Dr. Jay Sui Tung

Associate Scientist
Department of Geoscience, University of Wisconsin-Madison
stung6@wisc.edu | https://jaytung.geoscience.wisc.edu

Career Goals

Pursuing excellence in teaching, student mentoring, and research with dedicated services to the campus, scientific, and the greater public community

Teaching Synopsis

- Introductory Geology and Volcanology Field Camp
- Entry-To-Advance-Level Geophysics, Structural and Field Geology
- Numerical, Geophysical Modeling and Finite Element Models
- Geophysics Course Evaluation: 4.3/5

Research Synopsis

- Solid-Earth Geophysics and Machine Learning
- Reservoir Modeling of Unconventional and Conventional Energy Systems, and Crustal Processes
- Geomechanical and Geodetic Analysis of Induced Seismicity, Earthquakes, Volcanos, Tsunami Genesis
- Early Hazard Warnings and High-Performance Computing
- PI of NSF, SCEC, and ALOS Grant, NASA Panelist

Residency

US Permanent Resident (Greencard Holder with Work Authorization)

Education

Ph.D. in Earth Sciences (2013), **M.Phil.** in Physics (2009), **B.S.** in Physics (2007), University of Hong Kong

Employment, Professional Preparation, And Appointments

1.	Associate Scientist, University of Wisconsin-Madison, USA *-Develop Multi-Physics Reservoir Models of Geothermal Energy Operations for Assessing Induced Seismic Hazard in Collaboration with Lawrence Livermore National Laboratory* *-Investigate Magmatic and Lava Lake Activities Associated with Nicaraguan Volcanoes*	2020 -
2.	Visiting Scholar, Arizona State University, USA	2020 -
3.	Affiliated Collaborator, Lawrence Livermore National Laboratory, And SD Mines	2019 -
4.	Assistant Research Scientist, Arizona State University, USA	2019 - 2020
5.	Research Scientist, South Dakota School of Mines (SD Mines), USA	2017 - 2019
6.	Post-Doctoral Scientist, South Dakota Mines - Advisor: Timothy Masterlark	2013 - 2016
7.	Course Coordinator/Lecturer, South Dakota Mines, USA	2015
8.	Field Instructor, South Dakota Mines, USA	Summer 2014
9.	Guest Lecturer, South Dakota Mines, USA	2014 - 2019

Services (Outreach And Synergistic Activities)

1.	Invited Panelist, NASA ROSES Solicitation	2021
2.	Proposal Reviewer, US National Science Foundation	2021
3.	Journal Editorial Board of Remote Sensing	2021 -
4.	Peer Reviewer, *Geophysics Research Letter, Bulletin Of The Seismological Society Of America, Journal Of Geophysical Research, Earth And Planetary Science Letters, USGS Report, Geophysical Journal International, Earth, Planets, And Space, Journal Of Geodesy, Pure And Applied Geophysics, Journal Of Co2 Utilization, International Research Journal Of Engineering Science, International Journal Of Physical Sciences And Earth Science Research*	2014 -

5.	Vice President of Membership, Vulcan Voices Toastmasters, Alabama	2021 -
6.	Oral Presentation Judge, Student Research Symposium, South Dakota Mines	2018
7.	Judge of Outstanding Student Paper Award, AGU Fall Meeting	2016
8.	Committee, International Students Inc., South Dakota Mines	2014 - 2015

Awards And Honors

1.	Cover Page of the May 2016 Issue, Journal of Geophysical Research-Solid Earth	2016
2.	NASA ROSE ESI-Funded Postdoc Stipend (**USD 120,000**)	2017 - 2019
3.	NASA JPL-Funded Postdoc Stipend (**USD 150,000**)	2013 - 2016
4.	University Conference Grant, University of Hong Kong (**USD 2,000**)	2011
5.	Postgraduate Scholarship, University of Hong Kong (**USD 110,000**)	2007 - 2013
6.	University Travel Grant, University of Hong Kong (**USD 2,000**)	2008

Taught Courses/Lectures		**Role**	
1.	Engineering Geophysics **Course Evaluation: 4.3 out of 5**	Lecturer	2015
2.	Geophysical/Volcanology Field Camps at Hawaii	Primary Instructor	2014
3.	Physical Geology	Guest Lecturer	2014 - 2018
4.	Geophysics/Structural Geology	Teaching Assistant	2009 - 2012

Advisory/Supervisory Committees		**Degree/Student**	**Period**
1.	"*Reconciling Thermal and Deformation Models with Known Magma Location at the Iddp-1 Well, Krafla, Iceland"* (Geophysics)	Ph.D. Michael Baranowski	2015 - 2021
2.	*"Shale Poroelastic Behavior Determination by a Novel Tensile Strength Test"* (Rock Mechanics and Petrophysics)	Ph.D. Scyller Borglum	2015 - 2018
3.	*"Legal and Economic Aspects of Development near Springs"* (Economic Geology)	Ph.D. Renel Hallbeck	2018
4.	*"High Energy Cascadian Tsunami Impacts on the Mouth of the Columbia River"* (Natural Hazards)	Senior Study Benjamin Cathey	2018

Field-Trip Experiences

1.	Geophysical Surveys of Undergraduate Geophysics Course, South Dakota,	2014
2.	Geophysical Field Camp at Kilauea Volcano, Big Island, Hawaii, 3 weeks	2014
3.	Multiple High-Resolution Gravity Surveys, Eastern Tibet, 3 months	2009 - 2011
4.	Geological Mapping Field Camp of Undergraduate Course, 3 days	2012
5.	Public Geology Tour	2012
6.	Radon Potential Mapping and Geological Field Investigation, 3 months	2007 - 2009

Press And Media Attention

Invited Nationally Televised Interviews:

1. KNBN, USA (2015)
2. Phoenix TV, HK (2013)
3. Now TV, HK (2013)
4. Phoenix TV, China (2013)
5. BBTV, HK (2013)
6. TVB, HK (2013)

Professional Memberships

American Geophysical Union

Active Grants/Suports				
1.	**PI Tung** (Awarded)	NSF EAGER	*"Collaborative Proposal: Probabilistic Scenarios for Megathrust Earthquakes and Tsunami Genesis" with PI: Timothy Masterlark @South Dakota Mines*	2022-2023, **USD 179,993**
2.	**PI Tung** (Active)	NSF Prevent	*"Modeling of Crater Floor Deformation in Relationship with Lava Lake Activity" Subaward from PI: Christelle Wauthier @Penn State*	2021-2022, **USD 35,317**
3.	Associate Research Scientist	DOE	"*Water & Hole Observations Leverage Effective Stress Calculations and Lessen Expenses*" *PI: Kurt Feigl @Uwisconsin-Madison Collaborating with Lawrence Livermore National Laboratory*	2019 -
Current/Past Supports				
1.	**PI Tung**	SCEC	"*Testing Mechanical Fault Models of Complex Rock Heterogeneity: Do the Distributed Domain Material Properties Affect Elastic Slip Estimates?*"	2019 - 2020, **USD 25,000**
2.	**PI Tung**	6th ALOS Research Program, JAXA	"*Validating Interpretations of Alos-2 Data for the 2015 M8.3 Chile Earthquake: Calibration of Co-Seismic and Post-Seismic Deformation and Assessment of Transient Seismic Hazard"*	2016-2021, Funded With Data Access Of **USD 613,000** Worth
3.	Assistant Research Scientist	DOE	"*Physics-Based Operational Induced Earthquake Forecasting: Process Understanding and Hazards Mitigation?*" *PI: Manoochehr Shirzaei @Virgina Tech*	2019 - 2020
4.	Research Scientist	NASA ROSES	"*Numerical Impulse-Response Experiments for Fluid Magma Migration and Storage" Pi: Timothy Masterlark* @South Dakota *Mines*	2017 - 2019
5.	Post-Doc	NASA ROSES	*"Near-Field Postseismic Deformation, Insar Observations, and Modeling" PI: Timothy Masterlark* @South Dakota *Mines*	2013 - 2016
Grant Submissions/Attempts				
1.	**PI**	USGS NEHRP (Panel Recommendation)	*"Developing Community Fem-Based Green's Function Library (CGL) of Fault Deformation in the San Francisco Bay Area: Collaborative Research with Arizona State University and South Dakota School of Mines"*	2020
2.	**PI**	SCEC	*"Community Fault Dislocation Library (CDFL) of Merging CFM and CVM for Southern California – Phase 1 with a Case Study of the 2019 Ridgecrest Earthquakes"*	2020
3.	**CO-PI**	NASA ROSES	*"Constraining 3D Poroelastic Model of Central Valley Aquifer System Using Deformation, Gravity, and Well Data"*	2019

4.	**PI**	NASA ROSES	*"JPL Collaborative Research: Transient Deformational Tomography of Near-Fault Permeability and Viscosity Structures by Bayesian Impulse-Medium-Response Experiments"*	2018
5.	**PI**	USGS NEHRP	*"Cyberinfrastructure for Near-Real-Time Aftershock Hazard Mapping: a Library of Transient Deformation Models for Northern California"*	2018
6.	**PI**	USGS NEHRP	*"Community Fault Deformation Model for Northern California"*	2017
7.	**CO-PI**	NSF MGG	*"Probabilistic Tsunami Scenarios for Megathrust Earthquakes"*	2017
8.	**CO-PI**	NSF	"*Tsunami Scenarios for Megathrust Earthquakes*"	2017
9.	**PI**	NASA ROSES	*"Green's Function Library of Slip-Induced Deformation at Plate Boundaries",*	2016
10.	**PI**	NSF GEOPRISMS	*"Building Community Green's Function Library of Slip-Induced Deformation within a Heterogeneous Crustal Domain for Near-Real-Time Slip Inversion, Aftershock Forecasts, and Tsunami Warning System in the Cascadia, Alaska-Aleutian and New Zealand Subduction Zones"*	2016
11.	**PI**	USGS NEHRP	*"Green's Function Libraries of Slip-Induced Deformation for Southern California"*	2016
12.	**PI**	NSF MGG	*"Numerical Models of Coupled Earthquake-Tsunami Dynamics for Cascadia"*	2014

References

Prof. Timothy Masterlark (Post-doc Advisor)
Professor, Department of Geology
South Dakota School of Mines & Technology
Rapid City, SD, USA
Email: masterlark@sdsmt.edu

Prof. Lung Sang Chan (Ph.D. Advisor)
Deputy Director, HKUSPACE
Honorary Professor, Department of Earth Sciences
The University of Hong Kong, Hong Kong
Email: chanls@hku.hk

Prof. Manoochehr Shirzaei (Current Collaborator)
Associate Professor, Department of Geoscience
Virginia Tech, VT, USA
Email: shirzaei@vt.edu

Prof. Kurt Feigl (Current Supervisor)
Professor, Department of Geoscience
University of Wisconsin-Madison
Room A248 Weeks Hall, Madison, WI, USA
Email: feigl@wisc.edu

Current Collaborations

Manoochehr Shirzaei @ Virgina Tech
Timothy Masterlark @ South Dakota Mines
Christelle Wauthier @ Penn State
Kelly Blake @ US Navy
Christopher Sherman @ Livermore National Laboratory
Ole Kaven @ USGS
Michael Cardiff, Herbert Wang, Clifford Thurber @ UW-Madison

Past Collaborations (Last 3 years)

Roland Burgmann @ UC Berkeley
Daniel Sai Huen Lo @ University of Hong Kong
Jianshe Lei @ China Earthquake Administration
Eric Fielding, David Bekaert, Zhen Liu @ NASA JPL
Dave Petley @ University of Sheffield
Kurt Katzenstein @ South Dakota Mines

Peer-Reviewed Publications

1. **Tung, S**.*, M. Shirzaei, C. Ojha, A. Pepe, Z. Liu (2021), Structural Controls Over The Rupture And Aftershocks Of The 2019 Ridgecrest Earthquake Sequence Investigated By High-Fidelity Elastic Models Of Velocity Structures, *Journal Of Geophysical Research* https://doi.org/10.1029/2020jb021124
2. **Tung, S**.*, G. Zhai, M. Shirzaei, Potential Link Between 2020 Mentone, West Texas M5 Earthquake And Nearby Wastewater Injection: Implications For Aquifer Mechanical Properties (2020), *Geophysical Research Letter* https://doi.org/10.1029/2020gl090551
3. **Tung, S**.*, E. Fielding, D. Bekaert And T. Masterlark (2019b), Rapid Geodetic Analysis Of Subduction Zone Earthquakes Leveraging 3D Elastic Green's Function Library, *Geophysical Research Letters* https://doi.org/10.1029/2018gl080578
4. **Tung, S**.*, K. Katzenstein, T. Masterlark, J. Lei, C. Wauthier And D. Petley (2019a), Sensitivities Of Geodetic Source Analysis To Elastic Crust Heterogeneity Constrained By Seismic Tomography For The 2017 Mw 6.5 Jiuzhaigou, China, Earthquake, *Seismological Research Letters* https://doi.org/10.1785/0220180272
5. **Tung, S**.*, And T. Masterlark (2018d), Delayed Poroelastic Triggering Of The 2016 October Visso Earthquake By The August Amatrice Earthquake, Italy, *Geophysical Research Letters* https://doi.org/10.1002/2017gl076453
6. **Tung, S**.*, And T. Masterlark (2018c), Sensitivities Of Near‐Field Tsunami Forecasts To Megathrust Deformation Predictions, *Journal Of Geophysical Research: Solid Earth* https://doi.org/10.1002/2017jb015354
7. **Tung, S**.*, And T. Masterlark (2018b), Resolving Source Geometry Of The August 24 2016 Amatrice, Central Italy Earthquake From Insar Data And 3D Finite Element Modeling, *Bulletin Of The Seismological Society Of America* https://doi.org/10.1785/0120170139
8. **Tung, S**.*, And T. Masterlark (2018a), Transient Poroelastic Stress Coupling Between The 2015 M7.8 Gorkha, Nepal Earthquake And Its M7.3 Aftershock, *Tectonophysics* https://doi.org/10.1016/j.tecto.2018.02.003
9. **Tung, S.***, And T. Masterlark (2016), May 2016 Cover Feature Of *Journal Of Geophysical Research - Solid Earth* https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1002/jgrb.51297
10. **Tung, S.***, And T. Masterlark (2016), Coseismic Slip Distribution Of The 2015 M_w7.8 Gorkha Earthquake From Joint Inversion Of Gps And Insar Data For Slip Within A 3D Heterogeneous Domain, *Journal Of Geophysical Research* https://doi.org/10.1002/2015jb012497
11. **Tung, S.***, Leung, J. K. C., Jiao, J., Wiegand, J., And Wartenberg, W. (Https://Doi.Org/10.1002/2015jb012497 2013), Assessment Of Soil Radon Potential In Hong Kong, China, Using A 10-Point Evaluation System, *Environmental Earth Sciences*, P. 1-11. https://doi.org/10.1007/s12665-012-1782-0
12. Masterlark, T.*, T. Donovan, K.L. Feigl, M. Haney, C. Thurber, And **S. Tung** (2016), Volcano Deformation Source Parameters Estimated From Insar: Sensitivities To Uncertainties In Seismic Tomography, *Journal Of Geophysical Research* https://doi.org/10.1002/2015jb012656
13. Cheung, Y. T. D. *, M. J. Spittal, M. K. Williamson, **S. Tung** And Pirkis, J., (2014), Predictors Of Suicides Occurring Within Suicide Clusters In Australia, 2004-2008, *Social Science & Medicine*, 118, 135-142 https://10.1016/j.socscimed.2014.08.005
14. Cheung, Y. T. D.*, M. J. Spittal, M. K. Williamson, **S. Tung** And Pirkis, J., (2013), Application Of Scan Statistics To Detect Suicide Clusters In Australia, *Plos One*, V. 8, No. 1, P. E54168. https://10.1371/journal.pone.0054168

Book Chapters

1. **Tung, S.**, T. Masterlark, And D. S. H. Lo (2018). Finite Element Models Of Elastic Earthquake Deformation, In *Earthquakes-Forecast, Prognosis, And Earthquake Resistant Construction*, *Intechopen*. (Invited) https:///doi.org/10.5772/intechopen.76612
2. Masterlark, T., And **S. Tung** (2018), Finite Element Models Of Elastic Volcano Deformation, In *Volcanoes*, *Intechopen* (Invited) https:///doi.org/10.5772/intechopen.71156

Thesis and Dissertation

1. **Tung, S.** (2013), Co-Seismic And Post-Seismic Gravity Variation Associated With The 2008 M8 Wenchuan Earthquake, Ph.D. Thesis, University Of Hong Kong https://doi.org/10.5353/th_b5053364
2. **Tung, S.** (2009), Radon Potential Mapping In Hong Kong, Mphil Thesis, University Of Hong Kong http://doi.org/10.5353/th_b4414242

Conference Papers and Abstracts

1. Feigl, K. L., **S. Tung**, H. Guo, E. Cunningham, J. Hampton, S. J. Kleich, B. Jahnke, B. Heath, C. Roland, M. Folsom, J. Akerley, C. Sherman, I. Warren, C. Kreemer, H. Sone M. A. Cardiff, N. E. Lord, C. H. Thurber, H. F. Wang (2022), Overview And Preliminary Results From The Wholescale Project At San Emidio, Nevada, U.S., 45th Workshop On Geothermal Reservoir Engineering, Stanford University, Stanford, California, February 7-9, 2022 (Submitted)
2. ***Tung, S.**, K. Blake, M. Shirzaei, M. Cardiff, T. Masterlark, H. F. Wang, K. L. Feigl (2021), Temporal Evolution And Spatial Distribution Of Stress And Strain At Coso Geothermal Field: January 2005 Through June 2019, American Geophysical Union Fall Meeting (Accepted)
3. ***Tung, S.**, C. Sherman, T.Masterlark, M. Cardiff, H. F. Wang, K. L. Feigl (2021), Modeling Displacement, Strain, And Stress Via A Library Of Green's Functions Calculated With The Finite Element Method: Application To Coso Geothermal Field, California, U.S.A., American Geophysical Union Fall Meeting (Accepted)
4. ***Tung, S.** And K. Feigl (2021), Modeling Surface Deformation Of Geothermal Environments With High-Fidelity Finite Element Models, *Egu Annual Meeting*
5. ***Tung, S.**, M. Shirazei, T. Masterlark (2020), Integrated Fault Mesh Of Southern California In Finite Element Models Of Structural Geometric Complexities, Crustal Heterogeneity, And Topography, *Scec Annual Meeting*
6. ***Tung, S.**, G. Zhai And M. Shirazei (2020), 2020 M5 Mentone Earthquake Potentially Induced By Deep Wastewater Injection: Implications For Reservoir Mechanical Property And Individual Well Impacts, *American Geophysical Union Fall Meeting*, California
7. ***Tung, S.**, G. Zhai And M. Shirazei (2019), Investigating Impact Of Local Hydrogeology And Tectonics On Physics-Based Induced Earthquake Forecast Models, *American Geophysical Union Fall Meeting*, California
8. *Masterlark, T., J. Long-Fox And **S. Tung** (2019), Enhancing Inverse Analyses Of Volcano Deformation Data With Multidisciplinary Information Using Finite Element Models, *American Geophysical Union Fall Meeting*, California
9. *Long-Fox, J., T. Masterlark, J. And **S. Tung** (2019), Investigating Transient Deformation Of Okmok Volcano, Alaska, Using Fems, *American Geophysical Union Fall Meeting*, California
10. **Tung, S.**, G. Ustunisik And *R. L. Nielse (2018), Potential Consequences Of The Compositional Distribution Of Trace Element Partitioning Experiments, Abstract #382100, *American Geophysical Union Fall Meeting*, Washington
11. *Masterlark, T., **S. Tung**, G. Ustunisik And M. Baranowsk (2018), Impulse-Response Experiments For Integrating Space-Borne, Field, And Laboratory Measurements Of Magmatic Systems*, American Geophysical Union Chapman Meeting*, Quinamavida, Maule Region, Chile
12. ***Tung, S.**, And T. Masterlark (2016), Rapid Inversion Of Earthquake Sources By Geodesy- Based Seismic Deformation Within Complex Crustal Heterogeneity, *American Geophysical Union Fall Meeting*, San Francisco
13. ***Tung, S.**, And T. Masterlark (2016), Coseismic Slip Distribution Along A Curved Rupture Embedded In The 3D Heterogeneous Crust: Joint Inversion Of Insar And Gps Data For The 2016 Central Italy Earthquake, *American Geophysical Union Fall Meeting*, San Francisco, Usa
14. ***Tung, S.**, T. Masterlark And T. Donovan (2015), Inverting For Earthquake Kinematic Source Parameters With Gps And Insar: Stepwise Nonlinear And Linear Fem-Based Inverse Analyses*, International Association For Mathematical Geosciences Conference*, Germany

15. Masterlark, T., K. Katzenstein, T. Donovan And ***S. Tung** (2015), Volcano Deformation Source Parameters Estimated From Fem-Based Nonlinear Inverse Analyses Of Insar: Sensitivities To Uncertainties In Seismic Tomography, *International Association For Mathematical Geosciences Conference*, Freiberg, Germany
16. *Masterlark, T., T. Donovan, And **S. Tung** (2014), Embedding Abaqus In Nonlinear Inverse Analyses Of Satellite Radar Data To Estimate Magma Flux Within An Active Volcano, *Simulia Community Conference*, Providence, Usa
17. *Masterlark, T., K. Katzenstein, T. Donovan And **S. Tung** (2014), Fem-Based Nonlinear Inverse Analyses Of Volcano Deformation: Sensitivities To Uncertainties In Seismic Tomography And Nonspherical Chambers, *Wegener*, Leeds, Uk
18. *Donovan, T., T. Masterlark, And **S. Tung** (2014), Automation Techniques For Developing And Evaluating 3D Heterogeneous Elastic Volcano Deformation Fems, *Wegener*, Leeds, Uk
19. ***Tung, S.**, L. Chan And T. Masterlark (2012), Finite Element Modeling Of Post-Seismic Viscoelastic Response Of The Crust Associated With The 2008 M=8.0 Wenchuan Earthquake, *International Geological Congress, Brisbane*, Australia
20. ***Tung, S.**, L. Chan And T. Masterlark (2011), Finite Element Modeling Of Co-Seismic Deformation Of The Longmenshan Thrust Belt Associated With 2008 M=8 Sichuan Earthquake, Abstract T23c-2418, *Agu Fall Meeting*, San Francisco, Usa
21. Chan, L, ***S. Tung**, M. Chan, J. Zhu (2011), Evidence For Co-Seismic And Post-Seismic Changes In Gravity Values Associated With The 2008 M=8 Sichuan Earthquake, Abstract T23c-2420, *American Geophysical Union Fall Meeting*, San Francisco, Usa
22. ***Tung, S.**, Leung J. K. C. (2008), Radon Potential Mapping In Hong Kong, *Workshop On Radon Risk Mapping: From Soil-Gas To Indoor Concentrations*, *International Geological Congress*, Oslo, Norway

*Presenting Author