

Juan Bernardo Pastuszak Leon

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Aerospace engineer focused on guidance and control for UAVs and autonomous aircraft, with hands-on experience in control design, flight dynamics and hardware testing.

EDUCATION

MSc Advanced Aeronautical Engineering

2026 to 2027 (expected)

Imperial College London

- Specialising in advanced control, systems engineering for UAVs, design optimisation and AI for aerospace.

BEng Aerospace Engineering

2023 to 2026

University of Bristol

- **First Class Honours.**
- **Royal Aeronautical Society Prize:** highest-achieving final-year student across the whole Aerospace Engineering cohort (BEng, MEng and MSc), 2025/26.
- **Highest coursework mark in the cohort:** Flight Dynamics and Advanced Control; Dynamics and Control of Linear Systems.

FLIGHT DYNAMICS AND CONTROL

Gain Scheduled Pitch Rate Control, F-16 Model

2025 to 2026

University of Bristol, Flight Dynamics and Advanced Control project and extension

- Trimmed and linearised a supplied nonlinear F-16 model in MATLAB and Simulink; wrote the **numerical search** that selected PI gains against modal and transient criteria.
- Implemented an **airspeed scheduled PI controller** from seven trim points (100 to 220 m/s) with Simulink lookup tables, and compared it with fixed gains at 13 initial speeds in the nonlinear model.
- In matched simulated flights with gusts and sensor noise, cut mean RMS pitch rate error by **36% overall and 64% below 140 m/s**; flagged higher actuator demand as the next check.
- Studied actuator rate limits and anti-windup on a linearised model.

UAV Design and Flight-Dynamics Tool

2026 to present

Self-initiated project, in progress

- Developing a Python tool that runs OpenVSP/VSPAERO and AVL and builds **state-space models**.

Stinson L-5 Simulated Flight Tests

2025 to 2026

University of Bristol, coursework task extended on my own initiative

- Flew X-Plane test manoeuvres, wrote a Python tool to process the logs and analysed **glide polars, roll authority, trim and Dutch roll damping** in MATLAB.

AUTONOMOUS SYSTEMS AND HARDWARE

Satellite Payload and Control

2024 to 2025

Team SLOWMo, UKSEDS Satellite Design Competition

- Built a **Python/OpenCV AprilTag pose pipeline** and ground interface feeding PID reaction-wheel control; tuned the controller on the hardware after a simple model did not transfer.
- Selected the motor and wrote the Raspberry Pi 4 control software; redesigned the **reaction wheel** from machined aluminium to laser-cut acrylic after it vibrated.

- Built a moving-marker test cart to check camera distance readings to ± 1 mm and LiDAR to ± 3 cm against measured distances.
- Operated the demonstrator at the national final at Airbus Stevenage, where the team won **Best Satellite**; later mentored Bristol's next team to the final.

Payload Team Lead

Oct 2025 to Aug 2026

HyPower Bristol, Launch 4 Change

- Led a **four-person payload team**, coordinating interfaces, schedules and design reviews.
- Designed the ESP32-S3 sensor **PCB** in Altium (my first) and wrote the MicroPython acquisition and logging firmware; restored programming over UART when USB-C failed.
- Produced workshop drawings for a payload under 66 mm in diameter, and revised the CAD late to fit the electronics lead's flight controller.
- The rocket flew at **Mach 1.5**, the team's highest and fastest flight; my payload logged a 4,817 m barometric peak and a particulate profile against altitude.

RESEARCH AND STRUCTURES

Undergraduate Researcher

2025 to 2026

Bristol Composites Institute, supervised by Dr Dmitry Ivanov

- Built a **Python framework** linking an existing Abaqus/Explicit model to Bayesian optimisation.
- Developed a shear strain gradient metric; compared the model with **four physical forming configurations**, reporting fibre breakage and a predicted defect that did not appear.

UAV Structures Specialist

2024 to 2025

AVDASI2 agricultural survey UAV, University of Bristol

- Integrated the subteams' CAD, found mismatched rear spar positions and reworked the main wing joint with aluminium reinforcement; proposed the **split friction clamp**.
- Operated the wind tunnel and helped run the load test, where the pod failed at about 1,600 N.
- Identified a pitch model from the tunnel data (LabVIEW) and designed a **PID controller: 1.27 s settling, 0% overshoot** in simulation.

OTHER EXPERIENCE

- **Bristol Drone Society, IMechE UAS Challenge (2026)**: made the carbon-fibre leading edges and helped build the wooden wings of an aircraft that flew autonomously at the national final.
- **NASA Space Apps Challenge, Bristol (Oct 2025)**: divided tasks in a six-person team and wrote backend code in 48 hours; won the local Global Connection award.

TECHNICAL SKILLS

Software: Python, MATLAB, Simulink, MicroPython, OpenCV, Abaqus automation, LabVIEW.

Control and analysis: PI and PID design, gain scheduling, linearisation, system identification, Bayesian optimisation.

Hardware and tools: Altium, Fusion 360, Autodesk Inventor, OpenVSP, AVL, X-Plane, 3D printing, soldering.

Languages: English and Spanish, both fluent.

Classical piano, Grade 8 with Distinction; football and strength training.