Names: Pablo Eduardo
Surnames: Espinoza Lara
Bday. 20 Apr. 1989
pablo.elara@ieee.org

Pablo Eduardo Espinoza Lara

About me: My interest deals with seismic analysis (continuum models) through the earthquake seismology, volcano seismology, seismic signal processing and measurement techniques, using artificial intelligence in order to search patterns. New instrumentation displays huge time-series data, my hypothesis is that Artificial Intelligence is a huge tool to understand, find evidences, and estimate parameters in a fast and precise way, mixing with Forecasting Failure Method, Tsalli entropy, among others. I develop models based on artificial intelligence (deep learning, machine learning, etc.) applied to geophysics, also in forecasting (Early Warning Systems). I am currently developing the Earthquake Early Warning System for Peru based on artificial intelligence, and also earthquake forecasting.

Education

2020 - present, Université Côte d'Azur, France
PhD program in Earth and Universe Sciences
Doctoral School of Fundamental and Applied Sciences
Building thesis: Detection of seismological signals based on artificial intelligence. Writing article about Early Warning System based on Artificial Intelligence.

2018 - 2019, Universidade Federal do Ceará, Brazil
Master of Science in Electrical Engineering and Computer Science
(Public Dissertation defensed)
Dissertation: "Automatic multichannel volcano-seismic classification using machine learning and emd"
url: http://www.repositorio.ufc.br/handle/riufc/51894

2017, Universidad Nacional de Ingenieria, Peru
Diploma Electrical Engineer (Public thesis defensed)
Thesis: "Design of a monitoring system for the satellite seismic network of Peru in real-time", approved with distinction
url: http://cybertesis.uni.edu.pe/handle/uni/13260

2007 - 2014, Universidad Nacional de Ingenieria, Peru
Diploma of Bachelor degree in Electrical Engineering. BAC+5

Main publications

March 2022, Science
Co-author of the article: "Citizen seismology helps decipher the 2021 Haiti earthquake"
DOI: 10.1126/science.abn1045

April 2021, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing
Co-author of the article: "Tensor-Based Learning Framework for Automatic Multichannel Volcano-Seismic Classification"
DOI: 10.1109/JSTARS.2021.3074058

March 2020, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing
Author of the article: "Automatic Multichannel Volcano-Seismic Classification Using Machine Learning and EMD"
DOI: 10.1109/JSTARS.2020.2982714

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Professional experience

Mar 2020 - present, *Artificial intelligence researcher*, Instituto Geofisico del Peru. IGP & IRD Convention

Main achievements:

- Design the Earhquake Early Warning System for the Seismic Alert System of Peru (SASPe) project based on artificial intelligence and 3s of P-wave, which detects earthquakes, pick the P-phase, estimates magnitudes and hypocentral parameters in real-time.

Oct 2014 - Nov 2017, *Software engineer*, Geophysical Institute of Peru

Main achievements:

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

Sep 2014, *Laboratory engineer*, HIGSEG E.I.R.L.

Calibration and verification of electronic measuring equipment such as Luxometers, Multiparameters, Gas meter O2, CO, H2S, SO2, LEL, Sound level meters, Dosimeters, Ionizing Radiation Equipment, Gravimetric Pumps, etc.

Lecturer

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.

2020 December, *Poster*, American Geophysical Union

Efficient P-wave detection in real time for Earthquake Early Warning System based on Artificial Intelligence.

2020 December, *Oral presentation*, American Geophysical Union

Co-author: Sismo-volcano classification in real time based on Empirical Mode Decomposition (EMD) and Machine Learning.

2019 Winter, *Teaching*, Universidade Federal do Ceará

Pattern Recognition, Sobral, Brazil.

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.

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Software Development Skills

Artificial Intelligence

- TensorFlow
- PyTorch
- Keras
- Scikit-learn

Programming

- C
- C++
- Python
- Assembler
- Shell
- C-Shell
- Java
- Perl
- HTML
- PHP
- Ajax
- JQuery
- CSS
- Matlab
- Clusters

Computer software

- MySQL
- MariaDB
- Linux
- MongoDB

Seismic software

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

Languages

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

Main awards

2020, *Doctoral Scholarship*, Institut de recherche pour le développement (IRD)
Scholarship awarded by the IRD for the preparation of the doctoral thesis on Detection of seismological signals based on artificial intelligence.

2018, *Master Scholarship*, OAS/GCUB
Scholarship awarded to the best research proposals thanks to the Organization of American States and the Coimbra Group of Brazilian Universities.

2001, *Second place*, UNI - PUCP - TRILCE - Peruvian Mathematical Society - International Commission of the Mathematics Olympics
Second place prize 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
Prize for the first places of the "V Regional Mathematics Olympiad, Chavín Region".