

## Jeremy Maurer

Geological Engineering Program  
Geosciences and Geological and Petroleum Engineering  
Missouri University of Science and Technology

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### SUMMARY

Dr. Maurer is Assistant Professor in the Geological Engineering program at Missouri S&T in Rolla, MO, where he has worked since January 2020. Dr. Maurer's research is focused on applying a broad range of statistical and computational techniques to solve problems in earthquake science and remote sensing. Several projects in southern California, Mexico, Haiti, and Guatemala involve using InSAR and GNSS to measure crustal strain accumulation on large faults and resulting earthquake potential, developing new algorithms for quantifying uncertainty in the results. He also studies human-induced earthquakes, using numerical models and statistical analysis to understand what controls the largest events, and develops new methods to model and remove atmospheric noise from InSAR data.

### EDUCATION

Ph.D. Geophysics, Stanford University, 2018  
M.S., Geological Sciences, Indiana University, 2013  
B.A., General Science, Grace College, 2010

### PROFESSIONAL APPOINTMENTS

2020-Present Assistant Professor, Missouri University of Science and Technology.  
2018-2019 Postdoctoral Researcher, RADAR Science and Engineering, Jet Propulsion Laboratory.  
2017 Summer Intern, Earthquake risk management, Risk Management Solutions, Inc.

### PUBLICATIONS

#### In preparation or submitted

Maurer, J., D. Bekaert, P. S. Agram, & H. Fattahi, (*in prep*), A ray-tracing tropospheric noise correction for InSAR.

Maurer, J., P. Segall, and E. Dunham. (*submitted*) Role of fluid injection on earthquake size in dynamic rupture simulations on rough faults.

Maurer, J., D. Bekaert, J.A. Gonzalez-Ortega, and M.-H. Huang. (*submitted*) Disentangling Aseismic Processes on the Guerrero Segment of the Mexico Subduction Zone using Geodetic Data.

### Published and in press

Maurer, J., D. Kane, M. Nyst, and J. Velasquez. (2020). Risk from Oklahoma's Induced Earthquakes: The Cost of Declustering. *Bulletin of the Seismological Society of America*. doi: <https://doi.org/10.1785/0120190268>.

Maurer, J., and P. Segall, (2018). Magnitudes of Induced Earthquakes in Low-Stress Environments, *Bull. of the Seismological Society of America*, 108 (3A): 1087–1106. doi: <https://doi.org/10.1785/0120170295>.

Maurer, J., K. Johnson, and P. Segall (2018). Bounding the moment deficit rate on crustal faults using geodetic data: Application to Southern California. *J. Geophys. Res. Solid Earth*, 123. <https://doi.org/10.1029/2018JB016097>.

Maurer, J., P. Segall, and A. Bradley (2017). Bounding the Moment Deficit Rate on Crustal Faults using Geodetic Data: Methods, *J. Geophys. Res. Solid Earth*, 122, doi:10.1002/2017JB014300.

Maurer, J., and R. Knight (2016). Models and Methods for Predicting Hydraulic Conductivity in Near-Surface Unconsolidated Sediments Using Nuclear Magnetic Resonance, *GEOPHYSICS* 81(5): D503-D518, doi: 10.1190/geo2015-0515.1.

Maurer, J., and K. Johnson (2014). Fault coupling and potential for earthquakes on the creeping section of the central San Andreas Fault, *J. Geophys. Res. Solid Earth*, 119, doi:10.1002/2013JB010741.

### INVITED TALKS

- 2019 Geodetic Remote Sensing constrains slip and moment release from the 2017/2018 SSE and earthquakes near Guerrero, Mexico, Berkeley SeismoLab, Nov 19.
- 2019 Answering Questions about Human-induced earthquakes, Missouri S&T, Feb 20.
- 2016 Bounding the Interseismic Moment Deficit Rate – Methods and Application to Southern California, USGS Earthquake Science Center, Nov 2.

### CONFERENCE PRESENTATIONS

#### Talks

- 2017 Estimating Interseismic Surface Strain and Moment Deficit Rates in Southern California using Geodetic Data, SSA annual meeting.
- 2016 Geostatistical Interpolation of GPS Velocities in Southern California with Applications, Stress in the Earth workshop, Los Alamos National Laboratory.
- 2015 Modeling Time Dependent Earthquake Magnitude Distributions Associated with Injection-Induced Seismicity, AGU Fall Meeting.

- 2015 An Assessment of the Relationship for Estimating Hydraulic Conductivity from NMR Measurements in Unconsolidated Sediments, MRS conference, Aarhus University, Aarhus, Denmark.
- 2014 Constraining Moment Deficit Rate on Crustal Faults from Geodetic Data, AGU Fall Meeting.
- 2013 Constraining earthquake moment deficit rate on the creeping segment of the San Andreas Fault, AGU Fall Meeting.

### **Posters**

- 2019 Slow slip and potential earthquake triggering near Guerrero, Mexico from geodetic remote sensing, SSA annual meeting.
- 2018 Slow slip and potential earthquake triggering near Guerrero, Mexico from geodetic remote sensing, AGU Fall Meeting.
- 2017 Modeling earthquake magnitudes from injection-induced seismicity on rough faults, AGU Fall Meeting.
- 2016 Estimating Interseismic Surface Strain and Moment Deficit Rates in Southern California using Geodetic Data, AGU Fall Meeting.
- 2015 Constraining Moment Deficit Rate on Crustal Faults from Geodetic Data, SCEC annual meeting.
- 2013 Constraining earthquake moment deficit rate on the creeping segment of the San Andreas Fault, SCEC annual meeting.

## **RESEARCH EXPERIENCE**

### **Jet Propulsion Laboratory**

- Develop and apply time series methods for InSAR observations to measure time-dependent surface deformation in southern Mexico
- Develop general algorithms for tropospheric correction of InSAR data

### **Stanford University**

- Combining theoretical simulations of fault roughness and slip with observations of induced seismicity to estimate in-situ stress and fault properties in Oklahoma
- Developed methods for quantifying uncertainty in the seismic moment accumulations rates in southern California using geodetic data based on physical models of the crust
- Probabilistic and statistical analysis of synthetic earthquake catalogs for determining parameters that control the magnitude of anthropogenically-induced earthquakes
- Analyzing and simulating induced earthquake sequences for understanding induced earthquake magnitudes
- Developing geostatistical tools for interpolation of GPS measurements of the crustal velocities for use in estimating surface strain rates and earthquake potential
- Developed models for predicting hydraulic conductivity in unconsolidated aquifer sediments using NMR measurements; quantified uncertainty in the results

### **RMS, Inc.**

- Analyzed earthquake sequences and developed risk models for induced seismicity in Oklahoma

**Indiana University**

Estimated uncertainty in the moment deficit rate on the creeping San Andreas Fault

**TEACHING EXPERIENCE**

**Stanford University**

Crustal Deformation (Winter 2016, TA)

Predicting Volcanic Eruptions (Spring 2014, TA)

**Indiana University**

Earthquakes and Volcanoes (Fall 2012, Instructor of record, designed and taught the course)

**Grace College**

Physical Science Survey (2013, Instructor of record, taught the online course)

Physics I & II (2007, 2008, 2009, Lab Instructor)

**PROFESSIONAL MEMBERSHIPS**

American Geophysical Union

Seismological Society of America

**OTHER SKILLS**

**Field Experience**

Geologic mapping

Geophysical tools: LIDAR, gravity, GPS surveys

Nuclear magnetic resonance

**Programming and software**

Python, Matlab, R, C++

Windows, Mac OS, Linux

**Other**

Bash scripting, Linux servers, and basic Linux system administration

Bayesian statistics, modeling, and analysis

Machine learning, geostatistics