

CHUN-YU KE

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EDUCATION

- Cornell University, Ithaca, New York, U.S.A.** **09/2016 – 08/2021**
PhD, Structural Engineering, School of Civil and Environmental Engineering
Dissertation Title: Mechanics of Spontaneously Arrested Laboratory Earthquakes
Advisors: Assistant Professor Gregory C. McLaskey and Assistant Professor David S. Kammer
- National Taiwan University, Taipei, Taiwan** **09/2012 – 06/2014**
Master of Science, Structural Engineering, Department of Civil Engineering
Thesis title: Development of Structure Optimal Design Software: Applications in Cable-Stayed Bridge Design
Thesis advisor: Professor Liang-Jenq Leu, Chairman of the department.
- National Taiwan University (NTU), Taipei, Taiwan** **09/2008 – 06/2012**
Bachelor of Science in Engineering, Department of Civil Engineering

HONORS AND AWARDS

- Outstanding Student Presentation Award, American Geophysical Union, U.S.A.** **12/2020**
• The OSPAs are awarded to promote, recognize and reward students for quality research in the geophysical sciences.
- Government Scholarship for Studying Abroad, Ministry of Education, Taiwan (R.O.C.)** **06/2019**
• This scholarship honors outstanding Taiwanese graduate students who study abroad.
- Altruistic Award, College of Engineering, National Taiwan University** **01/2014**
• This award shall spotlight the contributions and selfless dedication made by an individual to the society at large.
- Outstanding Young Researcher Award, the Twenty-Sixth KKHTCNN Symposium on Civil Engineering** **11/2013**
• This is the only award in the KKHTCNN Symposium, which honors 7 outstanding young presenters.
- Outstanding Overseas School Award, the Fifth China National Structure Design Contest for College Students** **11/2011**
• I lead the team of 3 and participate in the competition on behalf of the department of Civil Engineering, NTU.
- Outstanding Teamwork Award, 2011 Bridge Design Aesthetics Workshop, China Engineering Consultants, Inc.** **08/2011**
• I lead the team and participate in the workshop on behalf of the department of Civil Engineering, NTU.

PROFESSIONAL EXPERIENCE

- Research Associate** at Department of Geoscience, Penn State University **07/2023 – present**
- Postdoctoral Scholar** at Department of Engineering Science and Mechanics, Penn State University **09/2021 – 06/2023**
- Graduate Research Assistant** at Cornell University **09/2016 – 08/2021**
- Intern Developer, Fourdesire Co., Ltd.** **11/2015 – 05/2016**
- IT Consultant, IPworks Technology Corporation** **01/2011 – 08/2016**
- Administrative Cadre, National Fire Agency, Ministry of the Interior, Taiwan (R.O.C.)** **10/2014 – 09/2015**
- IT Engineer, Envision Engineering Consultants Inc.** **08/2014 – 10/2014**

PEER REVIEWED JOURNAL PUBLICATIONS

- Kamml, J., Ke, C.-Y., Acevedo, C. and Kammer, D.S. (2023) The Influence of AGEs and Enzymatic Cross-Links on the Mechanical Properties of Collagen Fibrils. *Journal of the Mechanical Behavior of Biomedical Materials*, 143, 105870. doi: [10.1016/j.jmbbm.2023.105870](https://doi.org/10.1016/j.jmbbm.2023.105870)
- Cebry, S. B. L*, Ke, C.-Y*, Shreedharan, S., Marone, C., Kammer, D. S. and McLaskey, G. C. (2022) Creep fronts and complexity in laboratory earthquake sequences. *Nature Communications*, 13, 6839. doi: [10.1038/s41467-022-34397-0](https://doi.org/10.1038/s41467-022-34397-0)
***co-first authors**

- Cebry, S. B. L., **Ke, C.-Y** and McLaskey, G. C. (2022) The Role of Background Stress State in Fluid-Induced Aseismic Slip and Dynamic Rupture on a 3-meter Laboratory Fault. *Journal of Geophysical Research: Solid Earth*, 127, e2022JB024371. doi: [10.1029/2022JB024371](https://doi.org/10.1029/2022JB024371)
- **Ke, C.-Y.**, McLaskey, G. C. and Kammer, D.S. (2022) Earthquake Breakdown Energy Scaling Despite Constant Fracture Energy. *Nature Communications*, 13, 1005. doi: [10.1038/s41467-022-28647-4](https://doi.org/10.1038/s41467-022-28647-4)
- Kammer, D. S., Albertini, G. and **Ke, C.-Y.** (2021) UGUCA: a spectral-boundary-integral method for modeling fracture and friction. *SoftwareX*, 15, 100785. doi: [10.1016/j.softx.2021.100785](https://doi.org/10.1016/j.softx.2021.100785)
- **Ke, C.-Y.**, McLaskey, G. C. and Kammer, D. S. (2021) The Earthquake Arrest Zone. *Geophysical Journal International*, 224(1), 581-589. doi: [10.1093/gji/ggaa386](https://doi.org/10.1093/gji/ggaa386)
- Brodsky, E. E., McLaskey, G. C. and **Ke, C.-Y.** (2020) Groove Generation and Coalescence on a Large-Scale Laboratory Fault. *AGU Advances*, 1(4), e2020AV000184. doi: [10.1029/2020AV000184](https://doi.org/10.1029/2020AV000184)
- **Ke, C.-Y.**, McLaskey, G. C. and Kammer, D. S. (2018). Rupture Termination in Laboratory-Generated Earthquakes. *Geophysical Research Letters*, 45(23), 12,784–12,792. doi: [10.1029/2018GL080492](https://doi.org/10.1029/2018GL080492)

SELECTED CONFERENCE ABSTRACTS

- **Ke, C.-Y.**, Wood, C., Rathbun, A., Marone, C., Elsworth, D., Riviere, J. and Shokouhi, P. (2022) An Integrated Experimental and Multi-Physics Numerical Study on the Interplay Between Hydraulic and Elastic Properties of Fractured Rock Interfaces Under Stress Perturbations. *American Geophysical Union, Fall Meeting Dec 12, 2022, #MR55A-07.*
- **Ke, C.-Y.**, McLaskey, G. C. and Kammer, D. S (2020) Spatial Distribution of Slip and Stress Changes in Contained Laboratory-Generated Earthquakes with Heterogeneous Initial Stress. *American Geophysical Union, Fall Meeting Dec 14, 2020, #T043-05.*
- **Ke, C.-Y.**, McLaskey, G. C. and Kammer, D. S (2019) A Singularity-Free Crack Model Inferred from Contained Laboratory-Generated Earthquakes. *American Geophysical Union, Fall Meeting Dec 13, 2019, #S53F-0526.* doi: [10.1002/essoar.10502142.1](https://doi.org/10.1002/essoar.10502142.1)
- Cebry, S. B. L., **Ke, C.-Y.**, Shreedharan, S., Marone, C., Kammer, D. S. and McLaskey, G. C. (2019) Laboratory observations of frictional stability and fault zone evolution under heterogeneous friction, rheology, and stress conditions. *American Geophysical Union, Fall Meeting Dec 13, 2019, #MR31A-05.*
- **Ke, C.-Y.**, McLaskey, G. C. and Kammer, D. S (2019) The Shape of Slip Profiles in Contained Laboratory-Generated Earthquakes. *Symposium on The Applications of Mechanics to Geophysics Jun 26, 2019*, University of California, San Diego La Jolla, CA.
- **Ke, C.-Y.**, McLaskey, G. C. and Kammer, D. S (2018) Rupture Termination in Laboratory-Generated Earthquakes. *American Geophysical Union, Fall Meeting Dec 17, 2018, #T13B-06*
- **Ke, C.-Y.**, McLaskey, G. C. and Kammer, D. S. (2018) Rupture Termination in Laboratory-Generated Earthquakes. *Gordon Research Conference: Rock Deformation August 20, 2018*, Andover, NH.

SELECTED CONFERENCE PAPERS

- Zhan, X., **Ke, C.-Y.** and Leu, L.J. (2015) Optimal Design of Cable-Stayed Bridge Using Structural Analysis Software and Optimal Design Software. *Proceeding of the Sixth Cross-Straits Symposium on Monitoring and Control in Civil Engineering*, China, August 13-16, 2015.
- **Ke, C.Y.**, Shih, K.W. and Leu, L.J. (2013) Applications of Element Exchange Method in Structural Topology Optimization. *Proceeding of the Twenty-Sixth KKHTCNN Symposium on Civil Engineering*, Singapore, November 18-20, 2013.

OPEN-SOURCE SOFTWARE

- UGUCA: a spectral-boundary-integral method for modeling fracture and friction. <https://uguca.gitlab.io/uguca/>

TEACHING EXPERIENCE

Graduate Teaching Assistant of “Intermediate Solid Mechanics”, Cornell University

Fall 2019

- Holding weekly discussion sessions and office hours.

- Proofreading, solving, and grading homework and exams.

Graduate Teaching Assistant of “Modern Structures”, Cornell University

Fall 2016-2018

- Holding office hours and labs; proofreading, solving, and grading homework and exams.
- Assisting and photographing the final pasta bridge project.

Graduate Teaching Assistant of “Intro. to the Behavior of Metal Structures”, Cornell University

Spring 2017

- Holding office hours; proofreading, solving, and grading homework and exams.

Graduate Teaching Assistant of “Method of Finite Elements”, National Taiwan University

Spring 2014

- Required course for graduate students in structural engineering division.
- Developing MATLAB program of 1D/2D/3D finite element analysis and visualization.
- Proofreading and grading homework, lab assignments, project, and exams.

Graduate Teaching Assistant of “Advanced Structural Theory”, National Taiwan University

Fall 2013

- Required course for graduate students in structural engineering division.
- Adapting FORTRAN legacy code of matrix structural analysis to MATLAB.
- Proofreading and grading homework, lab assignments, and exams.

Tutor of high school students in math, physics, and chemistry

2008 – 2016

- One-on-one tutoring — taught 21 high school students over the course of eight years.

RESEARCH INTERESTS/EXPERIENCE

- Mechanics of earthquakes: nucleation, propagation, and termination, using linear elastic fracture mechanics.
- Dynamic rupture simulations using spectral boundary integral method with different interfacial constitutive laws.
- Experiments of frictional ruptures in different scales (centimeters to meters), materials, and interfacial properties.
- Optimal structural design: structural topology optimization, multi-material structural design, microstructure design, and cable-stayed bridge design, *etc.*
- Structural engineering and computational solid mechanics.

LEADERSHIP

President of Civil Engineering Graduate Student Association, National Taiwan University

04/2013 – 04/2014

Chief of the Activity Division of the 2010 NTU Civil Engineering Orientation Camp

04/2010 – 09/2010

CERTIFICATES

Emergency Medical Technician-1 (EMT-1)

11/2014

- Trained and certificated by National Fire Agency, Ministry of the Interior (Taiwan, R.O.C.)

SKILLS AND LANGUAGES

Programming language (Proficient): MATLAB, Python, Julia, C++, C#, Java, FORTRAN, VBA.

Graphic and office software (Proficient): Photoshop, Illustrator, AutoCAD, SketchUp, Autodesk Fusion, Microsoft Office.

Structural analysis and BIM software (Competent): Abaqus, ETABS, SAP2000, Revit, Tekla.

Language: English (Fluent), Mandarin (Advanced)

Misc.: Experimental instrumentations, signal processing, optimization, MPI, OMP, Linux, web development, game development (Unity), software development.