



Pablo Lara

Bday. 20 Apr. 1989  
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# Pablo Lara

**About me:** My interest deals with seismic analysis through earthquake seismology, 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. I develop models based on artificial intelligence (deep learning, machine learning, etc.) applied to seismology, also in forecasting (Early Warning Systems). I developed the Early Warning System algorithm for Peru, which is called E3WS. It can be applied anywhere, and uses only the first 3 seconds of an earthquake recorded by a single sensor.

## 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.

Submitted article: Earthquake Early Warning using 3 seconds of records on a single station. Journal: JGR Solid Earth.

### 2018 - 2019, Universidade Federal do Ceará, Brazil

Master of Science in Electrical Engineering and Computer Science  
(Public Dissertation defended)

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 defended)

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 Geofísico del Peru. IGP & IRD Convention***

Main achievements:

- Design the Earthquake 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 O<sub>2</sub>, CO, H<sub>2</sub>S, SO<sub>2</sub>, 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 Satelital 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".