Miguel Neves

PhD Candidate in Geophysics
Georgia Institute of Technology

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miguelj-neves

RESEARCH INTERESTS

I apply machine learning and big data techniques to study earthquakes. My research focuses on earthquake detection and location to create more complete earthquake catalogs in both interplate and intraplate regions. I am interested in leveraging these improved catalogs to better understand the physics of earthquakes, mechanisms of stress transfer and earthquake nucleation.

EDUCATION

PhD Geophysics 2017–2022 (Expected)
School of Earth and Atmospheric Sciences, Georgia Institute of Technology
Minor in Higher Education
Advisor: Dr. Zhigang Peng

MSc Geophysical Sciences 2014–2016
Faculty of Sciences, University of Lisbon
Concentration in Solid Earth
Master Thesis: *Dynamic triggering of seismic activity in rifting and volcanic settings*
Advisor: Dr. Susana Custódio

BSc Engineering Physics 2010–2014
Instituto Superior Técnico, University of Lisbon

EXPERIENCE

Teaching Assistant Fall 2018, Spring 2018 and 2020
School of Earth and Atmospheric Sciences, Georgia Institute of Technology *Atlanta, GA*
Courses: 'EAS2600: Earth Processes' (Fall 2018 and Spring 2020)
Courses: 'EAS1601: Habitable Planet' (Spring 2018)

Research Trainee March–August 2017
Instituto Dom Luiz, University of Lisbon *Lisbon, Portugal*
Member of Project FIRE. Research on the 2014 Fogo Island eruption, Cape Verde, using seismic ambient noise monitoring techniques.
Advisor: Dr. Graça Silveira

PUBLICATIONS

G. Lin, Z. Peng and **M. Neves** (2022), *Comparisons of in situ Vp/Vs ratios and seismic characteristics between northern and southern California.* Geophysical Journal International, 229(3), 2162–2174, doi: 10.1093/gji/ggac038.

M. Neves, S. Custódio, Z. Peng and A. Ayorinde (2018), *Earthquake triggering in southeast Africa following the 2012 Indian Ocean earthquake.* Geophysical Journal International, 212(2), 1331-1343, doi: 10.1093/gji/ggx462.

M. Neves, Z. Peng and G. Lin *(in review)*, *A High-Resolution Earthquake Catalog for the 2004 M6 Parkfield Earthquake Sequence using a Matched Filter Technique.*

M. Neves, L. Chuang, W. Li, Z. Peng and S. Ni *(in prep.)*, *Combining Deep Learning and Matched Filter Detection to image a Complex Earthquake Sequence in Sparta, North Carolina, Eastern United States.*

M. Neves, Z. Peng, S. Custódio, M. Maceira and C. Chai *(in prep.)*,*New Perspective on Iberia's Seismicity using Dense Seismic Deployments and Deep Learning.*

ABSTRACTS

Z. Peng, **M. Neves**, C. Daniels, Q. Zhai and S. Jaumé, *Systematic Detection of Microearthquakes During Several Moderate-Size Earthquake Sequences in Central and Eastern United States*, 2022 SAGE/GAGE Community Workshop, Pittsburgh, PA, USA, June 2022 (Poster presentation).

M. Neves, Z. Peng, S. Custódio, M. Maceira and C. Chai,*Illuminating Seismic Structures in Iberia Using a Deep Learning Seismic Phase Detector*, 54th AGU Fall Meeting, Abstract #T55D-0105, New Orleans, LA, USA, December 2021 (Poster presentation).

M. Neves, Z. Peng, G. Lin and C. Daniels,*Detailed Study of the 2004 Mw 6 Parkfield Earthquake Sequence Using a New Relocated Microearthquake Catalog*, 54th AGU Fall Meeting, Abstract #S45F-0361, New Orleans, LA, USA, December 2021 (Poster presentation).

M. Neves, L. Chuang, W. Li, Z. Peng and S. Ni, *Seismological studies of the 2020 M5.1 Sparta Earthquake sequence, North Carolina*, 2021 Eastern Section SSA Annual Meeting, Virtual, October 2020 (Oral presentation).

M. Neves, Z. Peng, S. Custódio, C. Chai and M. Maceira *Earthquake detection in Iberia based on dense seismic deployments using deep learning and matched filter techniques*, 37th General Assembly of European Seismological Commission, Virtual, September 2021 (Oral presentation).

M. Neves, Z. Peng, and G. Lin, *New Microearthquake Catalog for the Parkfield Section of the San Andreas Fault, California*, 2021 SSA Annual Meeting, Virtual, April 2021 (Poster presentation).

M. Neves, Z. Peng, and S. Custódio, *Earthquake Detection in Iberia using a Deep Convolutional Neural Network Phase Picker*, 52nd AGU Fall Meeting, Virtual, December 2020 (Poster presentation).

M. Neves, Z. Peng, and S. Custódio, *Seismicity Detection at the Slowly Deforming Iberia using Deep Learning*, 2020 Eastern Section SSA Annual Meeting, Virtual, October 2020 (Oral presentation).

L. Chuang, **M. Neves** and Z. Peng, *Foreshock and aftershocks sequence of the M5.1 Sparta Earthquake in North Carolina*, 2020 Eastern Section SSA Annual Meeting, Virtual, October 2020.

M. Neves, Z. Peng, G. Lin and C. Daniels,*Study of the Parkfield section of the San Andreas Fault, California, using a new microearthquake catalog*, 52nd AGU Fall Meeting, Abstract #S53E-0496, San Francisco, CA, USA, December 2019 (Poster presentation).

Z. Peng, **M. Neves**, C. Daniels, L. Zhu, J. McLellan and J. Zhuang, *Seismic Detection of Very Early Aftershocks Following the 2004 M6.0 Parkfield Earthquake*, 51st AGU Fall Meeting, Abstract #S11C-0373, Washington D.C., USA, December 2018 (Poster presentation).

M. Neves, Z. Peng and S. Custódio, *Remote dynamic triggering in southeast Africa*, Seismology of the Americas, joint LASC and SSA meeting, Miami, FL, USA, May 2018 (Oral presentation).

M. Neves, Z. Peng, X. Meng, C. Daniels and G. Lin, *Systematic detections of microearthquakes and repeators in Parkfield long before and after the 2004 M6 Earthquake*, Seismology of the Americas, joint LASC and SSA meeting, Miami, FL, USA, May 2018 (Poster presentation).

M. Neves, S. Custódio and Z. Peng, *Dynamic earthquake triggering in southeast Africa*, EGU General Assembly, Abstract EGU2018-16344, Vienna, Austria, April 2018 (Poster presentation).

GENERAL AUDIENCE PUBLICATIONS

M. Neves (2020), *Earthquakes in Turkey support two disparate models of earthquake initiation.* Temblor, http://doi.org/10.32858/temblor.133.

M. Neves (2020), *Challenges of earthquake early warning.* Temblor, http://doi.org/10.32858/temblor.093.

AWARDS

FCT Doctoral Fellowship 2019 – 2022
Fundação para Ciência e Tecnologia (Portuguese NSF)

Georgia Tech-Oak Ridge National Lab Seed Grants 2021
Georgia Institute of Technology

Graduate Student Symposium Best Poster Award 2019, 2018
School of Earth and Atmospheric Sciences, Georgia Institute of Technology

TRAINING

Short course September 2016
2nd TIDES Training School *Sesimbra, Portugal*

Short course April 2016
TIDES (MS)Noise Workshop Vienna *Vienna, Austria*

COMPUTATIONAL SKILLS

Programming Languages: Proficient with Python, C/C++, Julia. Basic knowledge of Matlab and Fortran.

Software Libraries: Proficient with ObsPy, GMT, SAC, Latex. Working knowledge of Machine Learning libraries: Tensorflow, Keras, PyTorch, Scikit-Learn. Working knowledge of parallel programming libraries: CUDA, OpenMP.

Operating Systems: Proficient with MacOS, Windows and Linux operating systems.

SERVICE AND OUTREACH

Vice President, Graduates in Earth and Atmospheric Sciences Council 2019 – 2021
Georgia Institute of Technology *Atlanta, GA*

EAS Graduate Student Symposium Spring 2021
Georgia Institute of Technology *Atlanta, GA*
Organizing committee and oral session moderator.

Geophysics Seminar Coordinator Fall 2018 - Spring 2020
School of Earth and Atmospherics Sciences, Georgia Institute of Technology *Atlanta, GA*
Invite and schedule seminar speakers. Maintain website and divulge talks.

Volunteer 2018
Atlanta Science Festival, EAS Halloween Open House, Ponce Science Showcase series Atlanta, GA
Showcasing different activities to explain earthquake science and atmospheric sciences.

Volunteer 2015-2017
IDL Outreach activities *Lisbon area, Portugal*
Different activities for the general public in the street and in museums. Small hands-on experiments to explain seismic and tsunami hazard, earthquake preparedness, and how seismologists study earthquakes and the deep Earth.

Scout Leader 2014–2017
Corpo Nacional de Escutas *Lisbon, Portugal*

Two years in training with the 10-14 years old section. One year responsible for the 14-18 years old section.
Devise and plan opportunities for young people in personal development, volunteering actions and outdoor activities.

LANGUAGES

English: Proficient

Portuguese: Native

German: Basic conversation/writing

French: Basic conversation/writing

Spanish: Basic conversation/writing

PROFESSIONAL ORGANIZATIONS

· American Geophysical Union (*AGU*)

· European Geosciences Union (*EGU*)

· Seismological Society of America (*SSA*)

REFERENCES

· Professor Zhigang Peng (*PhD advisor*): zpeng@gatech.edu

· Professor Susana Custódio (*MSc advisor*): sicustodio@fc.ul.pt

· Professor Graça Silveira: mdsilveira@fc.ul.pt