

LI-WEI KUO



Areas of Expertise:
Mineralogy,
Petrology,
Rock mechanics,
Tectonophysics

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Sciences, National
Central University

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Zhongda Rd., Zhongli
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32001, Taiwan ROC

EDUCATION

- 2009.01-2011.02 **Ph. D, Department of geosciences, National Taiwan University, Taiwan**
2004.02-2007.09
Thesis title: Characteristics of Clay Minerals from the Taiwan Chelungpu fault Drilling Project
Award: 2010 Annual best thesis Award in Youth Forum, National Taiwan University
- 2001.07-2004.01 **Master, Department of geosciences - division of applied geology, National Taiwan University, Taiwan**
Thesis title: Fault-Related Rocks from Foot Hill of Miaoli
Award: 2004 Annual best thesis Award in Youth Forum, National Taiwan University
- 1997.07-2001.06 **Bachelor of Science in Geology, National Taiwan University, Taiwan**

EXPERIENCE

- 2018.08-present **Associate Professor, National Central University, Taiwan**
- 2015.08-2018.07 **Assistant Professor, National Central University, Taiwan**
- **2016 Ministry of Science and Technology Project (3 years):** Deciphering the seismically active faults from natural and experimental fault rocks
 - **2016 Ministry of Science and Technology Project:** Initiation and kinematics of deep-seated rockslides-friction law on sliding plane
 - **2015 Ministry of Science and Technology Project:** Inferring deformation mechanics of active faults using an integrated field and laboratory approach
- 2015.06-2015.07 **Post-doctoral fellow, National Taiwan University with supervisor *John Suppe*, Taiwan**
- 2014.08-2015.05 **Visiting researcher, University of Padova with supervisor *Giulio Di Toro*, Italy**
- 2011.03-2014.07 **Post-doctoral fellow, National Taiwan University with supervisor *John Suppe*, Taiwan**
- 2009.07-2009.08 **On-site geologist, Wenchuan Earthquake Fault Scientific Drilling Project, China**

COLLABORATIVE RESEARCH PROJECT & OVERSEA EXPERIENCE

- 2017.08 - present **Bulk rheology of fault damage zone materials and its implication for interseismic fault mechanics -Chelungpu fault, Taiwan: with Hiroki Sone at University of Wisconsin-Madison, USA**
- 2011.07-present **Wenchuan Earthquake Fault Scientific Drilling (WFSD), China: with Haibing Li and Jialiang Si at Chinese Academy of Geological Sciences, China**
- 2014.08-2015.06
2012.07-2012.07
2011.10-2011.11 **Research program at Istituto Nazionale di Geofisica e Vulcanologia (INGV) and University of Padova, Italy: with Giulio Di Toro and Elena Spagnuolo at Università di Padova and Istituto Nazionale di Geofisica e Vulcanologia, Italy**
- 2006.07-2006.08 **Research Training Program at Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan**
- 2005.09-2007.08 **Taiwan Chelungpu Fault Drilling Project (TCDP), Taiwan**

EXPERIMENT EQUIPMENT

Analytical instrument

- Synchrotron X-ray diffraction
- Synchrotron Transmission X-ray Microscopy
- X-ray powder Diffraction (XRD)
- X-ray Fluorescence (XRF)
- Thermogravimetric Analyzer (TGA)
- Scanning Electron Microscope (SEM)
- Transmission Electron Microscope (TEM)
- Micro-Raman

Simulated fault instrument

- Slow to High Velocity Apparatus (SHIVA)
- Rotary-shear high-velocity frictional testing apparatus (LHVR)

AWARD & FELLOWSHIP

- 2018 **2018 Good Teaching Faculty of the College of Earth Sciences, National Central University, Taiwan**
- 2015-2017 **2015-2017 Newly-Employed Teacher Academic Research Grants, National Central University, Taiwan**
- 2014 **Ma Ting-Ying Youth Thesis Award (馬廷英青年論文獎), Geological Society of Taiwan**
- 2014 **PISCOPIA Fellowship Programme co-funded by Marie Curie Actions**
- 2013 **Postdoctoral Research Abroad Program, National Science Council, Taiwan**

PUBLICATION

- ***Kuo, L. W.****, J. R. Huang, J. N. Fang, J. Si, H. Li and S. R. Song, 2018. Carbonaceous materials in the fault zone of the Longmenshan Fault belt: 1. Signatures within deep Wenchuan earthquake fault zone and its implication. *Minerals*, 8(385), doi: 10.3390/min8090385.

- **Kuo, L. W.***, J. R. Huang, J. N. Fang, J. Si, S. R. Song, H. Li and E. C. Yeh, 2018. Carbonaceous Materials in the Fault Zone of the Longmenshan Fault Belt: 2. Characterization of Fault Gouge from Deep Drilling and Implications for Fault Maturity. *Minerals*, 8(393), doi: 10.3390/min8090393.
- J. Si*, H. Li, **L. W. Kuo**, J. R. Huang, S. R. Song, J. Pei, H. Wang, L. Song, J. N. Fang and H. S. Sheu. Carbonaceous Materials in the Longmenshan Fault Belt Zone: 3. Records of Seismic Slip from the Trench and Implications for Faulting Mechanisms. *Minerals*, 8(457), doi:10.3390/min8100457
- **Kuo, L. W.***, F. Di Felice, E. Spagnuolo, G. Di Toro, S. R. Song, S. Aretusini, H. Li, J. Suppe, J. Si and C. Y. Wen, 2017. Fault gouge graphitization as evidence of past seismic slip. *Geology*, 45, p.979-982, doi: 10.1130/G39295.1.
- **Kuo, L. W.***, S. R. Song, J. Suppe and E. C. Yeh, 2016. Fault mirrors in seismically active fault zones: A fossil of small earthquakes at shallow depths. *Geophysical Research Letters*, 43, p.1950-1959, doi: 10.1002/2015GL066882.
- **Kuo, L. W.***, Y. F. Song, C. M. Yang, S. R. Song, C. C. Wang, J. J. Dong, J. Suppe and T. Shimamoto, 2015. Ultrafine spherical quartz formation during seismic fault slip: Natural and experimental evidence and its implications. *Tectonophysics*, 664, p.98-108.
- Wang, H., H. Li, J. Si, Z. Sun, X. Fu, D. Liu, J. Pei, C. Li, J. Zhang, S. R. Song, **L. W. Kuo**, J. Mori, L. Xue, E. E. Brodsky, K. Yun and Z. Gong, 2015. Progress in the study of the Wenchuan Earthquake Faulting. *Acta Geoscientica Sinica*, 36(3), p.257-269, doi: 10.3975/cagsb.2015.03.01
- **Kuo, L. W.*** and S. R. Song, 2014. Characteristics of clay minerals in principal slip zone of an active fault: A case study from the Taiwan Chelungpu fault Drilling Project: Invited chapter in Jorge Sanjurjo-Sánchez, eds., hardcover edited collection "Clays and Clay Minerals: Geological Origin, Mechanical Properties and Industrial Applications": Nova Science Publishers Inc., p.297-333. ISBN: 978-1-63117-779-8.
- Si, J., H. Li, **L. W. Kuo**, J. Pei, S. R. Song and H. Wang, 2014. Clay mineral anomalies in the Yingxiu-Beichuan fault zone from the WFSD-1 drilling core and its implication for the faulting mechanism during the 2008 Wenchuan earthquake (Mw 7.9). *Tectonophysics*, 619-620, p. 171-178.
- **Kuo, L. W.***, H. C. Hsiao, S. R. Song, H. S. Sheu and J. Suppe, 2014. Coseismic thickness of principal slip zone from the Taiwan Chelungpu fault Drilling Project-A (TCDP-A) and correlated fracture energy. *Tectonophysics*, 619-620, p.29-35.
- **Kuo, L. W.***, H. Li, S. Smith, G. Di Toro, J. Suppe, S. R. Song, S. Nielsen, H. S. Sheu and J. Si, 2014. Gouge graphitization and dynamic fault weakening during the 2008 Mw 7.9 Wenchuan earthquake. *Geology*, 42, p.47-50, doi: 10.1130/G34862.1.
- Li, H. B., H. Wang, Z. Q. Xu, J. L. Si, J. L. Pei, T. F. Li, H. Yao, S. R. Song, **L. W. Kuo**, Z. M. Sun, M.-L. Chevalier and D. L. Liu, 2013. Characteristics of the fault-related rocks, fault zones and the principal slip zone in the Wenchuan earthquake Fault Scientific Drilling project Hole-1 (WFSD-1).

Tectonophysics, 584, p.23-42.

- **Kuo, L. W.***, S. R. Song, E. C. Yeh, H. F. Chen and J. Si, 2012. Clay mineralogy and geochemistry investigations in the host rocks of the Chelungpu fault, Taiwan: implication for faulting mechanism. *Journal of Asian Earth Sciences*, 59, p.208-218.
- Chou, Y. M., S. R. Song, C. Aubourg, T. Q. Lee, A. M. Boullier, Y. F. Song, E. C. Yeh, **L. W. Kuo** and C. Y. Wang, 2012. An earthquake slip zone is a magnetic recorder. *Geology*, 40, p.551-554, doi: 10.1130/G32864.1.
- **Kuo, L. W.**, S. R. Song, L. Huang, E. C. Yeh and H. F. Chen, 2011. Temperature estimates of coseismic heating in clay-rich fault gouges, the Chelungpu fault zones, Taiwan. *Tectonophysics*, 502, p.315-327.
- Chen, H. F., Y. P. Chang, S. J. Kao, M. T. Chen, S. R. Song, **L. W. Kuo**, S. Y. Wen, T. N. Yang and T. Q. Lee, 2011. Mineralogical and geochemical investigations of sediment-source region changes in the Okinawa Trough during the past 100 ka (IMAGES core MD012404). *Journal of Asian Earth Science*, 40(6), p.1238-1249.
- **Kuo, L. W.**, S. R. Song, E. C. Yeh and H. F. Chen, 2009. Clay mineral anomalies in the fault zone of the Chelungpu Fault, Taiwan, and their implications. *Geophysical Research Letters*, 36, L18306, doi:10.1029/2009GL039269
- Wu, Y. H., E. C. Yeh, J. J. Dong, **L. W. Kuo**, J. Y. Hsu and J. H. Hung, 2008. Core-log integration studies in hole-A of Taiwan Chelungpu-fault Drilling Project. *Geophysical Journal International*, 174, p.949-965, doi: 10.1111/j.1365-246X.2008.03841.x
- Wang, P. L., L. H. Lin, H.T. Yu, T.W. Cheng, S. R. Song, **L. W. Kuo**, E. C. Yeh, W. Lin and L. Y. Wang, 2007. Cultivation-Based Characterization of Microbial Communities Associated with Deep Sedimentary Rocks from Taiwan Chelungpu Drilling Project Cores. *Terrestrial Atmospheric and Oceanic Science*, 18, p.395-412.
- Song, S. R., **L. W. Kuo**, E. C. Yeh, C. Y. Wang, J. H. Hung and K. F. Ma, 2007. Characteristics of the Lithology, Fault-related rocks and fault zone structures in the TCDP Hole-A. *Terrestrial Atmospheric and Oceanic Science*, 18, p.243-269.
- Ma, K. F., H. Tanaka, S. R. Song, C. Y. Wang, J. H. Hung, Y. B. Tsai, J. Mori, Y. F. Song, E. C. Yeh, W. Soh, H. Sone, **L. W. Kuo** and H. Y. Wu, 2006. Slip zone and energetics of a large earthquake from the Taiwan Chelungpu-fault Drilling Project. *Nature*, 444(23), p.473-476, doi:10.1038/nature05253
- Song, S. R., Y. L. Chen, C. M. Liu, W. Y. Ku, H. F. Chen, Y. J. Liu, **L. W. Kuo**, T. F. Yang, C. C. Chen, T. K. Liu and M. Lee, 2005. Hydrochemical Changes in Spring Waters in Taiwan: Implications for Evaluating Sites for Earthquake Precursory Monitoring. *Terrestrial Atmospheric and Oceanic Science*, 16, p.745-762.
- Chen, H. F., S. R. Song, H. J. Lo, L. J. Li, J. N. Fang, Y. L. Chen, I. C. Lin, Y. J. Liu, C. M. Liu and **L. W. Kuo**, 2005. Dissolution of $\text{Na}_2\text{O-CaO-nSiO}_2$ glasses in Na_2CO_3 solution for long-term and short-term experiments. *Journal of Non-Crystalline Solids*, 351, p.1417-1425.

- Song, S. R., W. Y. Ku, Y. L. Chen, I. C. Lin, C. M. Liu, L. W. Kuo, T. F. Yang and H. J. Lo, 2003. Groundwater Chemical Anomaly before and after the Chi-Chi earthquake in Taiwan. *Terrestrial Atmospheric and Oceanic Science*, 14, p.311-320.

19 reviews for 10 different ISI journal (including *Geology*, *Scientific reports*, *EPSL*, *GSA bulletin*, *GRL*, *G-cubed*, *Tectonophysics*, *JSG*, *JAES* and *EPS*)

CONFERENCE PRESENTATION IN 5 YEARS

2018

Gordon Research Conference-Rock Deformation, USA

- Kuo, L. W., F. Di Felice, J. R. Huang, E. Spagnuolo, G. Di Toro, S.R. Song, H. Li, J. Si, S. Aretusini and J. Suppe. Coseismic Gouge Graphitization and its Signatures in the Active Fault Zone of the Longmenshan Fault, China. (poster)
- Wu, W. J., L. W. Kuo, J. C. Lee and J. J. Dong. Mineral amorphization during rock creeping: evidence from Chihshang fault. (poster)

Japan Geoscience Union Meeting, Japan

- Kuo, L. W., F. Di Felice, J. R. Huang, E. Spagnuolo, G. Di Toro, S. R. Song, H. Li, J. Si, S. Aretusini and J. Suppe. Coseismic gouge graphitization and its signatures in the active fault zone of the Longmenshan fault, China. (poster)
- Karunia, W. O., L. W. Kuo, K. F. Ma and W. J. Wu. Particle Size Distribution of the active fault zone of Chelungpu fault and its implication for slipping and energetics of large earthquakes. (poster)

Annual congress of Geological Society, Taiwan

- Wu, W. J., L. W. Kuo, J. C. Lee and J. J. Dong. Mineral amorphization during rock creeping: Evidence from Chihshang fault. (Oral presentation)
- Lin, W. T., L. W. Kuo, W. J. Wu and J. J. Dong. An upgrade fault simulator on gouge-the development of the pressure vessel. (Oral presentation)
- Karunia, W. O., L. W. Kuo, K. F. Ma and W. J. Wu. Particle size distribution to the energetics of a large earthquake and its implication for slipping mechanism. (Oral presentation)
- Aprilniadi, T. D., W. J. Wu and L. W. Kuo. Permeability structure and anisotropy: implication for the physical properties in Chihshang Fault. (Oral presentation)

2017

Annual congress of Geological Society, Taiwan

- Kuo, L. W., G. Di Toro, F. Di Felice, E. Spagnuolo, S. R. Song, S. Aretusini, H. Li, J. Suppe, J. Si and C. Y. Wen. Fault gouge graphitization as evidence of past seismic slip. (Oral presentation)
- Wu, W. J., L. W. Kuo, C. H. Mu, J. C. Lee, W. J. Huang and J. J. Dong. Integrating natural and experimental evidence for inferring Fault behavior of the seismically active Chihshang Fault, Taiwan. (Oral presentation)

- Hung, C. C., L. W. Kuo, C. C. Wang, J. J. Dong, S. R. Song, E. Spagnuolo, W. Lin and G. Di Toro. Fault Commintion and Frictional Melting during Experimental Deformation and Implications for Seismic Slip at Shallow Depths. (Oral presentation)
- Koo, W. S., Andrew T. Lin, L. W. Kuo and Y. H .Lee. Sediment characteristics and provenance of Taiwan Shoal in the southern Taiwan Strait. (Poster)

European Geosciences Union General Assembly, Austria

- Wu, W. J., L. W. Kuo, J. C. Lee, W. J. Huang and J. J. Dong. Frictional properties of the seismically active Chihshang Fault, southern section of Longitudinal Valley Fault, Taiwan, and its implication for fault strength and slip behavior. EGU2017-9672. (Poster)

2016

American Geophysical Union Fall Meeting, United States

- Kuo, L. W., V. Luzin and K. F. Ma. Unravelling deformation textures in the principal slip zone of the Chelungpu fault, Taiwan. Abstract T23A-2898.(Poster)
- Hung, C. C., L. W. Kuo, J. J. Dong, S. R. Song, E. Spagnuolo, W. Lin and G. Di Toro. Frictional Properties of Hoping Granitic Gneiss, Northeast Taiwan, and Its Implication. Abstract T21D-2845. (Poster)
- Koo, W. S., Andrew T. Lin, L. W. Kuo and Y. H .Lee. Sediment characteristics and provenance of Taiwan Shoal in the southern Taiwan Strait. Abstract OS51C-2065. (Poster)

88° Congresso della Società Geologica Italiana, Italy

- Di Toro, G., E. Spagnuolo, M. Fondriest, F. Passelegue, S. Aretusini, M. Demurtas, S. Murphy, S. Nielsen, O. Plumper and L. W. Kuo. Shallow earthquakes: are they "brittle" or "ductile"?

Faulting, friction and weakening: from slow to fast motion, United Kingdom

- Kuo, L. W., G. Di Toro, F. Di Felice, S. R. Song, E. Spagnuolo, J. Suppe and H. Li. Graphite Raman spectra in fault zones: only geothermometer or a seismic slip indicator? (Poster)

2015

American Geophysical Union Fall Meeting, United States

- Kuo, L. W., Y. F. Song, C. M. Tang, S. R. Song, C. C. Wang, J. J. Dong, J. Suppe and T. Shimamoto. Ultrafine Spherical Quartz Formation during Seismic Fault Slip: Natural and Experimental Evidence and Its Implications. (Oral presentation)

The Sino-German Workshop on Seismic Rupture and Faulting, China

- Kuo, L. W. Frictional properties of fault zone gouges from the WFSD-3 project (Mw7.9 Wenchuan earthquake). (Oral presentation)

2014

American Geophysical Union Fall Meeting, United States

- Di Toro, G., S. A. F. Smith, L. W. Kuo, S. Mittempergher, F. Remitti, E. Spagnuolo, T. M. Mitchell, A. Gaultien, J. Hadizadeh and B. M. Carpenter. Inferring earthquake physics from deep drilling projects of active faults. Abstract T33A-4638. (Poster)
- Huang, J. R., S. R. Song, H. Li, E. C. Yeh, L. W. Kuo and J. N. Fang. Characteristics of

carbonaceous materials in the fault zone of the Longmen Shan fault belt, China.
Abstract T33A-4652. (Poster)

Annual congress of Geological Society, Taiwan

- ***Kuo, L. W., S. R. Song and J. Suppe.*** Fault mirrors of seismically active fault: A fossil of small earthquakes at shallow depths. (Oral presentation)
- *Huang, J. R., S. R. Song, H. Li, E. C. Yeh, L. W. Kuo and J. N. Fang.* Characteristics of carbonaceous materials in the fault zone of the Longmen Shan faulem China, by Raman spectroscopy. (Oral presentation)

INVITED SPEECH

2018.05 **Institute of Earth Sciences, Academia Sinica, Taiwan**

- *Faults rock in fault rocks.*

2018.05 **Workshop on Drilling Investigation of Seismogenic Crust in Oklahoma (DISCO), USA**

- *Post Drilling Sample Analysis.*

2017.12 **Department of Earth and Environmental Sciences, National Chung Cheng University, Taiwan**

- *Fault gouge graphitization as evidence of past seismic slip.*

2017.03 **Department of Natural Resources and Environmental Studies, National Dong Hwa University, Taiwan**

- *Fossil earthquakes at shallow depths in seismically active fault zones, Taiwan.*

2017.03 **Mini-Symposium on X-ray crystallography, Taiwan**

- *Deciphering the seismically active faults from natural and experimental fault rocks.*

2016.11 **1st TEC Annual Meeting, Taiwan**

- *Deciphering the seismically active faults from natural and experimental fault rocks.*

2016.10 **Institute of Oceanography, National Taiwan University, Taiwan**

- *Deciphering the seismically active faults from natural and experimental fault rocks.*

2016.04 **Institute of Applied Geosciences, National Taiwan Ocean University, Taiwan**

- *Fossil earthquakes at shallow depths in seismically active fault zones, Taiwan.*

2015.12 **American Geophysical Union, USA**

- *Ultrafine Spherical Quartz Formation during Seismic Fault Slip: Natural and Experimental Evidence and Its Implications.*

2015.11 **Institute of Geology, Chinese Academy of Geological Sciences, China**

- *Frictional properties of fault zone gouges from the WFSD-3 project (Mw7.9 Wenchuan earthquake).*

PROFESSIONAL AFFILIATIONS

- 2018.05 【中華民國地質學會與中華民國地球物理學會學術研討會】民國 107 年『EM1 礦物及岩石學』及『EM2 礦物及岩石物理』召集人
Chairman of “the Mineralogy and Petrology” and “the Mineralogy and Rock Physics” session of the 107 Annual Taiwan Geosciences Assembly
- 2017.05- present 【科技部自然司地球化學貴重儀器研究與服務平台】委員
Member of the geochemical research of the Department of Natural Sciences and Sustainable Development
- 2017.08- 2021.07 【地球環境資源與災害協會】第一屆監事
Director of the 1st Earth Resources and Disaster Association
- 2017.08- 2019.07 【國立中央大學貴儀中心發展委員會】第 106、107 學年度委員
Member of the Instrumentation Center in National Central University
- 2017.08- 2019.07 【構造地質研究會】第八十四屆委員
Member of the 84th Structural Geology Research of Geological Society located in Taipei
- 2017.07-2019.06 【社團法人中華民國地質學會】第 84 屆(復會第 49 屆)財務委員會委員
Member of the 84th finance committee of Geological Society located in Taipei
- 2017.07-2019.06 【社團法人中華民國地質學會】第 84 屆(復會第 49 屆)會員委員會委員
Member of the 84th membership committee of Geological Society located in Taipei
- 2017.07-2019.06 【社團法人中華民國地質學會】第 84 屆(復會第 49 屆)國際及兩岸事務委員會委員
Member of the 84th international affairs committee of Geological Society located in Taipei
- 2017.07-2019.06 【社團法人中華民國地質學會】第 84 屆(復會第 49 屆)理事
Director of the 84th Geological Society located in Taipei
- 2017.05 【中華民國地質學會與中華民國地球物理學會學術研討會】民國 106 年『EM1 礦物及岩石學』召集人
Chairman of “the Mineralogy and Petrology” session of the 107 Annual Taiwan Geosciences Assembly
- 2016.12 The Chairperson for the poster session “Neotectonics, Seismology and surface processes in South and East Asia” at American Geophysical Union Fall Meeting
- 2016.05 【中華民國地質學會與中華民國地球物理學會學術研討會】民國 105 年壁報評審委員
Judge of the poster session of the 105 Annual Taiwan Geosciences Assembly
- 2015.08- 2017.07 【構造地質研究會】第八十三屆召集人
Chairman of the 83th Structural Geology Research of Geological Society located in

Taipei