Krittanon "Pond" Sirorattanakul

Seismological Laboratory, California Institute of Technology, Pasadena, CA, USA
Email: ksirorat@caltech.edu | Website: ksirorat.people.caltech.edu

Geoscientist at Caltech looking to create data-driven solutions to problems across disciplines.

EDUCATION

Ph.D. Candidate in Geophysics, minor in **Computer Science and Engineering** **Expected 2024**
California Institute of Technology, Pasadena, CA, USA GPA: 3.9/4.0

B.S. in Physics; B.A. in Earth & Environmental Sciences (highest honors) **2018**
Lehigh University, Bethlehem, PA, USA GPA: 3.94/4.0

EXPERIENCE

Graduate Research Assistant, *California Institute of Technology, Pasadena, CA, USA* 09/18 –present
Jean-Philippe Avouac Research Group

- **Blind source separation of GPS data:** Isolate deformations due to fault slips (2 - 3 mms) from GPS time series (RMS > 5 mm) using MATLAB-based variational Bayesian Independent Component Analysis
- **Inversion of geodetic data:** Develop MATLAB packages for jointly inverting surface deformations measured by GPS, InSAR, and optical images for slip on the faults at depth
- **Probabilistic earthquake forecasting:** Model and forecast earthquake rates from precursory surface deformations using point process statistics and a stress-driven model based on rate-and-state friction

Ares J. Rosakis Research Group and Center for Geomechanics and Mitigation of Geohazards (GMG)

- **Imaging laboratory earthquakes:** Design experiments to measure fault slip (10^{-11} - 10 m/s) in the presence of fluids using high-speed camera (10 million fps) and digital image correlations (DIC)
- **GPU:** Accelerate non-local means image filtering using Numba CUDA kernels (Google Colab NVIDIA Tesla T4 GPU) by > 3,500 times over python native (Google Colab Intel Xeon 2.30 GHz CPU)

Petroleum Engineer PhD Intern 06/22 – 09/22
Geomechanics Chapter, Chevron Technical Center, Houston, TX, USA

- Incorporate a newly developed method for robust estimation of magnitude statistics (b-value) in the presence of spatially varying detection levels into induced seismicity modeling tools (**patent pending**)
- Improve induced seismicity forecasts by integrating other surveillance data (DAS, InSAR) and make recommendations to field operations

NASA-funded Education Research Intern 05/17 – 11/17
Nurture Nature Center, Easton, PA, USA

- Developed lessons for middle schoolers and created dataset from satellite images for 3D sphere display

Lee Teng Intern in Accelerator Science and Engineering 06/16 – 08/16
Fermi National Accelerator Laboratory, U.S. Department of Energy, Batavia, IL, USA

- Developed graphical displays using a java-based platform and LabVIEW for cryomodule testing

TECHNICAL SKILLS

Programming Languages: *MATLAB, python, UNIX/shell, CUDA C/C++, java, LabVIEW*
Software Packages: *Tensorflow, Keras, sklearn, nltk, TextBlob, Numba, pandas, NumPy, ObsPy, FEniCS*
Tools: *Google Colab, Jupyter Notebook, Git, SolidWorks (CAD), ArcGIS, QGIS, ENVI, Google Earth*

ACHIEVEMENTS

- Named **24 Under 24 Leaders and Innovators** in 2018 by the Mars Generation.
- Co-lead **> 350 members** from **> 70 countries** in the Space Technology for Earth Applications (STEA) project group of the Space Generation Advisory Council (SGAC) in support of the **United Nations**.
- Published **3 peer-reviewed manuscripts** (citations = 18, h-index = 2) and **1 book chapter**.
- Journal Reviewer for *Earth and Planetary Science Letters, Geophysical Research Letters*