KHURRAM S. ASLAM

(901)359-3308 ⋄ kaslam@uoregon.edu
University of Oregon, Eugene, OR, USA
https://ksaslam.github.io/ ⋄ Github ⋄ Google Scholar

PROFESSIONAL SUMMARY

I have more than six years of experience as a Geoscience researcher. My current research is in the field of machine learning applications to Geoscience, dynamic rupture modeling, kinematic rupture modeling, earthquake cycle modeling, and ambient noise correlations. I also have experience of processing and interpreting seismic reflection data using commercial applications since I have worked for oil and gas industry. I also have a field experience of Nodes and Broadbands deployment.

EDUCATION

Ph.D. in Geophysics August 2014 - June 2019
CERI, University of Memphis, Memphis, TN, USA. CGPA: 3.94
Thesis: Modeling the effect of fault roughness on aftershock distribution.

Masters in EarthSystem Physics August 2011 - June 2013
International Center for theoretical Physics, Trieste, Italy. CGPA: 3.94
Thesis: Modeling pre-seismic phase of an earthquake using spring-slider model.

RELEVANT EXPERIENCE

Post Doctorate fellow Sept 2019 - Current
University of Oregon, Eugene, OR

- Modeled the coupled interaction of the slow-slip region and fast slip regions of Hawaaian subduction using seismic cycle modeling.
- investigated the effect of accretionary wedge structure of the Cascadia subduction on the shallow earthquake rupture process using Dynamic earthquake rupture propagation modeling.
- Constructing deep learning model using LSTM and convolutional neural network by training on synthetic earthquake and tsunami data to create a model for earthquake and tsunami early warning system.

Geoscientist March 2019 - Sept 2019
Landmark Graphics (LGC Haliburton), Houston, TX, USA.

- Data loading, Data import, Data management and Data Migration of different data types related to Hydrocarbon exploration in major G&G industry applications (OpenWorks/ Petrel/ Kingdom).
- Software support for Promax/ SeisSpace: Performing seismic processing workflows, Writing GOBOT scripts for automation of seismic processing, and Running jobs in a cluster environment to improve efficiency of large jobs using TORQUE.
- Software support of advanced modules of OpenWorks DecisionSpace Geoscience R5000 such as eZtracker, eZvalidator, Volume composer, Earth modeling, mapping Static and dynamic frameworks to fill, and DecisionSpace Stimulation (Microseism data handling).

Graduate Research Assistant Sept 2014 - Feb 2019
CERI, University of Memphis, Memphis, TN, USA.

- Modeled effect of stresses on spatial distribution of aftershocks by performing dynamic earthquake rupture modeling on complex faults.
- Modeled effect of damage zone on spatial distribution of aftershocks by performing dynamic earthquake rupture modeling on complex faults with inelastic deformation.
- Coupled the physics of short-term (dynamic) and long-term (quasi-static) phase of an earthquake to model interseismic phase of an earthquake on complex faults.

- Modeled the effect of topography and subsurface structure on ground motions in Christchurch area, New Zealand by performing kinematic earthquake rupture modeling.
- Estimated the seasonal variation in the seismic velocities in New Madrid region using ambient noise correlation technique of passive seismic data.
- Collaborated in estimating the maximum possible magnitude of an induced earthquake in Oklahoma using neural network approach of Machine-learning.
- The modeling resulted in three peer-reviewed publications (provided in publication section).

FUNDED RESEARCH PROPOSALS

1. Effect of fault roughness and associated inelastic deformation on postseismic and interseismic strain (2017). Funded by Southern California earthquake Center (SCEC). I wrote first draft (PI: Eric Daub).

2. The influence of rheology on post-seismic and interseismic deformation on rough faults (2018). Funded by SCEC, I wrote first draft (PI: Eric Daub).

RESEARCH PUBLICATIONS

In review

1. Aslam, K. S., Thomas, A. M., Melgar, D. (2020). Modeling the effect of the Fore-arc Deformation Style of the Cascadia Subduction Zone on its Shallow Earthquake Rupture behavior, Journal of Geophysical Research.

2. Saxena, A., Aslam, K. S., Choi, E., Powell, C., (2020). Effect of lithospheric foundering on the seismicity of the Eastern Tennessee Seismic Zone

Published (Selected)

3. Lin, J. T., Aslam, K. S., Thomas, A. M., Melgar, D. (2020). Overlapping regions of co-seismic and transient slow slip on the Hawaiian décollement. Earth and Planetary Science Letters, 544, 116353.

4. Liu, C., Aslam, K. S., Daub, E. G., (2020). Seismic velocity changes caused by water table fluctuation in the New Madrid seismic zone and Mississippi embayment, Journal of Geophysical Research, 125(8), e2020JB019524.

5. Liu, C., Aslam, K. S., Langston, E., (2020). Local and ocean ambient noise source directionality and seasonal variation constraints from statistical analysis and gradiometry, Geophysical Journal International, 223(2), 1100-1117.

6. Aslam, K. S., Daub, E. G., (2019). Effect of fault roughness on aftershock distribution: Plastic off-fault material properties, Journal of Geophysical Research, 124, 1-24.

7. Aslam, K. S., Daub, E. G., (2018). Effect of fault roughness on aftershock distribution: Elastic off-fault material properties, Journal of Geophysical Research, 123(11), 9689-9711.

8. Harris et. al., (2018). A suite of exercises for verifying dynamic earthquake rupture codes. Seismological Research Letters, 89(3), 1146-1162.

Technical reports (non peer-reviewed)

9. Daub, E. G., Gilmour, E., Aslam, K. S. (2019). Estimating the Maximum Magnitude of Induced Earthquakes, Final Technical Report to USGS for award number G18AP00021.

10. Daub, E. G., Aslam, K. S. (2018). Effect of fault roughness and associated inelastic deformation on postseismic and interseismic strain. Final Technical Report to SCEC for award number 17182.

11. Harris et. al., (2017). Rupture Dynamics, Validation of the Numerical Simulation Method. Final Technical Report to SCEC for award number 16056.

12. Daub, E. G., Aslam, K. S., Choi, E. (2020). The influence of rheology on post-seismic and interseismic deformation on rough faults. Final Technical Report to SCEC for award number 18095.

RESEARCH PRESENTATIONS

1. Aslam, K. S., Thomas, A. M., Melgar, D. (2020). Modeling the effect of the Fore-arc Deformation Style of the Cascadia Subduction Zone on its Shallow Earthquake Rupture behavior, Seismological Society of America.

2. Aslam, K., Liu, C., and Langston, C., (2019, 04), Estimating source directionality using ambient noise correlations of Mississippi embayment ambient noise data. 2019 Annual SSA meeting, Seattle, Washington.

3. Liu, C., Aslam, K., and Daub, E.G., (2019, 04), Estimating seasonal seismic velocity variation in Mississippi embayment area using ambient noise correlations. 2019 Annual SSA meeting, Seattle, Washington.

4. Aslam, K., Daub, E. G. (2018, 08), Modeling damage evolution in the near-fault region as a result of rupture on complex fault. Poster Presentation at 2018 SCEC Annual Meeting, Palm Springs, CA.

5. Aslam, K., Daub E. G., and E. Choi, (2018, 12), Coupling long-term and short-term physics of an earthquake on complex fault. 2018 AGU Fall Meeting Abstracts, Washington.

6. Aslam, K., Daub, E. G. (2017, 08), Modelling the spatio-temporal pattern of heterogeneous stresses and strain accumulation due to earthquake rupture on a geometrically complex fault. Poster Presentation at 2017 SCEC Annual Meeting, Palm Springs, CA.

7. Aslam, K., and Taborda, R.(2017, 08). 3D Ground Motion Simulations for the Christchurch Area Including the Surface Topography Effects, Poster Presentation at 2017 Quake-core Annual Meeting.

8. Aslam, K., et al. (2017, 12), Tectonostratigraphy of the Passive Continental Margin Offshore Indus Pakistan. 2017 AGU Fall Meeting Abstracts. New Orleans, LA.

9. Aslam, K., and Daub, E. G. (2017, 12), Effect of fault roughness on aftershock distribution and post co-seismic strain accumulation. 2017 AGU Fall Meeting Abstracts, New Orleans, LA.

10. Aslam, K., and Daub, E. G. (2015, 09), Modeling the coupled interaction of fault systems. 2015 Eastern section-Seismological Society of America Meeting, Memphis, TN.

11. Yousaf, W., and Aslam, K., (2018, 12), Identification of Faults and Cracks in Ornamental Stone of Dolarite rocks in Mansehra Granite region using ground penetrating radar (GPR). 2018 AGU Fall Meeting Abstracts, Washington.

COMMUNITY SERVICE AND OUTREACH

Peer-review

- Geophysical Journal International

- Open Geosciences

- Geological Journal

- IEEE Access

- Earth Sciences Research Journal

General

- Student Representative in academic program committee, CERI, University of Memphis (2017)

- Student representative in tenure track faculty search committee, CERI, University of Memphis (2018)

- Student representative earth-system physics, ICTP, Italy (2012)

- Student science fair judge: Shelby County Schools (2017)

- Part of student Education Outreach Program for CERI earthquake center (2016).

FIELD EXPERIENCE

- Design, deployment and data acquisition of 3-component seismic nodal array to detect LFEs in Northern California.

- Design, deployment, and data acquisition of 3-component seismic nodal array to detect LFEs in Rainier Washington .

- Deployment and service of broadband seismometers and their demobilization.

- Field experience of resistivity and seismic refraction methods.

- Experience with Guralp CMG 3T, FairFieldNodal ZLand 3-channel, GEOMETRIX, and GEODE.

PROGRAMMING SKILLS

- MATLAB (8+ years), Python and Jupyter notebook (6+ years), and R (2+ year).

- Unix shell scripting (5+ years) and AWK (4+ years).

- C, C++ (4+ years), Fortran (7+ years).

- Parallel programming and High performance Computing.

SOFTWARE AND LIBRARIES

- ArcGIS, QGIS, GMT

- SAC, ObsPy, MSNoise

- Promax/ Seispace, Decisionspace Geoscience (DSG), Seisworks, GeoProbe, Petrel, Kingdom, Geographix Suite

- Pandas, Pickle

- Fastai, Pytorch, Tensorflow, Keras, Scikit-learn

- Git, Github

- Remote sensing, Landsat

- Latex, Adobe Illustrator, Adobe Photoshop.