

Alexander F. Vasquez

Lima, Perú

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Research Interests

Nonlinear and optimal control, system identification, control of aerial and mobile robotic systems, implementation of control algorithms on embedded platforms.

Education

Pontificia Universidad Católica del Perú

July 2021 – Present

BS in Mechatronics Engineering

- **Overall Grade:** 17.9/20
- **Relevant Coursework:** Dynamic Systems and Control I & II, Robotics, Artificial Intelligence, Nonlinear Control, Optimal Control, System Identification.

Honors

Beca 18 Scholarship

June 2021

PRONABEC

Awarded a full scholarship for undergraduate studies at the Pontificia Universidad Católica del Perú, granted to low-income students with outstanding academic performance.

**Recognition for Best Performance and Top Positions in EEGGCC –
2023-1 & 2023-2**

August 2023

June 2024

Pontificia Universidad Católica del Perú

Second Place in General Science Studies during the 2023-1 and 2023-2 semesters

Research and Academic Projects

Modular Robotic Platforms

[video] 

- Development of a 4-DOF robotic arm and an omnidirectional car for the Robotics and Artificial Intelligence course laboratory.
- Tools Used: C++, Inventor, 3D Printing

Educational Platforms for Control and Automation

- Implementation of modules including a robotic arm, pick-and-place systems, and quality inspection processes.
- Tools Used: C++, Ladder Logic, MATLAB, Simulink, S7-PLCSIM

Balancing Robot for Dynamic Systems and Control I & II

[video] 

- Design and implementation of a self-balancing robot.
- Tools Used: Inventor, 3D Printing, Thonny, MicroPython, Linux, MATLAB, Simulink

Design of an Agricultural Robot for Indoor Quinoa Seeding

- Collaborated on the development of a robotic platform for indoor quinoa seeding using visible light positioning.
- Contributed to the implementation of the color grid used for localization and participated in the prototype assembly and testing to validate the navigation system.
- Tools Used: MATLAB, Python, Arduino IDE, Inventor, 3D Printing

Design and Implementation of a Hybrid Ground–Aerial Robot (Ongoing Development)

[video] 

- Developed in the course *Mechatronic Design Project*; design and implementation of a robot capable of transforming from a ground vehicle to an aerial platform.

- Tools Used: Pixhawk Firmware, Arduino IDE, Teensy 4.1, C++, Inventor, Eagle, 3D Printing

2-DOF Bicopter for Thesis (Ongoing Development)

[video] [🔗](#)

- Design and implementation of a bicopter module for Dynamic Systems and Control I & II courses, proposed for future use in advanced control courses.
- Tools Used: Inventor, Bambu Studio, C++, Eagle, MATLAB, Simulink

Control System for 2-DOF Bicopter (Ongoing Development)

[Paper Draft and Code] [🔗](#)

- Developed in the course *Advanced Control for Mechatronic Engineering*; includes the design of Backstepping, Gain Scheduling, Feedback Linearization, and EKF Controllers.
- Tools Used: MATLAB, Simulink, ODE45

Teaching and Professional Experience

Teaching Assistant in Digital Design

Lima, Peru

Pontificia Universidad Católica del Perú

Aug 2024 – Present

- Assisted students during laboratory sessions, supporting them in the implementation and debugging of code related to the course content.

Teaching Assistant in Optimization and Control

Lima, Peru

Pontificia Universidad Católica del Perú

Jan 2026 – Mar 2026

- Developed laboratory code and evaluation materials for LP, QP, LQR, MPC, and RCAC.
- Implemented numerical examples in MATLAB and assisted students during laboratory sessions.

Teaching Assistant in Robotics

Lima, Peru

Pontificia Universidad Católica del Perú

Mar 2025 – Jul 2025

- Assisted students during laboratory sessions, supporting them in the assembly of an omnidirectional robot, as well as in the implementation and debugging of autonomous navigation algorithms.

Engineering Development Assistant

Lima, Peru

L.A. Bear Robotics & Automation S.A.C.S.

January 2025 – July 2025

Assisted in the design and development of engineering modules focused on practical training in control and automation areas. Key activities include:

- Development of control modules, such as water level control in tanks and the inverted pendulum.
- Integration of Simulink and microcontrollers for the control of the modules.
- Assembly of automation modules, including a robotic arm, pick-and-place systems, and quality inspection processes.
- Integration of subsystems and validation of their performance to ensure functionality and reliability of the modules in educational environments.

Publications

Design of an Agricultural Robot for Indoor Quinoa Seeding using Visible Light Positioning

To appear

Daniel Tomas Menacho Ordoñez, **Alexander Vasquez**, Rodrigo Carbajal, Jasper-Jan Lut, Jose Balbuena, Marco Zúñiga Zamalloa, Diego Quiroz, Juan Diego Guevara Espinal

To appear in the V Latin American Congress on Automation and Robotics (LACAR 2025), Cusco, Peru

Technical Skills

Programming: MATLAB, Simulink, C++, C, Python, MicroPython, VHDL, Verilog

Software: Autodesk Inventor, Eagle, Siemens PLCSIM, Visual Studio Code, Thonny

Embedded Platforms: Arduino, STM32, Raspberry Pi, FPGA DE10-Lite

Languages: Spanish: Fluent (Native), English: B2 (FCE)