran Valley and Ridge in the Basin and Range: *Geosphere*, v. 11, p. 404-424, doi:10.1130/GES01102.1.
- Long, S.P.**, Henry, C.D., Muntean, J.L., Edmondo, G.P., and Thomas, R.D., 2014, Geologic map of the southern part of the Eureka mining district, and surrounding areas of the Fish Creek Range, Mountain Boy Range, and Diamond Mountains, Eureka and White Pine Counties, Nevada: Nevada Bureau of Mines and Geology Map 183, 1:24,000-scale, 2 plates, 36 p. (3 peer reviews)
- Di Fiori, R.V.\*, **Long, S.P.**, Edmondo, G.P., and Muntean, J.L., 2014, Preliminary geologic and alteration maps of Lookout Mountain, Ratto Ridge, and Rocky Canyon, southern Eureka mining district, Eureka County, Nevada: Nevada Bureau of Mines and Geology Open-File Report 14-8, 1:10,000-scale, 2 plates.
- Long, S.P.**, 2014, Preliminary geologic map of Heath Canyon, central Grant Range, Nye County, Nevada: Nevada Bureau of Mines and Geology Open-File Report 14-6, 1:24,000-scale, 1 plate, 4 p.
- Long, S.P.**, Henry, C.D., Muntean, J.L., Edmondo, G.P., and Cassel, E.J., 2014, Early Cretaceous construction of a structural culmination, Eureka, Nevada, U.S.A.: implications for out-of-sequence deformation in the Sevier hinterland: *Geosphere*, v. 10, p. 505-553, doi: 10.1130/GES00997.1.
- McQuarrie, N., Tobgay, T., **Long, S.P.**, Reiners, P.W., and Cosca, M.A., 2013, Variable

- exhumation rates and variable displacement rates: documenting a recent slowing of Himalayan shortening in western Bhutan: *Earth and Planetary Science Letters*, v. 385, p. 161-174, doi:10.1016/j.epsl.2013.10.045.
- McQuarrie, N., **Long, S.P.**, Tobgay, T., Nesbit, J.N., Gehrels, G., and Ducea, M., 2013, Documenting basin scale, geometry and provenance through detrital geochemical data: lessons from the Neoproterozoic to Ordovician Lesser, Greater, and Tethyan Himalayan strata of Bhutan: *Gondwana Research*, v. 23, p. 1491-1510, doi:10.1016/j.gr.2012.09.002.
- Long, S.P.**, McQuarrie, N., Tobgay, T., Coutand, I., Cooper, F.J., Reiners, P.W., Wartho, J., and Hodges, K.V., 2012, Variable shortening rates in the eastern Himalayan thrust belt, Bhutan: insights from multiple thermochronologic and geochronologic datasets tied to kinematic reconstructions: *Tectonics*, v. 31, TC5004, 23 p., doi:10.1029/2012TC003155.
- Long, S.P.**, 2012, Magnitudes and spatial patterns of erosional exhumation in the Sevier hinterland, eastern Nevada and western Utah, USA: Insights from a Paleogene paleogeologic map: *Geosphere*, v. 8, p. 881-901, doi: 10.1130/GES00783.1.
- Lewis, R., Link, P.K., Stanford, L., and **Long, S.**, 2012, Geologic Map of Idaho: Idaho Geological Survey Map 9, 1:750,000-scale, 1 plate, 18 p. (6 peer reviews)
- Corrie, S.L., Kohn, M.J., McQuarrie, N., and **Long, S.P.**, 2012, Flattening the Bhutan Himalaya: *Earth and Planetary Science Letters*, v. 349-350, p. 67-74, doi: 10.1016/j.epsl.2012.07.001.
- Tobgay, T., McQuarrie, N., **Long, S.**, Kohn, M., and Corrie, S., 2012, The age and rate of displacement along the Main Central thrust in the western Bhutan Himalaya: *Earth and Planetary Science Letters*, v. 319-320, p. 146-158, doi: 10.1016/j.epsl.2011.12.005.
- Long, S.P.**, McQuarrie, N., Tobgay, T., Grujic, D., and Hollister, L., 2011, Geologic map of Bhutan: *The Journal of Maps*, v2011, p. 184-192, 1:500,000-scale, doi:10.4113/jom.2011.1159. (3 peer reviews)
- Long, S.**, McQuarrie, N., Tobgay, T., and Hawthorne, J., 2011, Quantifying internal strain and deformation temperature in the eastern Himalaya: Implications for the evolution of strain in thrust sheets: *Journal of Structural Geology*, v. 32, p. 579-608, doi:10.1016/j.jsg.2010.12.011.
- Long, S.**, McQuarrie, N., Tobgay, T., and Grujic, D., 2011, Geometry and crustal shortening of the Himalayan fold-thrust belt, eastern and central Bhutan: *Geological Society of America Bulletin*, v. 123, p. 1427-1447, doi:10.1130/B30203.1.
- Long, S.**, McQuarrie, N., Tobgay, T., Rose, C., Gehrels, G., and Grujic, D., 2011, Tectonostratigraphy of the Lesser Himalaya of Bhutan: Implications for the along-strike stratigraphic continuity of the northern Indian margin: *Geological Society of America Bulletin*, v. 123, p. 1406-1426, doi:10.1130/B30202.1.
- Tobgay, T., **Long, S.**, McQuarrie, N., Ducea, M., and Gehrels, G., 2010, Using isotopic and chronologic data to fingerprint strata: the challenges and benefits of variable sources to tectonic interpretations, the Paro Formation, Bhutan Himalaya: *Tectonics*, v. 29, TC6023, doi:10.1029/2009TC002637.
- Long, S.**, and McQuarrie, N., 2010, Placing limits on channel flow: insights from the Bhutan Himalaya: *Earth and Planetary Science Letters*, v. 290, p. 375-390, doi:10.1016/j.epsl.2009.12.033.

- McQuarrie, N.M., Robinson, D., **Long, S.**, Tobgay, T., Grujic, D., Gehrels, G., and Ducea, M., 2008, Preliminary stratigraphic and structural architecture of Bhutan: Implications for the along strike architecture of the Himalayan system: *Earth and Planetary Science Letters*, v. 272, p. 105-117, doi:10.1016/j.epsl.2008.04.030.
- Long, S.P.**, and Link, P.K., 2007, Geologic Map Compilation of the Malad City 30' x 60' Minute Quadrangle, Idaho: Idaho Geological Survey Technical Report T-07-1, 1:100,000-scale.
- Long, S.P.**, Link, P.K., Janecke, S.U., Perkins, M.E., and Fanning, C.M., 2006, Multiple phases of Tertiary extension and synextensional deposition of the Miocene-Pliocene Salt Lake Formation in an evolving supradetachment basin, Malad Range, Southeast Idaho, U.S.A.: *Rocky Mountain Geology*, v. 41, no. 1, p. 1-27, doi:10.2113/gsrocky.41.1.1.
- Rodgers, D.W., **Long, S.P.**, McQuarrie, N., Burgel, W.D., and Hersley, C.F., 2006, Geologic Map of the Inkom Quadrangle, Bannock County, Idaho: Idaho Geological Survey Technical Report T-06-2, 1:24,000-scale.
- Steely, A.N., Janecke, S.U., **Long, S.P.**, Carney, S.J., Oaks, R.Q., Langenheim, V.E., and Link, P.K., 2005, Evolution of a late Cenozoic supradetachment basin above a flat-on-flat detachment with a folded lateral ramp, SE Idaho, *in* Pederson, J., and Dehler, C.M., eds., *Interior Western United States: Geological Society of America Field Guide 6*, p. 169-198, doi:10.1130/2005.fld006(08). (1 peer review)
- Long, S.P.**, Link, P.K., Janecke, S.U., and Rodgers, D.W., 2004, Geologic map of the Henderson Creek quadrangle, Oneida County, Idaho: Idaho Geological Survey Technical Report T-04-3, 1:24,000-scale.

**Invited talks:**

- 2018: National Association of Geoscience Teachers Structural Geology and Tectonics Forum
- 2017: Washington State University  
Geological Society of American annual meeting (2 talks)
- 2016: University of Nevada, Las Vegas  
Central Washington University
- 2015: Utah State University  
Washington State University  
Geological Society of Nevada 2015 Symposium  
Nevada Petroleum and Geothermal Society
- 2014: Bhutan Department of Geology and Mines  
University of Texas, Austin
- 2013: University of Arizona (2 talks)  
University of California, Berkeley  
University of California, Davis  
Nevada Petroleum and Geothermal Society
- 2012: California Institute of Technology  
University of Nevada, Reno  
Bhutan Department of Geology and Mines
- 2011: University of Nevada, Las Vegas  
University of Nevada, Reno

Idaho State University  
Boise State University  
2010: Nevada Petroleum Society

**Funding awarded:**

- 2017 - \$17,127 – USGS EdMap program, agreement no. G17AC00130, “Structural analysis of the McClure Spring syncline, Pancake Range, Nevada: characterizing the style and timing of contractional deformation in the Sevier hinterland.” **(PI)**
- 2016 - \$596,788 – NSF MRI, EAR-1626670, “Acquisition of a laser-ablation, multi-collector ICP-MS for research and training in Earth, Environmental, and Anthropological Sciences.” **(co-PI)**
- 2015 - \$117,000 – NSF Tectonics, EAR-1524765, “Collaborative Research: The record of Early Cretaceous growth of the Nevadaplano from syn-orogenic deposits of the Sevier hinterland” **(PI)**
- 2014 - \$15,068 – Makoil, Inc., “Analysis of the thermal history of the central Grant Range: testing models for development of Railroad Valley petroleum systems” **(PI)**
- 2013 - \$39,216 - USGS Statemap, “Northern Grant Range mapping project: evaluating structural models for the Grant Canyon and Bacon Flat oil fields” **(PI)**
- 2013 - \$123,000 - NSF Tectonics, EAR-1250510, “Collaborative Research: Thrust belt response to rapid surface uplift of the Altiplano: A field test of Cordilleran cyclicity in southern Bolivia” **(PI)**
- 2012 - \$46,000 – Timberline Resources Corporation, “Focused geologic mapping and structural analysis in the southern Eureka mining district: testing structural models of mineralization” **(PI)**
- 2012 - \$392,960 – NSF Tectonics, EAR-1220300, “Did channel flow drive the thermo-mechanical evolution of the eastern Himalaya? A field-based test in northeast Bhutan” **(PI)**
- 2012 - \$14,317 – University of Nevada, Reno, College of Science; funds for mineral separation equipment. **(PI)**
- 2011 - \$61,213 – USGS Statemap, “South Eureka mining district mapping project: understanding connections between tectonics, magmatism, and gold deposits” **(PI)**
- 2011 - \$45,000 - Timberline Resources Corporation, “Geologic framework of the southern Eureka mining district” **(PI)**
- 2009 - \$2,310 – GSA graduate student research grant, “Convergence partitioning in the eastern Himalaya: the role of the Bhutan fold-thrust belt” **(PI)**

**Teaching:** 26 semesters

**Washington State University:** associate professor

- Summer 2019: SOE 408 – Field Geology (3 credits)  
Spring 2019: SOE 210 – Earth’s History and Evolution (4 credits)  
Fall 2018: SOE 542 – Extensional Tectonics (3 credits)  
Summer 2018: GEOL 408 – Field Geology (3 credits)  
Spring 2018: GEOL 340 – Structural Geology (4 credits)  
Summer 2017: GEOL 408 – Field Geology (3 credits)  
Spring 2017: GEOL 340 – Structural Geology (4 credits)  
GEOL 498/598 – Geology Seminar (1 credit)

Fall 2016: GEOL 541 – Orogenic Systems (3 credits)

Spring 2016: GEOL 340 – Structural Geology (4 credits)

**University of Nevada, Reno:** assistant professor

Summer 2015: GEOL 451 - Summer Field Camp (6 credits) – served as Director

Summer 2014: GEOL 451 - Summer Field Camp (6 credits) – served as Director

Summer 2013: GEOL 451 - Summer Field Camp (6 credits) – served as Director

Summer 2012: GEOL 451 - Summer Field Camp (3 credits)

Spring 2012: GEOL 701A - Balanced Cross-Sections (2 credits)

Fall 2011: GEOL 731 - Orogenic Systems (3 credits)

**Princeton University:** teaching assistant during Ph.D.

Fall 2009: ENV 399 – Environmental Decision Making TA (1 credit)

ENV 499 – Environmental Change, Poverty and Conflict TA (1 credit)

Spring 2009: GEO 210 – Earthquakes, Volcanoes, and Other Hazards lab (2 credits)

Spring 2008: GEO 210 – Earthquakes, Volcanoes, and Other Hazards lab (1 credit)

Fall 2007: GEO 235 – The Physical Earth laboratory (1 credit)

**Idaho State University:** adjunct instructor

Spring 2006: GEOL 1101 – Physical Geology (3 credits)

GEOL 1100 – Geology and Human Affairs (3 credits)

GEOL g4409 – Remote Sensing laboratory (1 credit)

Fall 2005: GEOL 1101 – Physical Geology (3 credits)

GEOL 1110 – Physical Geology laboratory (2 credits)

GEOL g4402 – Geomorphology laboratory (1 credit)

Summer 2005: GEOL 1100 – Geology and Human Affairs (3 credits)

**Idaho State University:** teaching assistant during M.S.

Spring 2004: GEOL 1110 – Physical Geology laboratory (1 credit)

GEOL 4421 – Structural Geology laboratory (1 credit)

Spring 2003: GEOL 1110 – Physical Geology laboratory (2 credits)

GEOL 4421 – Structural Geology laboratory (1 credit)

Fall 2002: GEOL 1110 – Physical Geology laboratory (3 credits)

**University of Idaho:** teaching assistant during undergraduate work:

Spring 2002: GEOL 101L - Physical Geology laboratory (2 credits)

#### **Graduate students:**

2018-: Nolan Blackford (WSU, Ph.D. in progress)

2016-: Jesslyn Starnes (WSU, Ph.D. in progress)

2016-: Russell Di Fiori (WSU, Ph.D. in progress)

2015-2018: Laura Pianowski (co-advised) (WSU; M.S.)

2013-: Ryan Anderson (WSU, Ph.D. in progress)

2012-2014: Melissa Penfold (UNR, M.S.)

2012-2014: Russell DiFiori (UNR, M.S.)

#### **Undergraduate thesis students:**

2018-: Kimberly Kramer (WSU)

2017-2018: Connor Mullady (WSU)

2016-2017: Austin Stout (WSU)

#### **Service:**

**M.S. and Ph.D. committees:** 19 total between 2010 and present

WSU (2015-present): Daniel Gurganus, Alex Johnson, Clay McDonie, Da Wang, Austin Green, Gilbert Ching, Chris Brown, Ross Salerno

UNR (2010-2016): Jonathan Payne, Jack Rigsbee, Gwen Linde, Kyle Gray, Kate Zeiger, Kenjo Agustsson, Carolina Zamora

Boise State University: (2014-2017): Jesse Walters, Shaina Cohen

University of Idaho (2016-present): Andrew Canada

University of Alabama (2016-2017): Somiddho Bosu

**Journal editing:**

2015-: Associate Editor, AGU journal *Tectonics*

**Other committees:**

2018-: Washington Geological Survey STATEMAP advisory committee

2018: WSU SoE microprobe technician search committee

2017-2018: WSU SoE geology revitalization committee (chair)

2016-: Idaho Geological Survey geological mapping advisory committee

2016-2017: WSU, SoE geology revitalization committee

2015-2016: WSU, SoE undergraduate studies committee

2015: NBMG neotectonics faculty search committee

2015: Co-chair “Regional Geology,” session, Geological Society of Nevada Symposium

2014: Co-chair “Mesozoic Paleogeography of the North American Cordillera” session, Joint Rocky Mountain/Cordilleran GSA meeting

2014: NBMG economic geology faculty search committee

2013-2014: UNR College of Science instrumentation committee

2013-2015: Director, UNR Summer Field Camp

2012-2013: UNR Geology department geological engineering faculty search committee

2012-2013: NBMG personnel committee

2011-2012: UNR Geology department geological engineering faculty committee

2011-2012: NBMG personnel committee

**Journal reviews** (2011-present): Geology, GSA Bulletin, Tectonics, Earth and Planetary Science Letters, Geosphere, G-Cubed, Journal of Structural Geology, Palaeogeography-Palaeoclimatology-Palaeoecology, Gondwana Research, Precambrian Research, International Journal of Earth Sciences, GSA Field Trip Guides, Terra Nova, Rocky Mountain Geology, The Journal of Maps, Geological Society of Nevada

**Proposal reviews** (2011-present): NSF Tectonics, NSF Geophysics, ACS-Petroleum Research Fund, Graduate Women in Science