

# Nathan A. Toké

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Department of Earth Science  
Utah Valley University  
800 W. University Parkway  
Orem, Utah 84058

[Nathan.toke@uvu.edu](mailto:Nathan.toke@uvu.edu)  
<http://www.uvu.edu/profpages/nathantoke>  
Office: Pope Science Room 221. (801)-863-8117  
Cell Phone: (480)-268-5129

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## Education

Arizona State University

Ph.D. Geological Sciences, 2011, advised by J Ramón Arrowsmith, “Earthquake Geology, Hazard and Social Vulnerability along the San Andreas Fault.”

Universidad De Granada, Spain, spring 2008

Visiting Graduate Student, Sponsoring Faculty: Antonio Azor, Departamento de Geodinamica

Arizona State University

M.S. Geological Sciences, 2005, advised by J Ramón Arrowsmith, “Paleoseismology, Slip Budget, and Fault Behavior along the Parkfield segment of the San Andreas Fault.”

University of Vermont

B.S. Geology (Cum Laude), 2003, Advised by Paul Bierman.

“Compacted green space and effects on storm water hydrogeology in Burlington, Vermont.”

## Academic Employment

Associate Professor, Dept. of Earth Science, Utah Valley University, July 1<sup>st</sup> 2017 –

Assistant Professor, Dept. of Earth Science, Utah Valley University, (2011 –2017)

NSF/ASU GK-12 Education Fellow, Peoria, AZ School District, (2010-2011)

NSF IGERT in Urban Ecology Fellow, ASU School of Sustainability (2006-2010)

## Honors and Awards

Dean’s Award for Excellence in Scholarship, UVU College of Science and Health, 2014-2015

NSF GK-12 Fellowship, Arizona State University 2010-2011

NSF IGERT Fellowship in Urban Ecology, Arizona State University 2006-2010

GSA Diversity Scholarship, 2009

Troy L. Péwé Award for Quaternary Geology, Arizona State University, 2006

John Dewey Scholar, University of Vermont, 1999-2003

Vermont Scholars Award, University of Vermont, 1999-2003

NSF-Research Experience for Undergraduates, Plattsburgh State University 2002

Most Outstanding ALANA student, University of Vermont, 2001 and 2002

Salutatorian, People’s Academy High School – Morrisville, Vermont, May 1999

## Professional Memberships

AAG American Association of Geographers: Since 2016

AEG *American Association of Environmental and Engineering Geologists: Active in 2011-2012*

AGU American Geophysical Union: Since 2004

AHS *Arizona Hydrological Society: Active in 2009-2010*

EGU *European Geosciences Union: Active in 2008*

GSA Geological Society of America: Since 2001

NAGT National Association of Geoscience Teachers: Since 2010

UQFPWG Utah Quaternary Fault Parameters Working Group participant since 2012, member since 2016

SCEC Southern California Earthquake Center: Since 2003

SSA Seismological Society of America: Since 2017

## Publications

- Carlson, J.K., Bemis, S., **Toke**, N.A., Bishop, B., and T.P. Taylor “Documentation of seven earthquakes over the past ~7000 years on the west-central Denali fault at the Nenana River, Alaska.” *In revision, Bulletin of the Seismological Society of America*.
- Toké**, N.A., J. Thomas, M.P. Bunds, M. Arnoff, D.M. Horns, and K. Carlson “Inferences about Fault Segmentation from Recent Surface Breaks along the Wasatch Front from Lidar, SfM, and Outcrops from American Fork Canyon to Dimple Dell Regional Park” *2017 UGA Guidebook: Geology and Resources of the Wasatch Front and Back*.
- Toké**, N.A., C.G. Boone, and JR. Arrowsmith (2014) “Seismic Hazard, Regulations, and Social Vulnerability in Los Angeles, California – Turning Geologic Hazards into Urban Amenities” *Earth’s Future*. Vol. 2, no. 9 440-457. DOI: 10.1002/2014EF000241 <http://onlinelibrary.wiley.com/doi/10.1002/2014EF000241/abstract>
- Haddad, D. E., Akçiz, S. O., Arrowsmith, J R., Rhodes, D. D., Oldow, J. S., Zielke, O., **Toké**, N. A., Haddad, A. G., and Mauer, J., (2012) “Applications of airborne and terrestrial laser scanning to paleoseismology” in: *Seeing the True Shape of Earth's Surface: Applications of Airborne and Terrestrial Lidar in the Geosciences themed issue, Geosphere*, v. 8, no. 4, p. 771-786, DOI: 10.1130/GES00701.1. <http://geosphere.geoscienceworld.org/content/8/4/771.abstract>
- Toké**, N.A., JR. Arrowsmith, M.J. Rymer, A. Landgraf, D. Haddad, M. Busch, J. Coyan, and A. Hannah (2011) “Late Holocene slip rate of the San Andreas Fault and its accommodation by creep and moderate magnitude earthquakes at Parkfield, California” *Geology*, 10.1130/G31498.1 <http://geology.geoscienceworld.org/cgi/content/full/39/3/243?ijkey=Lo.bt.nO9TX3c&keytype=ref&siteid=gsgeology>
- El-Ashmawy, L., N.A. **Toké**, and JR. Arrowsmith (2009) “Geologic Investigations of Urban Sedimentation in Tempe, AZ using retention structures.” *Arizona Hydrological Society Symposium Proceedings*, 10 pp.
- Toké**, N.A., JR. Arrowsmith, J.J. Young, C.J. Crosby (2006) “Paleoseismic and post-seismic observations of fault slip along the Parkfield segment of the San Andreas Fault.” *Bulletin of Seismological Society of America* 96, 221-238. <http://www.bssaonline.org/cgi/content/abstract/96/4B/S221>
- Toké**, N.A. and JR. Arrowsmith (2006) “Reassessment of a slip budget along the Parkfield segment of the San Andreas Fault” *Bulletin of Seismological Society of America* 96, 339-348. <http://www.bssaonline.org/cgi/content/abstract/96/4B/S339>
- Rymer, M.J., J.C. Tinsley, III, J.A. Treiman, J R. Arrowsmith, K.B. Clahan, A.M. Rosinski, W.A. Bryant, H.A. Snyder, G.S. Fuis, N.A. **Toké**, and G.W. Bawden (2006) “Surface Fault Slip Associated with the 2004 Parkfield, California, Earthquake” *Bull. of the Seis. Soc. of Amer.*, 96, 11 - 27. <http://bssa.geoscienceworld.org/cgi/content/abstract/96/4B/S11>

## Papers in Preparation

- Toké**, N. A., J.B. Salisbury, M. Bunds, J R. Arrowsmith, E.C. Matheson, L.T. Kellum, N. Abueg, T. Sato, D. Horns, J.K. Carlson, J. Anderson, and J. Selck, “Formation, preservation, and documentation of Holocene deformation from creep using structure from motion at the Dry Lake Valley site on the central San Andreas Fault” *in preparation for submission to Geosphere*

## Technical Reports and White Papers

- Toké**, N.A. and JR. Arrowsmith (2015) “Documentation of Late Holocene and Present Day Deformation from Creep at the Dry Lake Valley Site on the Central San Andreas Fault?” Southern California Earthquake Center Technical Report
- Toké**, N.A. and JR. Arrowsmith (2013) “Significant ground deformation between 780 and 1031 A.D. at the Dry Lake Valley Paleoseismic Site: Do large earthquakes rupture the creeping section of the San Andreas Fault?” Southern California Earthquake Center Technical Report
- Toké**, N.A. and JR. Arrowsmith (2009) “Paleoseismic characterization of earthquakes and a geologic slip rate at Parkfield” U.S. Geological Survey National Earthquake Hazard Reduction Program Technical Report, 31pp. <http://earthquake.usgs.gov/research/external/reports/07HQGR0094.pdf>

## Professional Meeting Presentations

*Underlined + italics = Presenting student coauthor*

UVU

2017

- Toké**, N.A., N. Butterfield, M.P. Bunds, A. Zanazzi, A. Uribe, A. Arendt, and V. Pacheco. Initial Assessments of the Geomorphic Impacts from Two Late Holocene, Drainage-Damming Landslides within the City Creek and Little Cottonwood Creek Watersheds, iUtah 2017 Summer Symposium, Logan, Utah, July 13<sup>th</sup>, 2017.
- Toké**, N.A., C. Langevin, J. Phillips, E. Kleber, C.B. DuRoss, J.D. Wells, D. Horns, G. McDonald, and J.K. Carlson “Investigating the History of Large Wasatch Fault Earthquakes Along the Fort Canyon Fault at the Traverse Ridge Paleoseismic Site” *Seismological Society of America Annual Meeting, Denver, CO: April 20<sup>th</sup>, 2017, Poster #22*
- DuRoss, C.B., M.P. Bunds, N.G. Reitman, R.D. Gold, S.F. Personius, R.W. Briggs, N.A. **Toké**, K. Johnson, and L. Lajoie, “The distribution of surface displacements in the 1983 Borah Peak earthquake and prehistoric ruptures of the Warm Springs and Thousand Springs sections of the Lost River fault zone.” *Seismological Society of America Annual Meeting, Denver, CO: April 20<sup>th</sup>, 2017, Poster # 1*
- Delora, M., **Toke**, N., and H. Hungerford. “Assessment of Environmental Injustices Associated with TRI Sites in Utah’s Wasatch Front Communities Using Dasymetric Mapping and Geographically Weighted Regression.” *Submitted to the Annual Meeting of the American Association of Geographers, Boston, MA: April 5<sup>th</sup> – 9<sup>th</sup>, 2017.*
- Toké**, N.A., “Investigating the History of Large Earthquake of the Wasatch Fault at the Traverse Ridge Paleoseismic Site in Draper, Utah” *Utah Quaternary Fault Parameters Working Group, Salt Lake City Utah: February 8<sup>th</sup>, 2017.*

2016

- Bunds M., J Andreini, M. Arnold, K. Larsen, A. Fletcher, and N. **Toké**, “New Data on Quaternary Surface Offset and Slip Rates of the Oquirrh Fault (Utah, USA) from DSMs Made with Structure from Motion Methods” *American Geophysical Union Meeting, San Francisco, CA: December 11-16, 2016.*
- Toké**, N. A., M.P. Bunds, J.B. Salisbury, JR. Arrowsmith, T. Sato, D. Horns, N. Abueg, J. Anderson, J.K. Carlson, L. Kellum, E. Matheson, A. Lawrence, and J. Selck “Dry Lake Valley Observations of Historical and Prehistoric Creep on the Central San Andreas Fault” *Southern San Andreas Fault Evaluation (SoSAFE) Workshop: Project Successes and Future Challenges at the Southern California Earthquake Center Annual Meeting, Palm Springs, California, September 10, 2016*
- DuRoss, C.B., R.D. Gold, S.F. Personius, R.W. Briggs, N.G. Reitman, M.P. Bunds, N.A. **Toké**, K. Johnson, L. Lajoie, and D.P. Schwartz, “Spatial Distribution of Displacement Along the Northern Part of the 1983 M 6.9 Borah Peak Earthquake Rupture” *Poster #17, Seismological Society of America Annual Meeting, Reno, NV: April 20-22<sup>nd</sup>, 2016.*
- Toké**, N. A., “Paleoseismic Investigation within the Traverse Ridge Segment Boundary: Initial Plans for Summer 2016 Field Work” *Utah Quaternary Fault Parameters Working Group, Salt Lake City, Utah, February 10<sup>th</sup>, 2016.*
- Bunds, M., S. Janecke, J. Andreini, M. Arnold, K. Larsen and N.A. **Toké**, “New Data on Holocene Offsets and Slip Rates for the Oquirrh and East Cache Faults from DEMs Made with Structure-from-Motion Methods” *Utah Quaternary Fault Parameters Working Group, Salt Lake City, Utah, February 10<sup>th</sup>, 2016.*

2015

- Carlson, J.K., S. Bemis, N. **Toké**, P. Taylor, and B. Bishop “Paleoearthquakes of the past ~2500 years at the Dead Mouse site, west-central Denali fault at the Nenana River, Alaska” *American Geophysical Union Meeting, San Francisco, CA: December 13-18, 2015.*
- Bunds M., N.A. **Toké**, A. Lawrence, J R. Arrowsmith and J.B. Salisbury “Insights into Surface Manifestation of Aseismic vs. Coseismic Fault Slip from UAV Imagery of Creep-Induced Surface Fracturing Along the Central San Andreas Fault” *American Geophysical Union Meeting, San*

Francisco, CA: December 13-18, 2015.

Bunds, M., N. A. **Toké**, C.B. DuRoss, R.D. Gold, R.W. Briggs, N. Reitman, K. Johnson, L. Lajoie, S.F. Personius, and A. Fletcher “Applications of Structure from Motion for use in Earthquake Geology Investigations: Examples from the Wasatch and San Andreas Fault.” *Paper No. 289-10, Annual Meeting of the Geological Society of America, Baltimore, MD: November 1-4, 2015*

Huffaker, B., N.A. **Toké**, M. Bunds, A. Stallings, and S. Walther “Quantifying Geomorphic Change over Multiple Time Scales along Pleasant Creek, Capitol Reef National Park, Utah” *Paper No. 291-22, Annual Meeting of the Geological Society of America, Baltimore, MD: November 1-4, 2015.*

Butterfield, N.J.F., M. Bunds, A. Zanazzi, and N.A. **Toké** “A Preliminary Look at Geomorphic Impacts and Timing of Two Large, Drainage-Damming Landslides in the Central Wasatch” *Paper No. 207-12, Annual Meeting of the Geological Society of America, Baltimore, MD: November 1-4, 2015.*

**Toké**, N. A., M. Bunds, J.B. Salisbury, A. Lawrence, and J.R. Arrowsmith “Rupture Patterns Due to Aseismic Creep During the 2013-2014 California Drought Match Deformation Structures Observed in the 5000 Year Dry Lake Valley Paleoseismic Record” *Annual Southern California Earthquake Center Meeting, Proceedings and Abstracts Vol. 25, Palm Springs, California, September 12-16, 2015*

Nelsen, M., N.A. **Toké**, S.A. Fellows, and J.W. Jackson “GIS Analysis of the Types and Spatial Extents of Volcanic Hazards in Millard County, Utah” *The 67<sup>th</sup> Annual Rocky Mountain Regional Geological Society of America Meeting, Casper, WY: May 21-23<sup>rd</sup>, 2015.*

**Toké**, N. A., M. Arnoff, J.K. Carlson, M. Bunds, and J. Thomas, “Fault strip mapping and continued exploration of existing Traverse Ridge Salient trenches and natural exposures along the Wasatch Fault” *Utah Quaternary Fault Parameters Working Group, Salt Lake City, Utah, Feb 10<sup>th</sup>, 2015.*

**Toké**, N. A., Arnoff, M., Thomas, J., and M. Bunds. “Documenting Recent Rupture Traces and Paleoseismic Exposures from the Northern Provo to the Southern Salt Lake city Segment of the Wasatch Fault” *Basin and Rang Province Seismic Hazards Summit III, January 12-16<sup>th</sup>, 2015.*

Bunds, M., **Toké**, N. A., Fletcher, A. and M. Arnoff. “Applications of Structure from Motion for use in Earthquake Geology Investigations: Examples from the Wasatch and San Andreas Fault.” *Basin and Rang Province Seismic Hazards Summit III, January 12-16<sup>th</sup>, 2015.*

2014

Huffaker, B., S. Walther, and N.A. **Toké** “Analysis of the Geomorphic Impact of a Flood Season on Pleasant Creek, Capitol Reef National Park, Utah” *Geological Society of America Meeting, Abstracts with Programs, Vol. 46, no. 6, Paper No. 124-2, Vancouver, B.C. Canada, October 20<sup>th</sup>, 2014.*

**Toké**, N. A. “Symmetrical Bias in Reporting Slip Rates: Asymmetric Probability Density Functions are Inherent Outcomes of Accounting for Uncertainties in Displacement and Age” *Annual Southern California Earthquake Center Meeting, Proceedings and Abstracts Vol. 24, Palm Springs, California, September 6-10, 2014.*

**Toké**, N.A. “Geomorphic and paleoseismic evidence for multiple surface ruptures along structures between the Salt Lake City and Provo segments of the Wasatch Fault.” *Utah Quaternary Fault Parameters Working Group, Salt Lake City, Utah, February 5<sup>th</sup>, 2014.*

2013

Kellum, L.T. and N.A. **Toké** “Using LiDAR DEMs for Geomorphic Assessment of Lake Bonneville Wave-Cut Terraces and Post-Bonneville Displacement Along the Wasatch Fault.” *Geological Society of America Meeting Abstracts with Programs, Vol. 45, No. 7, Paper No. 347-3, Denver, Colorado, October 30, 2013.*

**Toké**, N. A., Carlson, J.K., Barnum, E., Das-Toke, S., Dastrup, D.B., Ivie, H.A., Judd, E., Selck, J., Stuart, K., and J. Whitaker. “Evidence for Multiple Surface Ruptures with 0.3-1.5 Meter Slip-Per-Event Along Structures Between the Salt Lake City and Provo Segments of the Wasatch Fault” *Geological Society of America Meeting Abstracts with Programs, Vol. 45, No. 7, Paper No. 238-3, Denver, Colorado, October 29, 2013.*

Simister, A., **Toké**, N.A., Armstrong, A., and M. Bunds “Timpanogos National Monument: Structural Analysis of Cave System Faults.” *Geological Society of America Meeting, Abstracts with Programs, Vol. 45, No. 7, Paper 136-1, Denver, Colorado, October 2, 2013.*

**Toké**, N. A., Salisbury, J.B., J.R. Arrowsmith, L.T. Kellum, E. Matheson, J.K. Carlson, D. Horns, T.

Sato, N. Abueg, J. Anderson, and J. Selck. "Documenting at least 1300 years of aseismic slip: en-echelon shear bands and small-scale ground cracking at the Dry Lake Valley Paleoseismic site along the central San Andreas Fault" *Annual Southern California Earthquake Center Meeting, Proceedings and Abstracts Vol. 23, Palm Springs, California, September 8-11, 2013*.

2012

**Toké, N. A.,** Abueg, N., Anderson, J., Kellum, L., Selck, J., Sato, T., Salisbury, J.B., and Arrowsmith JR., "Recognition of Paleoseismicity along Creeping Faults: Examples from the Dry Lake Valley Site on the central San Andreas" *Eos Transactions, American Geophysical Union, Fall Meeting, Abstract T22C-02, San Francisco, California, December 4<sup>th</sup>, 2012*.

**Toké, N. A.,** Sato, T., Kellum, L., Abueg, N., Anderson, J., Selck, J., Salisbury, J.B., and Arrowsmith JR., "Preliminary Results from the 2012 Dry Lake Valley Paleoseismic Site on the central Creeping section of the San Andreas Fault." *Annual Southern California Earthquake Center Meeting, Proceedings and Abstracts Vol. 21, Palm Springs, California, September 9-12, 2012*.

2011

**Toké, N. A.,** "Evidence from the Parkfield section of the San Andreas fault: Implications for Extreme Events" *Southern California Earthquake Center – invited talk for the Southern San Andreas Fault Evaluation Workshop Annual Meeting, Palm Springs, California, September 11, 2011*.

ASU

2010

**Toké, N. A.,** A. Johnson, and K. Nelson. "Earthquakes, Cities, and Lifelines: Lessons integrating tectonics, society, and engineering in middle school Earth Science" *Eos Transactions. American Geophysical Union, Fall Meeting, San Francisco, California, December, 2010*.

**Toké, N. A.,** C.G. Boone, and J R. Arrowsmith. "Distribution of Seismic Hazard, Regulation, and Vulnerability in greater Los Angeles" *Annual Southern California Earthquake Center Meeting, Proceedings and Abstracts, Vol. 20, Palm Springs, California, September 11-15, 2010*.

**Toké, N. A.,** E. Cook, C Mead, K. Darby, J. Brian, T Benn, C.G. Boone, S. Fisher, and S. Semken. "Pedagogy in interdisciplinary higher education: an investigation of faculty and student perspectives." *12<sup>th</sup> annual CAP LTER Meeting, Arizona State University, Tempe, Arizona, January 14, 2010*.

2009

**Toké, N. A.,** K. Darby, E. Cook, C Mead, J. Brian, T Benn, S. Fisher, C.G. Boone, and S. Semken. "Pedagogy in interdisciplinary higher education: an investigation of faculty and student perspectives." *Annual Geological Society of America Meeting, Abstracts with Programs Vol. 41, No. 7, Portland, Oregon, October 18-21st, 2009*.

El-Ashmawy, L., N.A. **Toké,** and JR. Arrowsmith "Sedimentary Geology of Urban Environments: an example of measuring sediment production and composition in Tempe, AZ" *Annual Geological Society of America Meeting, Abstracts with Programs Vol. 41, No. 7, Portland, Oregon, October 18-21<sup>st</sup> 2009*.

**Toké, N. A.,** J.R. Arrowsmith, M.J. Rymer, A. Landgraf, J. Cohan, M. Busch, D. Haddad "Long-lived creep, M6 earthquakes, and a Holocene slip rate for the main trace of the San Andreas Fault at Parkfield, California" *Annual Southern California Earthquake Center Meeting, Proceedings and Abstracts, vol. 19, Palm Springs, California, September 12-16th, 2009*.

El-Ashmawy, L., N.A. **Toké,** and JR. Arrowsmith "Geologic Investigations of Urban Sedimentation in Tempe, AZ using retention structures." *Arizona Hydrological Society Symposium Posters, Scottsdale, Arizona, August 31<sup>st</sup> - September 2<sup>nd</sup>, 2009*.

2008

**Toke, N. A.,** J R. Arrowsmith, M. Rymer, A. Landgraf, J. Cohan, M. Busch, D. Haddad Paleoseismic interpretation and a preliminary geologic slip rate for the Parkfield segment of the San Andreas Fault, *Eos Transactions. American Geophysical Union, Fall Meeting, Abstract T41A-1955, San Francisco, California, December 15-19<sup>th</sup> 2008*.

Hale, R. **Toké,** N.A., Grimm, N. and J R. Arrowsmith "Aridland Urban Hydrology in Phoenix, AZ" *10th annual CAP LTER Meeting, Arizona State University, Tempe, Arizona, January 10th, 2008*.

2007

**Toké, N.A.** and J R. Arrowsmith "Paleoseismic and Holocene slip rate investigations along the San

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Andreas Fault, at Parkfield, California” *EOS Transactions American Geophysical Union*, Fall Meeting, Abstract: T43A-1097, San Francisco, California, December 10-14th, 2007.

**Toké, N.A.** and J R. Arrowsmith “Paleoseismic and Holocene slip rate investigations along the San Andreas Fault, at Parkfield, California” *Annual Southern California Earthquake Center meeting*, Proceedings and Abstracts, vol. 17, Palm Springs, CA, September 9-12th, 2007.

**Toké, N.A.** and J R. Arrowsmith “Fluvial Processes in Phoenix, Maricopa County, Arizona: A natural laboratory for studying dryland fluvial systems” *9th annual CAP LTER Meeting*, Arizona State University, Tempe, Arizona, January 10th, 2007.

#### 2006

**Toké, N.A.** and J R. Arrowsmith “Fluvial Processes in Phoenix, Maricopa County, Arizona: A natural laboratory for studying urbanized dryland fluvial systems” *EOS Transactions American Geophysical Union*, Fall Meeting, Abstract: H13A-1356, San Francisco, California, December 11-15th 2006.

Busch, M., J R. Arrowsmith, P.J. Umhoefer, G.M. Gutierrez, N. **Toké**, D. Brothers, E. Dimaggio, S. Maloney, O. Zielke, B. Buchanan “Late Quaternary Faulting in the Cabo San Lucas – La Paz region, Baja California.” *EOS Transactions American Geophysical Union*, Fall Meeting, Abstract: T41D-1612, San Francisco, California, December 11-15th 2006.

Akciz, S.O., L.B. Grant, J R. Arrowsmith, O. Zielke, N.A. **Toké**, G. Noriega, J. Cornoyer, E. Starke, N. Reusseau, B. Campbell “Does the new paleoseismological evidence from the Carrizo Plain section of the San Andreas Fault indicate abnormally high late Holocene slip rates?” *EOS Transactions American Geophysical Union*, Fall Meeting, Abstract: T21E-01, San Francisco, California, December 11-15<sup>th</sup>, 2006.

**Toké, N.A.** and J R. Arrowsmith “Fluvial Geomorphology and Urbanization in Phoenix, Maricopa County, Arizona: A Natural Laboratory for Studying Human Alteration of Dryland Fluvial Systems.” *Binghamton Geomorphology Symposium on the Human Role in Fluvial Systems*, October 20-22<sup>nd</sup>, 2006

#### 2005

**Toké, N.A.** and J R. Arrowsmith "Estimating a Slip Budget along the Parkfield segment of the San Andreas Fault: A Slip Deficit since 1857" *Southern California Earthquake Center Annual Meeting*, Proceedings and Abstracts, vol. 15. Palm Springs, California, September 11-14<sup>th</sup>, 2005

Akciz, S., L.B. Grant, J R. Arrowsmith, O. Zielke, N.A. **Toké**, G. Noriega, E. Starke, and J. Cornoyer. “Constraints on ruptures along the San Andreas Fault in the Carrizo Plain: Initial Results from 2005 Bidart Fan Site Excavations.” *Southern California Earthquake Center Annual Meeting*, Proceedings and Abstracts, vol. 15. Palm Springs, California, September 11-14<sup>th</sup>, 2005.

#### 2004

**Toké, N.A.**, Arrowsmith, J R., Crosby, C.J., and Young, J.J. “Paleoseismology and Tectonic Geomorphology: Results from the Parkfield, CA Segment of the San Andreas Fault.” *EOS Transactions American Geophysical Union*, Fall Meeting, , Abstract T13A 1336, San Francisco, California, December 13-17<sup>th</sup>, 2004.

**Toké, N.A.**, Arrowsmith, J R., Crosby, C.J., and Young, J.J. “Preliminary Paleoseismology Results from the Parkfield, CA Segment of the San Andreas Fault.” *Southern California Earthquake Center Annual Meeting*, Proceedings and Abstract, vol. 14, Palm Springs, California, September 19-21<sup>st</sup>, 2004.

UVM

#### 2003

Klepeis, K.A., Clarke, G.L., and **Toké, N.**, “Exhumation and Topographic Uplift along Continental Strike-Slip and Oblique-Slip Faults in Southwest New Zealand.” *Annual Geological Society of America Meeting*, Abstracts with Programs, Vol. 35, No. 6, Seattle, Washington, November 2-5<sup>th</sup> 2003.

Billow, S., Krasilovsky, M., Rimbault, J., **Toké, N.**, Romanowicz, E.A, and Franzi, D.A. “A preliminary hydrogeochemical assessment of the Little Chazy River, northeastern New York” *Northeast Regional Geological Society of America Meeting*, Abstracts with Programs, Vol.35, No.1, Halifax, Nova Scotia, Canada, March 27-29<sup>th</sup>, 2003.

#### 2002

**Toké, N.A.** “Tectonics and Topography: Some New Relationships Identified along the Alpine Fault in

- New Zealand”, Vermont Geological Society Newsletter, Presentation at Middlebury College, Middlebury, Vermont, spring 2002.
- Klepeis, K.A., Claypool, A., and Toké, N., “Dynamic topography in transpressional regimes: an example from the New Zealand plate boundary zone *Northeast Regional Geological Society of America Meeting*, Abstracts with Programs, Vol. 34, No. 1, Springfield, Massachusetts, March 25-27<sup>th</sup>, 2002.
- Lord, A., Lini, A., Toké, N., Parris, A., and Bierman, P. “Contrasting evolution of northern New England post-glacial lakes.” *Northeast Regional Geological Society of America Meeting*, Abstracts with Programs, Vol. 34, No. 1, Springfield, Massachusetts, March 25-27<sup>th</sup>, 2002.

## **Service and Outreach**

### *Service to the University and External to the University:*

- Center for Ethics Panel Discussion: “Sci-Hub and Ethics of Academic Publishing”, September 28<sup>th</sup>, 2016
- Skype Geology Interview with Johnson, VT Elementary Students, May 25<sup>th</sup>, 2016.
- GIS Day Career Panel, November 19<sup>th</sup>, 2015
- Rock Canyon Day Presenter – The Earth Moves (Quaternary Geology), September 19<sup>th</sup>, 2015
- Orem City Earthquake Preparedness Drill Block Captain, September 17<sup>th</sup>, 2015
- UVU Environmental Studies at Capitol Reef Field Station Committee Spring 2015-Present.
- In Harm’s Way: GEO 3200 Seismic Safety Education Materials for Utah Schools, Fall 2014
- LEAP Tour and K-12student Q/A and Geology Motivational Chat – December 2014
- Scholarship Essay Reviewer for the Utah National Association for Multicultural Education - 2013
- SCEC Participating Institution UVU Point of Contact 2012 - Present
- AEG Intermountain Regional Point of Contact for K-12 Educators 2011 - 2013
- NSF GK-12 7<sup>th</sup> Grade Earth Science Teaching 2010-2011

### *Peer Review:*

- 2017: Geology,
- 2016: Utah Geological Association Publication 45 – Geology of the Wasatch Front and Back.
- 2015: Journal of Geophysical Research – Solid Earth
- 2014: The Geological Society of London - Seismicity, Fault Rupture and Earthquake Hazards in Slowly Deforming Regions
- 2014: Utah Geological Association Publication 44 – The Uinta Basin and Mountains.
- 2013: Utah Geological Association Publication 43 – Utah’s Far South
- 2011: Earth and Planetary Science Letters, Earth Surface Processes and Landforms

### *Professional Meeting Moderator:*

- 2012 AEG Annual Meeting, Session #4: Faults and Earthquake Hazards
- 2009 AHS Annual Symposium, Session #4: Erosion and Sedimentation

### *UVU College of Science and Health Service:*

- NSF CSH STEM Scholarship Selection Committee 2013-2016
- Dean’s Day Earth Science Dept. Outreach, 2014-2016
- CSH Science Education Hiring Committee 2013-2014
- CSH Scholarly Activities Committee: 2012-2014

### *UVU Department of Earth Science Service:*

- Department Assessment Coordinator 2012-Present
- Geography Program Development Committee 2013-Present
- GIS program development Committee 2011-Present
- Geology Field Camp Planning Committee 2011-Present
- Organization and Cleaning for PS Renovation May 2016
- Library Needs Assessment Coordinator 2015-2016
- Petrology Hiring Committee Spring 2017
- Physical Geography Hiring Committee, 2015-2016
- Human Geography Hiring Committee Chair, 2014-2015

## Tools, Methods, and Resources

Publishing:	Adobe Creative Suite, HTML, Microsoft Office Suite
Computational:	MatLab, Octave, SPSS, C,
Geospatial:	AgiSoft Photoscan, ENVI, ERDAS Imagine, ESRI ArcGIS, Google Earth, Image J, P2G, Trimble Business Center,
Field Methods:	Trimble RTK GPS, Total Station, Low Altitude Aerial Imagery Collection, Soil Classification, Paleoseismic Characterization, Geologic Mapping.

## Student Mentoring and Advising of Research

### Current Student Projects

*Chris Langevin*, BS in Geology, “Paleoseismology of the Wasatch Fault at Traverse Ridge.”

*Joseph Phillips*, BS in Geology, “Paleoseismology of the Wasatch Fault at Traverse Ridge.”

### Past Projects and Graduated Students

*Nicole Abueg*, BS in Geology, “Geochronology of the 2012 Dry Lake Valley Paleoseismic Site – 2012 field season” Now working at **Advanced Laboratories in Salt Lake City**.

*James Anderson*, BS in Geology, 2013. “Creep versus rupture in paleoseismic trenches.” Completed an MS in Geology at Oklahoma State University, now with **Devon Energy in Oklahoma City**.

*Michael Arnoff*, BS in Geology, “Paleoseismology of a natural exposure along the northern segment Provo segment of the Wasatch Fault” Working as an **Engineering Geologist in Wyoming**.

*Laila El-Ashmawy*, BS in Civil, Environmental, and Sustainable Engineering, 2011: Research Project: “Urban Sedimentation in a Desert City.” Was with Schlumberger, Graduate with an MS/MBA from Colorado School of Mines, now with the **International Energy Association in Paris**.

*Nicholas Butterfield*, BS in Geology, “Impacts and Timing of Two Large, Drainage-Damming Landslides in the Central Wasatch Range” now an MS in geology student at New Mexico State University.

*Joseph Kade Carlson*, BS in Geology, 2014 “Paleoseismology of the Wasatch Fault along the Traverse Ridge.” Graduated with an MS in Geology from University of Kentucky. Now with **SLR Consulting in Irvine, California**.

*Matt DeLora*, BS in Integrated Studies, “Mapping Environmental Injustice along the Wasatch Front, Utah” Now an MS student in GIS at the University of Utah.

*Bret Huffaker*, BS in Geology, “GIS analyses, Structure from Motion, and Paleohydrology of Pleasant Creek, Capitol Reef National Park” Co-advised by Suzanne Walther. Completed an MS in Geology at Northern Colorado University, now an **Assistant Geologist with Burns and McDonnell in Kansas City**.

*Dustin Joe*, BS in Geology, “GIS Assessment of Rockfall Hazard and Recurrence Rates in St. George, UT

*Lawrence Kellum*, BS in Geology, 2014 “Deciphering the position of Bonneville Shoreline Terraces using GIS: Tectonics and Isostasy.” Now a MS student in Geography at the University of Utah.

*Ephram Matheson*, BS in Geology, “GIS logging of the Dry Lake Valley Paleoseismic site – 2013 field season.” And “Stress analyses of Wasatch segment boundaries”

*McKay Nelson*, BS in Earth Science Education, “Volcanism in Millard County UT”

*Jeff Selck*, Continuing Education in Geology. “Methods in photo-documenting paleoseismic trenches – 2012 field season” Now a MS student in Geology at BYU.

*Andy Simister*, BS in Geology, “Mapping of Timanogos Cave System Fault.”

*Alison Stallings*, BS in Geology, “Fluvial Geomorphology and Flash Floods in Pleasant Creek, Capitol Reef National Park” Co-advised with Suzanne Walther

*Jason Thomas*, BS in Geology, “GIS Mapping of Faults across the Provo to Salt Lake City segments of the Wasatch Fault.”

*Jack Wells*, BS in Geology, “Field Assistance at the Traverse Ridge Paleoseismic Site.”



## Courses Taught

UVU

- Introduction to Geology (GEO1010)** – Survey of physical geology using concept sketches, classroom group activities, field projects and lectures that incorporate discussion. (15)
- Physical Geography (GEOG 1000)** – Introduction to Physical Geography with an Earth Systems Science perspective linking human environmental interactions. (1)
- Meteorology (METO1010)** – A survey of weather and global climate processes. In this class we spend the first half of the class introducing overarching concepts related to atmospheric stability and the second half of the class is dedicated to applying those concepts to specific weather phenomena. (1)
- Geologic Hazards (GEO3200)** – We focus on the geologic hazards most central to the Salt Lake City area: Landslide and Earthquakes. In addition to the primary topic students learn about geotechnical evaluation of soils, geomorphology, geologic mapping, seismology, and social vulnerability (6)
- Geomorphology (GEO3500)** – A comprehensive introduction to the construction and evolution of landforms using *Key Concepts in Geomorphology* by Bierman and Montgomery. (5).
- Geographic Information Systems (GEOG 3600)** – Introduction to GIS using ESRI ArcGIS. (2)
- Advanced GIS (GEOG 3650)** – Project-based course using ESRI and additional software platforms. Focusing on Terrain Analysis and other raster-based approaches to geospatial problems. (2)
- Summer Field Geology (GEO 4600)** – I am a primary instructor for the UVU capstone summer field experience. I am the lead on our geomorphic mapping and neotectonics week (5)
- Earth Science Seminar (GEO 495R-07)** – Organizing guest speakers and facilitating student discussion. Presenting professional development material about grad schools, research, internships, and careers (2)
- Special Topics:** Small enrollment or one-on-one seminars with upper division students: Tectonic Geomorphology, Volcanism of the Millard County, GIS Special Topics, and Earthquake Geology and Fault Strip Mapping along the Wasatch Fault.

ASU

- NSF GK-12 Fellow; Collaborative Teaching in Sun Valley Elementary 7<sup>th</sup> Grade Earth Science 2010-2011 academic year.** My role was an educational assistant. I helped the science teacher (Ms. Johnson) develop new, inquiry-based material that meets the Arizona and National learning standards.
- Interdisciplinary and Career Opportunities in the Geosciences**  
<http://activetectonics.asu.edu/teaching/GLG494-ICOG/schedule.html> - *spring 2009* Organized and led a seminar covering interdisciplinary theory, professional development activities, literature review of interdisciplinary boundaries within the geosciences, and career opportunities. I organized guest speakers on career opportunities from academia, government, consulting firms, and industry.
- Strike-Slip Tectonics: Evaluating Activity along the San Andreas Fault System** - *University of Potsdam, Germany, Spring, 2008* I was a guest lecturer for a short course on Active Tectonics led by Manfred Strecker. Topics I covered included paleoseismology, evaluating tectonic landforms on strike slip faults, and a case study of the central San Andreas Fault.
- Field Camp Teaching Assistant, 2005 and 2006.** I participated in one on one instruction in geologic mapping and report writing with ASU field geology students near Payson, AZ.
- Introductory Geology Teaching Assistant, fall 2005.** Led review sessions for students, worked with students during office hours, filled in as lecturer for topics related to earthquakes and seismology, graded assignments and tests, and organized online coursework communication.
- Introductory Geology Lab Instructor, spring 2005.** Led three class sections with short lectures and one on one interaction as students worked through introductory geology curriculum.

## Teaching Development Activities

- UNAVCO Short Course: Hooking undergraduates into geophysics data and methods (GPS, Lidar, InSAR, SfM photogrammetry) through societally important issues, Dec. 11<sup>th</sup>, 2016
- SCEC Workshop on Science Communication: Navigating a Digital Social World, Sept. 11<sup>th</sup>, 2016.
- College of Science and Health Teaching Academy Seminar: Fall 2013
- Utah Meeting of the National Association for Multicultural Education, Feb. 23<sup>rd</sup> 2013.
- UVU Concurrent Enrollment Education Workshop, Feb. 7<sup>th</sup> 2013.

- Council on Undergraduate Research (CUR): Undergrad. Res. Workshop, Dec. 3<sup>rd</sup>, 2012
- Utah Meeting of the National Association for Multicultural Education, Mar. 10<sup>th</sup> 2012.
- UVU New Faculty Teaching Scholars Mentoring and Seminars – Fall 2011 and Spring 2012
- Preparing for an Academic Career in the Geosciences: Workshop for Graduate Students and Post-Doctoral Fellows, NAGT and Stanford University, 2010
- Interdisciplinary Teaching and Pedagogy - co-led - investigation of student and instructor perspectives, Arizona State University 2009-2010.
- Historical Image Archives to Investigate Landscape Change, 2009 GSA Fall Meeting Short Course

### **Invited Presentations and Colloquia**

- **David R. Keller Environmental Ethics Symposium** “Fault Zone Regulation, Seismic Hazard, and Social Vulnerability in Los Angeles, California” March 18<sup>th</sup>, 2015.
- **Grand Valley State University** “Socio-Environmental Interactions in the Geosciences: Urbanization, Earth Surface Processes, and Tectonics.” February 12<sup>th</sup>, 2015.
- **UVU Earth Science Seminar Series** “Systematic bias in reporting of geologic fault slip rates: when probability density functions are important” April 1<sup>st</sup>, 2014.
- **San Jose State University Speaker Series** “Examining the consistency of fault segmentation over the Holocene: What paleoseismology and tectonic geomorphology have revealed along the Wasatch and central San Andreas Fault” February 24<sup>th</sup> 2014.
- **Utah Valley GIS Day Seminar Series** “Hazard or Amenity? GIS-based analyses of Earthquake Fault Zones, Regulation, and Social Vulnerability in Los Angeles, California” November 7<sup>th</sup>, 2013.
- **CSH Seminar Series, 2013– *Science in Service of Humanity*** “The Misbehavior and Undesired Interactions of Faults: Implications for Earthquake Hazards Near and Far” October 23<sup>rd</sup>, 2013.
- **Grand Valley State University** “Hazard or Amenity? Earthquake Fault Zones, Regulation, and Social Vulnerability in Los Angeles, CA” October 10<sup>th</sup>, 2013.
- **UVU Earth Science Seminar Series** “All Quiet on the Western Front? Tales from a trench on the creeping section of the San Andreas Fault.” Presented with Larry Kellum, Nicole Abueg, Jim Anderson, and Jeff Selck on November 27<sup>th</sup>, 2012.
- **UVU Earth Science Seminar Series** “Social Vulnerability and Earthquake Hazards in Los Angeles, CA” November 29<sup>th</sup>, 2011.
- **Intermountain AEG monthly meeting**, “Social Vulnerability and Earthquake Hazards in Los Angeles, CA” November 10, 2011.
- **BYU Geological Sciences Seminar Series** “Social Vulnerability and Earthquake Hazards in Los Angeles, CA” September 29, 2011.
- **University of Granada**, Spain, Dept. de Geodinámica colloquium: “Earthquake history of the central San Andreas Fault: paleoseismology, slip budget analysis, and implications for fault zone structure and seismic hazard.” May, 2008.
- **University of Potsdam**, Germany: Lecturer for a short course on Active Tectonics: “Strike-Slip Tectonics: evaluating tectonic activity along the San Andreas Fault system” April, 2008.

### **Professional Workshops, Certifications, and Short Courses**

- Soils as a Tool for Quaternary Geology, with Dr. Missy Eppes, May 5-6, 2017
- Be a Better Reviewer, Advance Your Career, SSA Denver, April 17<sup>th</sup> 2017
- SCEC SoSAFE Workshop: Recent Successes and Future Challenges, September 10<sup>th</sup>, 2016
- OSL 1-Day Sample Collection Training at USU with T. Rittenour and others, May 4<sup>th</sup>, 2016
- California Earthquake Clearinghouse Training and Fieldwork Liability Certification, Sept 12<sup>th</sup> 2015.
- SCEC SoSAFE Geochronology Workshop, Oct. 28, 2014
- Utah Quaternary Fault Parameters working Group Meeting, February 2012-2017
- Environmental Justice in the city, Arizona State University, 2009
- The Superstition Vistas: developing a sustainable city east of Phoenix, AZ, 2008

## Research Grants

### External Support:

Total Awarded: \$172,917  
UVU Portion: \$93,808

### Internal Support:

Total Awarded: \$48,530  
Student portion: \$15,303

### CURRENT INTERNAL (UVU) SUPPORT

**2017 CSH Scholarly Activities Committee Faculty Research with Students:** Prospective Earthquake Geology Data Collection for Utah Lake, Topliff, and Thousand Lakes Faults. **\$3,915.**

### PAST EXTERNAL SUPPORT

**2016 National Earthquake Hazards Reduction Program (NEHRP) Grant,** Characterizing the timing of ruptures crossing the boundary between the Provo and Salt Lake City segments of the Wasatch Fault. Collaborative with D. Horns (UVU) and C. DuRoss (USGS), Submitted May 18<sup>th</sup>, 2015: **\$31,366.**

**2016 NVIDIA Hardware Grant,** 1 Tesla K40 CUDA GPU for image processing SfM of paleoseismic trench exposures ~ **\$3,000** (in kind donation). Received May, 2016.

**2015 iUtah: Innovative Urban Transitions and Aridregion Hydro-Sustainability – Research Catalyst Grant,** collaborative at UVU with Drs. Bunds, Walther, and Zanazzi: Multi-disciplinary Investigation of the Timing and Impact of Major Watershed-Damming Landslides in the Central Wasatch: Little Cottonwood and City Creek Canyon Case Studies, Submitted December 1<sup>st</sup>, 2014: **\$18,310.**

**2013 Southern California Earthquake Center Grant PI,** collaborative with JR. Arrowsmith (ASU): Examining the cause of significant ground deformation between 780 and 1031 A.D. at the Dry Lake Valley Paleoseismic Site: Do large earthquakes rupture the creeping section of the San Andreas Fault? **\$39,441** (\$23,776 UVU).

**2012 Southern California Earthquake Center Grant PI,** collaborative with JR. Arrowsmith and B. Salisbury (ASU), "Paleoseismic investigation along the inferred northernmost extent of the 1857 rupture: Do large southern San Andreas Fault ruptures extend into the creeping section?" **\$35,000** (\$17,356 UVU).

**2009 GSA Student Research Grant,** Human modification of hydrologic structure and sedimentation in a desert city, **\$2,800.**

**2007 National Earthquake Hazards Reduction Program (NEHRP) Grant,** co-written with JR. Arrowsmith (PI), Paleoseismic characterization of earthquakes at Parkfield, **\$43,000.**

### PAST INTERNAL (UVU) and STUDENT SUPPORT

**2016 CSH Scholarly Activities Committee Student Support:** Matthew Delora, AAG Travel Support: *Assessment of Environmental Injustice Associated With TRI Sites in Utah's Wasatch Front Communities Using Dasyetric Mapping and Geographically Weighted Regression: Presenting at the 2017 Annual AAG Meeting In Boston, MA.* **\$1,500**

**2016 CSH Scholarly Activities Committee Faculty Research with Students:** Characterizing the timing of ruptures crossing the boundary between the Provo and Salt Lake City segments of the Wasatch Fault: Request for Course Reassign Time and Site Excavation.: **\$4,904.**

**2015 Undergraduate Research, Scholarly, and Creative Award:** Bret Huffaker: GIS analyses, Structure from Motion, and Paleohydrology of Pleasant Creek, Capitol Reef National Park. **\$2,000.**

**2015 Faculty Senate Travel Grant:** Matching Support Towards Attending the 2015 Annual Meeting of the Southern California Earthquake Center, September 2015: **\$375.96**

**2015 CSH Scholarly Activities Committee Faculty Research with Students:** "Quarter Faculty Summer Salary Support for N.A. Toké: 6 Collaborative Projects Involving Students: **\$1,795.**

**2015 CSH Scholarly Activities Committee Faculty Research with Students:** Developing a long (~3000 yr) paleoearthquake record for the west-central Denali Fault at the Nenana River, Alaska – UVU Collaboration with Dr. Bemis and Kade Carlson at the University of Kentucky: **\$3,360.**

**2014 CSH Scholarly Activities Committee Faculty Research with Students:** Continued Investigation of

- the northern Provo Segment of the Wasatch Fault – Reassign time and Radiocarbon Samples. **\$4,100**
- 2014 Student Summer Undergraduate Research Fellowships:** McKay Nelson: Morphology and Origin of Fault Scarps in the Millard, UT Volcanic Field (\$1,500), Michael Arnoff: Documenting existing and natural paleoseismic exposures along the Wasatch Fault near Alpine, UT (\$1,500). Total Received: **\$3,000.**
- 2014 Grants for Engaged Learning Award:** Co-I with Suzanne Walther – “One-Time Assistance to Establish Geomorphology Projects Engaging Students in Long-Term Monitoring of Utah’s Active Landscapes” **\$9,754.**
- 2014 CSH Scholarly Activities Committee Student Support:** Attendance of the 2014 Annual SCEC meeting by Ephram Matheson and Emily Esplin: **\$1,400.**
- 2013 CSH Scholarly Activities Committee Faculty Research with Students:** Paleoseismic Investigation of the northern Provo Segment of the Wasatch Fault – Reassign time fall 2013 and summer field supplies: **\$2,424.**
- 2013 CSH Scholarly Activities Committee Student Support:** Kade Carlson GSA Presentation: **\$393.**
- 2013 UVU Summer Undergraduate Research Fellowships:** Lawrence Kellum: Using LiDAR to map the Lake Bonneville High Stand Terraces and Wasatch Fault Displacements (\$1,500), Andrew Simister: The origin and kinematics of Timanogos Cave faults (\$1,500): **\$3,000.**
- 2013 GSA Rocky Mountain Section Undergraduate Research:** Lawrence Kellum: **\$350**
- 2012 CSH Scholarly Activities Committee Student Support:** Abueg field work: \$1000, Selck field work: \$1000, Anderson field work: \$1000, Kellum SCEC presentation: \$660. Total Received: **\$3,660.**
- 2011 CSH Scholarly Activities Committee Faculty Research with Students:** Development of student-centered earthquake geology research projects: reassign time and supplies: **\$2,600.**

#### **UNFUNDED EXTERNAL PROPOSALS**

- 2017 NSF I-USE Grant Solicitation,** PI: Michael Stevens, Co-I(s): Mary Sowder, Kim Nielsen, McKenzie Skiles, and Weihong Wang. Cooperative Undergraduate Research Experiences at Capitol Reef: **\$300,000.**
- 2016 Southern California Earthquake Center,** PI: Michael Bunds, My Role: Co-I: Using Repeat Structure-from-Motion Photogrammetry Surveys to Map Evolution of Tectonic Geomorphology on the Creeping Sections of the San Andreas Fault: **\$19,703**
- 2016 NSF I-USE Grant,** Capitol Reef Environmental Undergraduate Research Cooperative (CREURC). PI: Richard Tafalla and CO-PIs: Weihong Wang, Nathan Toké, Kim Nielsen, and Heath Ogden: **\$300,000.**
- 2016 National Earthquake Hazards Reduction Program (NEHRP) Grant,** Collaborative Research with Brigham Young University and Utah Valley University: Timing, Rate, and Mechanisms of Slip along the Clear Lake Fault, Millard County, Utah. Collaborative with M. Bunds (UVU), S. Nelson (BYU), and J. McBride (BYU): **\$67,500** (29,496 UVU).
- 2015 US Department of Education, First in the World, CFDA #81.116F,** General Education Environmental Research Enhancement Project: Submitted by Benjamin Moulton (Project Director), my proposed role: Project Team Member. Proposed Amount: **\$2,046,209** over 4 years.
- 2015 National Earthquake Hazards Reduction Program (NEHRP) Grant,** Co-I(s) Drs. Bunds, Walther, and Zanazzi: Utilizing LiDAR and Geochronology to Assess Slip Rates, Paleoseismic Data Gaps, Slip Distribution, and Landslide Triggering along the Wasatch Fault: **\$75,689.**
- 2012 NSF STEP SOLICITATION:** STEM Success Through Research, Engagement, and Mentoring, D. Horns, PI; Tamara Goetz, CO-PI; Stan Klemetso, CO-PI; Afsaneh Minaie, CO-PI; **Nathan A. Toké,** CO-PI : Submitted December 10<sup>th</sup>, 2012: **\$1,982,909.**