Emilio José Ochoa Alva

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Education

University of Rochester *Rochester, USA*
Biomedical engineering PhD. Student Aug. 2024 - Present

- PhD. Student - Biomedical Engineering (GPA:3.96).
- Focus: Biomedical ultrasound

Pontificia Universidad Católica del Perú | Universidad Peruana Cayetano Heredia *Lima, Perú*
BsC. in Biomedical Engineering, Minor in biomedical signals and images Mar. 2018 – Dic. 2022

- Percentile: Top 20% (Biomedical Engineering Major), Top 25% (Faculty of Science and Engineering).
- Outstanding courses: Digital Signal Processing, Clinical Applications in signal and images, Digital circuits and systems, artificial intelligence for biomedical signals

Research Experience

Global Health & Medical devices Laboratory (Castaneda Lab) *University of Rochester (Rochester, USA)*
PhD student Aug. 2025 - Present

- PhD student advised by PhD. Benjamin Castañeda.
- Generation of new studies to expand capabilities of medical ultrasound in low rural areas using artificial intelligence.

Medical Images Laboratory (LIM-PUCP) *Pontificia Universidad Católica del Perú (Lima, Perú)*
Research Assistant Aug. 2021 - Present

- Work advised by PhD. Stefano E. Romero and PhD. Benjamin Castañeda.
- Generation and analysis of diabetic foot detection and segmentation using imaging processing method for reverberant shear wave field elastography assesment(RSWE).
- Training for student members of the LIM on artificial intelligence applied to ultrasounic volume sweep imaging.
- Generation of new studies to expand capabilities of medical ultrasound in low rural areas using artificial intelligence.

Biomedical optics and biophotonics Laboratory (BOB-PUCP) *Pontificia Universidad Católica del Perú (Lima, Perú)*
Research Assistant Feb. 2023 - Feb. 2024

- Work advised by PhD. Fernando Zvietcovich. Developed machine learning algorithms for classification of different Keratoconus stages.

Biomedical Engineering Laboratory *Universidad Peruana Cayetano Heredia (Lima, Perú)*
Research Assistant Aug. 2022 - Feb. 2024

- Work advised by Msc. Moises Meza and MD. Pedro Segura. Developed different signal processing and machine learning algorithms for cardiological assesment.

Skills

- Proficient in MATLAB and Python for signal and imaging processing.

- Proficient in Python for data science (numpy, pandas) and artificial intelligence (tensorflow, pytorch, scikit-learn).

- Proficient in LaTeXfor scientific writing.

- Competent in programming microcontrollers (ATMEGA328P, Arduino and ESP32)

- Competent in simulink for control systems.

- Experience developing applications using dart and flutter.

Publications

[1] **Emilio J. Ochoa**, Arthur Masiukiewicz, Cristina Orihuela, Maria Helguera, Benjamin Castaneda."Standardizing Obstetric Ultrasound Segmentation Using Unpaired Domain Translation Techniques" *Accepted on IUS 2025.*

[2] **Emilio J. Ochoa**, Gilmer Flores, Cristina Orihuela, Itamar Salazar, Stefano E. Romero, Kevin J. Parker, Roozbeh Naemi, Benjamin Castaneda."First Exploration of H-scan Ultrasound Imaging in Diabetic Foot: A Feasibility Study" *Accepted on IUS 2025.*

[3] **Emilio J. Ochoa**, Luis C. Revilla, Stefano E. Romero, Marika Toscano, Thomas J. Marini, Maria Helguera, Benjamin Castaneda." Automated Analysis of Fetal Heart Rate from VSI-Based Ultrasound Using Segmentation-Guided Optical Flow" *Accepted on IUS 2025.*

[4] **Emilio J. Ochoa**, Luis C. Revilla, Stefano E. Romero, Giancarlo A. Guarnizo, Thomas J. Marini, Kevin J. Parker, Yu Zhao, Galen Brennan, Jonah Kan, Steven Meng, Ann Dozier, Anna Weiss, Benjamin Castaneda."No Sonographer, no Radiologist: An AI-enabled Comprehensive Breast Ultrasound Diagnostic System for Low-Resource Settings" *Sent to Journal for peer-review. 2025*

[5] Stefano E. Romero, **Emilio J. Ochoa** , Luis C. Revilla, Jose Zapana, Berta Ramos, Gloria Rios, Marika Toscano, Thomas J. Marini, Benjamín Castaneda."Automated Fetal and Placenta Localization with Fetal Biometry Estimation using Obstetric Volume Sweep Imaging in rural areas" *Sent to Journal for peer-review. 2025*

[6] **Emilio J. Ochoa**, Alejandra Varea, Judith Birkenfeld, Andrea Curatolo, Nicolas Alejandre-Alba, Jesus Merayo-Lloves, Susana Marcos, Fernando Zvietcovich. "Classification of keratoconus stage based on OCT elastography using machine learning algorithms and novel biomarkers." *SPIE Photonics West 2024, San Francisco,United States, 2024.* [Link]

[7] **Emilio J. Ochoa**,Stefano E. Romero, Thomas J Marini, Avice O'Connell, Galen Brennan, Jonah Kan, Steven Meng, Yu Zhao, Tim Baran, Benjamin Castaneda."A comparison between Deep Learning architectures for the assessment of breast tumor segmentation using VSI ultrasound protocol" *46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society,Orlando,Florida,2024.* [Link]

[8] Harold Angeles,Mateo Portal, **Emilio J. Ochoa**,Stefano E. Romero, Benjamin Castaneda "Comparison of YOLO algorithms for automatic Region of Interest Detection as a Complement for Reverberant Shear Wave Elastography Assessment in Foot" *1st IFMBE Latin American Conference on Digital Health. CLASD 2024*[Link]

[9] Stefano E. Romero, **Emilio J. Ochoa**, Benjamin Castaneda. "Automatic Region of Interest Detection as a Complement for Reverberant Shear Wave Elastography Assessment in Foot" *2023 19th International Symposium on Medical Information Processing and Analysis (SIPAIM), Mexico City, Mexico, 2023, pp. 1-4.*[Link]

[10] **Emilio J. Ochoa**, Luis Revilla. "A convolutional neural network for early Supraventricular Arrhythmia identification." *International congress: Technology and innovation in engineering and computing 2023. Lima,Peru,2023* [Link]

[11] Adrián Hernández, Valery Huarcaya , Ítalo Acuña, Gabriel Marcos, **Emilio J. Ochoa**, Gianella Ccama, Andoni Molina"Additive manufacturing of a customized ankle-foot orthosis: design, manufacturing and mechanical evaluation." *Accepted on International congress: Technology and innovation in engineering and computing 2023 Lima,Peru,2023* [Link]

[12] Sofia Franco, Mauricio Ramos, Renzo Cordova, **Emilio J. Ochoa**, Gianella Ccama, Andoni Molina"Design, manufacturing and mechanical evaluation of a 3D printed customized wrist-hand orthosis for the treatment of De Quervain tenosynovitis" *International congress: Technology and innovation in engineering and computing 2023 Lima,Peru,2023* [Link]

[13] Dante Rodriguez, Catherine Boggio, Melany Cama, Joao Torres, **Emilio J. Ochoa**, Gianella Ccama, Andoni Molina"Development of a customized 3D printed orthosis for non-surgical treatment of olecranon elbow fractures" *Accepted on International congress: Technology and innovation in engineering and computing 2023 Lima,Peru,2023* [Link]

[14] **Emilio J. Ochoa**, Luis Revilla. "Signal filtering and peak analysis of ballistocardiography for heartbeat detection." *International Conference on Biomedical and Health Informatics 2022), Concepción, Chile,2022* [Link]

[15] **Emilio J. Ochoa**, Stefano E. Romero, Benjamin Castaneda. "Multiregion analysis of shear wave speed in reverberant shear wave elastography: Healthy foot case" *IEEE EMBS International Student Conference (ISC R9 LATAM)*, 94-97, 2021. [Link]

Awards and Honors

| Nov. 2024 | **Contest**: Second Prize in RCBU Biomedical Ultrasound Symposium Day 2024: Poster session | *Rochester, USA* |
| Nov. 2022 | **Contest**: Second Prize in International Conference on Biomedical and Health Informatics: student challenge 2022 | *Concepción, Chile* |

Teaching experience

Pontificia Universidad Católica del Perú *Lima, Perú*

Teaching assistant — Aug. 2022 - Dec. 2023

- [1IBM15] Proyectos de biodiseño 2: Assesed the generation of new types of 3D-printed orthosis with the students, teached design methodologies and finally assesed undergraduate students for submit a conference paper.
- [TEL201] Teoria de comunicaciones: Evaluated laboratories and homeworks focused on digital communications.
- [1IEE10] Electronica Basica: Evaluated assesments and exams, provided guidance on electronics for undergraduated students.
- [1IEE02] Temas de ingenieria electronica: Evaluated assesments and Provided guidance on design of medical devices in low-resource settings for undergraduate students.
- [1ING09] Digital signal processing: Prepared course materials, evaluated assesments and provided guidance on digital signal processing using MATLAB and Python for undergraduate students.
- [1IEE09] Circuitos y sistemas digitales: Prepared course materials, evaluated laboratories and exams based on microcontrollers, using SIMULINK, ATMEL and Arduino for digital circuits and systems.
- [1EST20] Procesamiento aleatorio discreto: Evaluated laboratories and provided guidance on different statitical approachs of random variables and random vectors for application in engineering, using SPSS and MATLAB.

Universidad Peruana Cayetano Heredia *Lima, Perú*

Teaching assistant Aug. 2023 - Dec. 2023

- [1CAY98] Patterns recognition: Prepared course materials, evaluated assesments and provided guidance on machine and deep learning algorithms in healthcare using Python and pytorch for undergraduate students.
- [1CAY59] Clinical Applications in signal and images: Prepared course material based on different frameworks of artificial intelligence in healthcare for creating disruptive projects (MONAI, 3Dslicer, Pytorch).

Conferences and courses

2025 IEEE International Ultrasonics Symposium *Utrecht, Netherlands*

Institute of Electrical and Electronics Engineers (Lecturer) Sep. 2025

2024 RCBU Biomedical Ultrasound Symposium Day *Rochester, USA*

Rochester Center for Biomedical Ultrasound (Lecturer) Nov. 2024

Physical Science Responsible Conduct of Research *Virtual*

CITI Program (Attendee) May 2023

International Conference on Biomedical and Health Informatics *Concepcion, Chile*

International Federation of Medical and Biological Engineering (Attendee) Nov. 2022

Deep learning summer school *Virtual*

Neuromatch academy (Attendee) Jun. 2022 - Jul. 2022

Volunteer Services

RCBU Work in progress Series *Rochester, USA*

Organizer comittee Jun. 2025 - Present

- Reactivated the RCBU Work in Progress series post–COVID-19, reinstating a monthly symposium that connects all ultrasound research members at the University of Rochester.
- Coordinated and hosted student presentations of ongoing projects, fostering constructive academic feedback in a collaborative environment.

Compañia de bomberos voluntarios del Perú N° 71 *Tarapoto, Perú*

Support consultant Feb. 2023 - Apr. 2023

- Performed both preventive and corrective maintenance on a wide range of biomedical equipment. This included conducting regular inspections, troubleshooting technical issues, and implementing necessary repairs to ensure the proper functioning of vital life-saving devices.
- Collaborated closely with firefighters and emergency response personnel to ensure that their critical equipment, including biomedical devices and ambulances, was maintained in optimal condition.

IEEE UPCH *Lima, Perú*

Vicepresident Feb. 2022 - Dec. 2022

- Mission: The mission of IEEE UPCH is to foster collaboration and knowledge exchange among researchers, students, and key stakeholders, with the aim of advancing technological innovation and its application in various fields for the betterment of society.
- Vision: become a leading organization within the Peruvian and global technical community, renowned for our contributions as a student organization towards enhancing public health and making significant advancements in various domains through the use of cutting-edge technology.

IEEE UPCH *Lima, Perú*

Marketing area coordinator Mar. 2021 - Feb. 2022

- Developing and implementing a comprehensive marketing strategy to enhance the visibility and reach of IEEE UPCH among the target audience, aligning with the organization's goals and objectives.
- Leading a team of marketing volunteers and coordinating their efforts to ensure the timely execution of marketing campaigns, managing tasks and responsibilities, providing guidance, and fostering a collaborative and motivated work environment.

Work experience

Interhealth EIRL *Lima, Peru*

CEO and Field engineer Feb. 2023 - Present

- In charge of preventive and corrective maintenance of diagnostic imaging, critical care, and laboratory equipment: Ultrasound machines / X-ray machines / Anesthesia machines / Monitors / Centrifuges / Spectrophotometers .Development of maintenance plans for private healthcare facilities upon request.

Draeger Perú SAC *Lima, Perú*

Customer Support trainee Feb. 2022 - Jul. 2022

- Instalation, training and delivery of mechanical ventilators, anesthesia machines, neonatal incubators and vital signals monitors to healthcare providers at national level.

INGECAP SAN MARTIN *Tarapoto, Perú*

Administrative assistant Jan. 2019 - Apr. 2022

- Responsible for coordinating, planning, and implementing training events in the field of occupational health and safety. Maintained records of available personnel for outsourcing services in various public and private entities.