Sergio Augusto Antenor **Jácobo Zavaleta**

Mechatronics Engineer | M.Sc. Candidate in Robotics and Automation | RENACYT Researcher

Madrid, Spain · linkedin.com/in/sjacobozavaleta · github.com/sjacobozavaleta · scholar.google.com · researchgate.net
+34 617 818 424 · 100514566@alumnos.uc3m.es

Research Profile

Mechatronics engineer and M.Sc. candidate in Robotics and Automation at Universidad Carlos III de Madrid, with research experience in soft robotics, Shape Memory Alloy (SMA) actuation, sensor-integrated control, and biomedical engineering applications. My current work focuses on the design and experimental control of tendon-based SMA actuation systems for robotic and rehabilitation-oriented platforms. I am interested in developing robust, experimentally validated robotic systems that integrate mechanical design, control engineering, and applied research.

Research Experience

SMA Tendon-Based Soft Robotic Actuation — Mar. 2025 – Present

Universidad Carlos III de Madrid, Madrid, Spain
Robotics student researcher. Design and experimental control of tendon-based soft robotic actuators using Shape Memory Alloy wires. Work includes mechanical prototyping, activation protocols, sensor-integrated control strategies, and validation of actuator reliability, response, and recovery behaviour for robotic and rehabilitation-oriented systems.

RENACYT Researcher — Apr. 2023 – Present

National Scientific, Technological and Innovation Registry, Peru
Registered researcher in the National Scientific Register of Peru. Code: P0153371.

Technological Projects for COVID-19 Prevention and Patient Care — May 2020 – Oct. 2020

Universidad Nacional de Trujillo, Trujillo, Peru
Participated in low-cost technological solutions during the COVID-19 emergency, including mechanical ventilator restoration, infrared thermometer development, and automated disinfection systems. Project recognized by Universidad Nacional de Trujillo.

Education

Expected 2026 / Sep. 2024 — **M.Sc. in Robotics and Automation, Universidad Carlos III de Madrid, Madrid, Spain**
- Master's thesis: *Design and Control of a Shape Memory Alloy Tendon-Based Soft Robotic Actuation System for Ankle Rehabilitation*.
- Focus: robotics, control systems, soft robotics, model-based design, sensor-integrated actuation, and experimental validation.

Jun. 2022 — **Professional Title in Mechatronics Engineering, Universidad Nacional de Trujillo, Trujillo, Peru**

Dec. 2018 / Apr. 2014 — **B.Sc. in Mechatronics Engineering, Universidad Nacional de Trujillo, Trujillo, Peru**
- Undergraduate thesis: *Modelamiento y simulación de un robot clínico asistido por Ultrasonido 3D para mejorar el guiado de inserción de agujas en biopsia percutánea de mama*.
- Academic merit: upper-rank distinction.

Publications

1. **Jácobo-Zavaleta, S.**, & Zavaleta, J. (2023). Needle Placement for Robot-Assisted 3D-guided Ultrasound Breast Biopsy: A Preliminary Study. *IEEE Latin America Transactions, 21*(3). doi:10.1109/TLA.2023.10068849
2. **Jácobo-Zavaleta, S.**, & Zavaleta, J. (2023). A Deep Learning Approach for Epilepsy Seizure Identification Using Electroencephalogram Signals: A Preliminary Study. *IEEE Latin America Transactions, 21*(3). doi:10.1109/TLA.2023.10068845
3. Zavaleta, A., Ñuflo-Vásquez, S., Alarcón-Turiani, V., & **Jácobo-Zavaleta, S.** (2023). Serie de casos de conducta suicida atendidos en un centro de salud del norte del Perú. *Norte Médico, 1*(5), 27–30.
4. **Jácobo-Zavaleta, S.**, Zavaleta Gavidia, W., & Zavaleta Gavidia, V. (2022). Deep Learning y enfermedades oculares. *Norte Médico, 3*(2).
5. Zavaleta de los Ríos, V., **Jácobo-Zavaleta, S.**, & Zavaleta Gavidia, V. (2022). Microbiota intestinal y las enfermedades neurodegenerativas. *Norte Médico, 1*(2).

Selected Projects

Topological Navigation for Autonomous Mobile Robots 2025
github.com/SJacoboZavaleta/topology_navigation
Implementation of a topological navigation framework for autonomous mobile robot simulation.
ROS | Python | Gazebo

Autonomous Ground Vehicle Simulation in Unstructured Terrains 2024
github.com/SJacoboZavaleta/agv_robot
Simulation of autonomous ground vehicle behaviour in uneven and unstructured environments.
Webots | Python

Automated Medication Dispensing Using a Robotic Manipulator 2024
github.com/SJacoboZavaleta/drug_dispensing_RI
Simulation and control workflow for robotic manipulation in medication dispensing tasks.
RobotStudio | Python

Optimization of Robotic Arm Control Parameters Using Evolutionary Algorithms 2024
github.com/SJacoboZavaleta/optimized_control_robot
Optimization of robotic arm control parameters using evolutionary computation.
MATLAB | Simulink

Professional Experience

Apr. 2021 – Nov. 2020 **Biomedical Equipment Maintenance Assistant, Corporación Tecnobiomédica Healthcare del Perú S.A.C., Lima, Peru**
- Supported preventive maintenance planning and technical service for biomedical equipment, adapting procedures to equipment condition and user requirements.

Biomedical equipment | Maintenance planning

Nov. 2019 – May 2019 **Maintenance Assistant, NORSAC S.A.C., Trujillo, Peru**
- Supported maintenance and logistics process improvements, updated electrical distribution documentation, and automated preventive maintenance task assignment workflows.

Industrial maintenance | Process improvement

Academic Service and Awards

Invited Scientific Reviewer Oct. 2022 – Present
IEEE Latin America Transactions
Invited reviewer for scientific manuscripts in engineering and applied technology.

Winner Project in Artificial Intelligence in Health Apr. 2022 – Jul. 2022
Biomedical Engineering Research Program, UTP, IEEE EMBS UTP and IEEE RAS UTP Student Chapters
Winner project: *A Deep Learning Approach for Epilepsy Seizure Identification Using Electroencephalogram Signals*.

Technical Skills

Programming and Scientific Computing	MATLAB, Simulink, Python, R, C++
Robotics and Simulation	ROS, Gazebo, Webots, RobotStudio, Arduino
Control and Embedded Systems	PID control, model-based design, sensor integration, PWM-based actuation, microcontroller prototyping
CAD and Mechanical Design	Fusion 360, SolidWorks, Onshape
Data and Documentation	Jupyter, RStudio, LaTeX, Quarto, Markdown, Zotero, BibTeX/BibLaTeX
Operating Systems	Windows, Linux

Languages

Spanish	Native
English	B2, TOEFL ITP
Japanese	Basic, JLPT N5
German	Basic