

Miguel Neves

Postdoctoral Researcher - Seismology
Geoazur, IRD, Université Côte d'Azur

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in miguelj-neves

RESEARCH EXPERIENCE

Postdoctoral Researcher

Geoazur, Université Côte d'Azur

July 2023–Current

Valbonne, France

ANR Osmose. Denoising RaspberryShake deployment in Haiti using machine learning techniques.

Research Trainee

Instituto Dom Luiz, University of Lisbon

March–August 2017

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

EDUCATION

PhD Geophysics

School of Earth and Atmospheric Sciences, Georgia Institute of Technology

2017–2023

Minor in Higher Education

Dissertation: *A deep look into continental tectonic processes using high-resolution earthquake catalogs*

Advisor: Dr. Zhigang Peng

MSc Geophysical Sciences

Faculty of Sciences, University of Lisbon

2014–2016

Concentration in Solid Earth

Thesis: *Dynamic triggering of seismic activity in rifting and volcanic settings*

Advisor: Dr. Susana Custódio

BSc Engineering Physics

Instituto Superior Técnico, University of Lisbon

2010–2014

PUBLICATIONS

M. Neves, L. Chuang, W. Li, Z. Peng, P. Figueiredo and S. Ni (2024), *Complex rupture dynamics of the extremely shallow August 2020 M5.1 Sparta, North Carolina earthquake*. *Communications Earth & Environment* 5, 163, doi: 10.1038/s43247-024-01316-8.

W. Chen*, M. Neves, Q. Zhai, C. Daniels, O. Adeboboye, S. Jaume, Z. Peng (2023), *Preliminary Results from a Dense Short-Period Seismic Deployment around the Source Zone of the 1886 M 7 South Carolina Earthquake*. *Seismological Research Letters*, 94 (5), 2479-2488, doi: 10.1785/0220230085.

M. Neves, Z. Peng and G. Lin (2022), *A High-Resolution Earthquake Catalog for the 2004 M6 Parkfield Earthquake Sequence using a Matched Filter Technique*. *Seismological Research Letters*, 94 (5), 2479-2488, doi: 10.1785/0220230085.

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.

O. Adeboboye, L. Chuang, **M. Neves**, Z. Peng, D. Frost, S. Jaume (*accepted*), *Localized west-dipping seismic structure defines the Elgin-Lugoff Swarm Sequence in South Carolina*, doi:10.31223/X50D9Z

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*.

* - mentored student

AWARDS / FUNDING

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

Student Presentation Award 2022
Eastern Section - Seismological Society of America Annual Meeting

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

INVITED TALKS

Data-driven discovery of the Earth using Machine Learning, Earth Systems Summer School 2024, Aveiro, Portugal, July 2024.

A deep look into continental tectonic processes using high-resolution earthquake catalogs, IDL Solid Earth Seminars, Lisbon, Portugal, June 2023.

ABSTRACTS

M. Neves, Q. Bletery, F. Courboulex, J. Chèze, D. Ambrois, T. Monfret, S. Paul, and E. Calais, *Combining denoising and matched filter detection to enhance Haiti's earthquake catalog*, 57th AGU Fall Meeting, Abstract #T13C-3364, Washington, DC, USA, December 2024 (Poster presentation).

M. Neves, Q. Bletery, F. Courboulex, J. Chèze, D. Ambrois, T. Monfret, S. Paul, J. Ampuero, and E. Calais, *Using a deep learning denoiser to improve earthquake detection in a low-cost citizen operated seismic network in Haiti*, 39th General Assembly of the European Seismological Commission, Abstract #734, Corfu, Greece, September 2024 (Poster presentation).

M. Neves, Z. Peng, S. Custódio, M. Maceira and C. Chai, *Revealing Active Fault Structures in the Slow-Deforming Region of Iberia by Applying Deep Learning Techniques to Dense Seismic Recordings*, 2023 SSA Annual Meeting, San Juan, Puerto Rico, April 2023 (Oral presentation).

M. Neves, L. Chuang, W. Li, Z. Peng and S. Ni, *Imaging a Complex Earthquake Sequence in Sparta, North Carolina, Eastern United States*, 55th AGU Fall Meeting, Abstract #S13A-03, Chicago, IL, USA, December 2022 (Oral presentation).

M. Neves, L. Chuang, W. Li, Z. Peng and S. Ni, *Using a high-resolution earthquake catalog to unravel the Mw5.1 Sparta, North Carolina, earthquake sequence*, 2022 Eastern Section SSA Annual Meeting, Tampa, FL, USA, October 2022 (Oral presentation).

W. Chen*, **M. Neves**, C. Daniels, Q. Zhai, S. Jaume and Z. Peng, *Preliminary relocation results from a temporary seismic deployment around the source zone of the 1886 M7 South Carolina earthquake*, 2022 Eastern Section SSA Annual Meeting, Tampa, FL, USA, October 2022 (Poster presentation).

- M. Neves**, L. Chuang, W. Li, Z. Peng and S. Ni, *Imaging a Complex Earthquake Sequence in Sparta, North Carolina, Eastern United States*, StatSei 12 Statistical Seismology International Conference, Cargèse, France, October 2022 (Poster presentation).
- M. Neves**, Z. Peng, G. Lin and J. Jiang, *A new look into the 2004 M6 Parkfield Earthquake sequence using an updated earthquake catalog*, 2022 SCEC Annual Meeting, Abstract #64, Palm Springs, CA, USA, September 2022 (Poster presentation).
- 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 2021 (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 repeaters 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, doi: 10.32858/temblor.133.

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

TEACHING EXPERIENCE

Teaching Assistant - Observational Seismology Spring 2020
School of Earth and Atmospheric Sciences, Georgia Institute of Technology Atlanta, GA
Prepared and delivered lectures: “Cross-correlation applications in Seismology” and “Tomography”.

Teaching Assistant - Lab sections 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)

ADDITIONAL TRAINING

Short course May 2024
IDRIS AI For Science bootcamp Orsay, France

Short course July 2023
InSAR Processing and Theory with GMTSAR Online

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

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

FIELD EXPERIENCE

Deployment of seismic nodes in Elgin and Charleston, South Carolina, USA February 2023

Deployment of short-period sensors in Oklahoma, USA October 2017

COMPUTATIONAL SKILLS

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

Software Libraries: Proficient with ObsPy, NumPy, SciPy, PyTorch, Scikit-Learn, GMT, SAC, Latex. Working knowledge of Keras, CUDA, OpenMP. Proficient with earthquake location packages: HypoDD, XCORLOC, Hypoinverse, Velest, GrowClust. Basic knowledge of Seiscomp3, GMTSAR.

Operating Systems: Proficient with Linux, MacOS, Windows.

SERVICE AND OUTREACH

Seismica - Standards and copy-editing team member 2024 – current
Seismica

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 Atmospheric Sciences, Georgia Institute of Technology

Atlanta, GA

Invite and schedule seminar speakers. Maintain website and divulge talks.

Science Education Outreach

2015 - 2018

Collaborator in IDL Outreach activities, Atlanta Science Festival, EAS Halloween Open House, Ponce Science Showcase series

Portugal / Atlanta, GA

Showcasing different activities to explain earthquake science, tsunami hazard, earthquake preparedness and atmospheric sciences.

LANGUAGES

Fluent: English, Portuguese; **Intermediate:** French; **Basic:** German, Spanish.