Pablo Lara
Born on April 20 1989
pablo.elara@ieee.org

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About me: I am a final-year PhD candidate at Géoazur (France), working under the supervision of Quentin Bletery and Jean-Paul Ampuero. During my PhD, I developed Machine Learning tools for the detection and rapid characterization of earthquake sources, which have been implemented in the earthquake early warning system of Peru, benefiting more than 18 million people by providing timely alerts and enhancing public safety.
I am particularly excited about the opportunity to join Google as a Research Scientist, where I can leverage my expertise in Machine Learning and seismology to contribute to innovative projects such as the Android Earthquake Alerts System, Google Crisis Response, and other cutting-edge initiatives in disaster preparedness and geophysical data analysis. My goal is to broaden my research interests while continuing to focus on developing cutting-edge algorithms that can make a significant difference in global earthquake preparedness and response.

Education

2020 - present, Université Côte d'Azur, France
PhD program in Earth and Universe Sciences
Advisors: Quentin Bletery and Jean-Paul Ampuero
Title: "Detection of seismological signals based on artificial intelligence"
Expected defense date: October 2024.

2018 - 2020, Universidade Federal do Ceará, Brazil
Master of Science in Electrical Engineering and Computer Science
Title: "Automatic multichannel volcano-seismic classification using Machine Learning and EMD", http://www.repositorio.ufc.br/handle/riufc/51894

2017, Universidad Nacional de Ingenieria, Peru
Electrical Engineer certification, approved with honors
Title: "Design of a monitoring system for the satellite seismic network of Peru in real-time" http://cybertesis.uni.edu.pe/handle/uni/13260

2007 - 2014, Universidad Nacional de Ingenieria, Peru
Bachelor in Science in Electrical Engineering

Publications

P. Lara, H. Tavera, Q. Bletery; J. P. Ampuero; A. Inza, D. Portugal, B. Orihuela, and F. Meza, Implementation of the Peruvian Earthquake Early Warning System, 2024. Submitted to Bulletin of the Seismological Society of America (BSSA). Preprint: https://eartharxiv.org/repository/view/7248/

P. Lara, Q. Bletery; J. P. Ampuero; A. Inza, H. Tavera, Earthquake Early Warning Starting From 3 s of Records on a Single Station With Machine Learning, Journal of Geophysical Research: Solid Earth, 2023.

E. Calais, S. Symithe, T. Monfret, B. Delouis, A. Lomax, F. Courboulex, J. P. Ampuero, **P. Lara**, Q. Bletery, J. Chèze et al., Citizen seismology helps decipher the 2021 Haiti earthquake, Science, 2022.

A. Teixeira, C. Rolim, **P. Lara**, A. Inza, J. Mars, J. P. Metaxian, M. Dalla Mura, M. Malfante, Tensor-Based Learning Framework for Automatic Multichannel Volcano-Seismic Classification, IEEE-JSTARS, 2021.

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P. Lara, C. Rolim, A. Inza, J. Mars, J. P. Metaxian, M. Dalla Mura, M. Malfante, Automatic Multichannel Volcano-Seismic Classification Using Machine Learning and EMD, IEEE-JSTARS, 2020.

Professional experience

Mar 2020 - Now, *Research Scientist*, Instituto Geofísico del Perú.

- Developped real-time volcanic event classification system for Ubinas volcano using Machine Learning.
- Designed the AI algorithm of the Peruvian Earhquake Early Warning System (SASPe) to detect earthquakes, pick the P-phase, and estimate magnitudes and hypocentral location in real-time based on 3 s of P-wave recorded by the nearest station.
- Led the implementation, testing and validation of the SASPe AI algorithm.

Oct 2014 - Nov 2017, *Software engineer*, Instituto Geofísico del Perú

- Designed a real-time monitoring system for the National Seismic and Accelerometric Network, comprising:
  - a decoding system for instruments with Satellite and Internet telemetry
  - a data acquisition system
  - a monitoring platform to display the state of health of the remote stations
  - an alert system to report the operational status of the stations
- Designed intensity maps (ShakeMaps) in real time, when an earthquake occurs.
- Designed software for Power Spectral Density estimation of seismic noise in real time.
- Designed software to monitor servers that manage the National Seismic Network in real time.

Teaching experience

2019 Winter (6 months), *Lecturer*, Universidade Federal do Ceará
Pattern Recognition, Sobral, Brazil.

Selected presentations

2023 September, *Poster*, ERC – TECTONIC Workshop
E3WS: Earthquake Early Warning starting from 3 seconds of records on a single station with machine learning, Rome, Italy.

2023 April, *Oral presentation*, European Geosciences Union
Earthquake Early Warning with 3 seconds of records on a single station, Vienna, Austria.

2022, *Oral presentation*, American Geophysical Union
Earthquake Early Warning with 3 seconds of records on a single station, Chicago, USA.

2021 September, *Poster*, ERC – TECTONIC Workshop
Earthquake Early Warning System based on 3 seconds of P wave: a Machine Learning approach for rapid detection, estimation magnitude and location, Rome, Italy.

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2018, *Oral presentation*, III Meeting of Information Technology
Subject "The Importance of Artificial Intelligence in Predicting Seismic events", Ieducare FIED University, Tianguá, Brazil.

2018, *Oral presentation*, IV Cycle of Engineering Lectures
Subject "Telemetry Satelitale research perspectives in Brazil and abroad", Universidade Federal do Ceará, Sobral, Brazil.

Software Development Skills

Artificial Intelligence

- TensorFlow
- PyTorch
- Keras
- Scikit-learn

Programming

- C
- C++
- Python
- Bash
- C-Bash
- HTML
- PHP
- Matlab

Computer software

- MySQL
- MariaDB
- Linux
- MongoDB
- Clusters
- Supercomputers

Seismic software

- GMT
- Earthworm
- Seedlink
- Nanometrics
- Reftek
- Guralp
- Seiscomp3
- Proxmox VM

Languages

- Spanish, native language.
- English, advanced.
- Portuguese, advanced.
- French, basic.

Awards and Honors

- 2024, One of the 3 nominees for the Innovation Trophies. The laureate will be announced on October 7 at the "SCIENCE 4 ACTION" Forum, as part of the celebrations of IRD 80th anniversary, https://en.ird.fr/discover-nine-nominees-2024-innovation-awards.
- 2020, Doctoral Scholarship. Awarded scholarship for doctoral thesis preparation on "Detection of seismological signals using artificial intelligence" by IRD.
- 2018, Master Scholarship. Received scholarship for outstanding research proposals from the Organization of American States (OAS) and the Coimbra Group of Brazilian Universities.
- 2001, Second Place, UNI - PUCP - TRILCE - Peruvian Mathematical Society - International Commission of the Mathematics Olympics: Achieved second place in the "National Mathematics Contest".
- 2001, Second Place, TRILCE: Second place prize in the "6th Mathematics Olympiad".
- 2000, First Place, National University of Santa: First place prize in the "I Mathematical Logic Contest".
- 2000, First Place, Editorial Active School and Ministry of Education: First place award in the "VIII Mathematics Olympiad SIGMA 2000".
- 1997, Honorable Mention, UNASAM: Awarded for achievements in the "V Regional Mathematics Olympiad, Chavín Region".