

Carla Prados Bodega

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EDUCATION

MEng Biomedical Engineering — University College London | 2024 – 2028

On track for First-Class Honours (76% weighted). **Minor in Modern Applications of Engineering Mathematics:** Engineering Mathematics in Finance (84%), **Stochastic Calculus and Uncertainty Analysis, Data Mining and Analysis** (latter two in progress). *Engineering Mathematics in Finance* covered maximum likelihood estimation on fat-tailed excess-return distributions, CAPM by ordinary least squares in matrix form, Monte Carlo via inverse-transform sampling and bond pricing.

International Baccalaureate Diploma — SEK International School, Madrid | 2022 – 2024

Bilingual Diploma. Four Higher Level subjects including **Mathematics Analysis & Approaches**. SAT 1350/1600 (90th percentile).

RESEARCH & WORK EXPERIENCE

Research Studentship — MISI Group, UCL Hawkes Institute | July 2026 – present

Awarded a Research Ignition Award — 1 of 3 departmental recipients — funding an independent research project, continuing as my final-year project. Selected for the UCL Undergraduate Research Showcase 2026.

- Designed and ran a **312-run test campaign** — six fibre configurations × 13 curvature channels × four actuation speeds — running the reference fibre both buffered and unbuffered to isolate the coating's effect from core diameter.
- Built a **3,000-line, 14-module Python pipeline** (pandas, NumPy, SciPy, OpenCV, matplotlib/seaborn) that has processed **181 of those runs into a 255,000-row tracked dataset** — YAML-configured, CLI-driven, with resumable caching and automated segmentation by rolling-median background subtraction.
- Engineered the dataset's **validation and quality layer**: reconciled frame rate across **three independent metadata sources**, flagging the conflict in **all 181 files** (the two readings differ **~35×** in derived timing); gated every statistic on detection rate and **published the tracking-failure map** rather than averaging over bad data; calibrated from **1,071 pooled observations at a 1.6% coefficient of variation**.
- Established a **monotonic relationship between curvature and directional speed asymmetry** — 0.1% when straight rising to **8.1% at the tightest radius** across 1,715 measured strokes — and characterised a systematic **+7–9% overshoot between commanded and achieved actuation speed**, so the commanded value could not be used as ground truth.

Data Science & Cybersecurity Intern — Amplía Soluciones S.L., Madrid | Nov 2023 – Apr 2024

CDTI-funded (Spanish national R&D) SecBluRed project; Industrial IoT.

- Validated and explained** Isolation Forest and deep autoencoder anomaly-detection models on large, noisy Industrial IoT network traffic.
- Worked with **no ground-truth label for "normal"**: proxy objectives around detection consistency, variance under perturbation and cross-condition stability replaced supervised accuracy, with **interpretable models** so detections stayed auditable.

SELECTED PROJECTS

- Optical Ultrasound for Lung-Cancer Diagnosis — commercial case.** Led the technical business case for a pre-revenue venture: sized the European market from **1.5 m annual procedures** to a serviceable population using clinical incidence data, assessed four incumbent modalities and their IP positions, and mapped the **CE Class IIa** regulatory pathway. Identified the mechanical risks I later won the Research Ignition Award to quantify.
- MyLenoma — AI skin-cancer triage app · Biomedical Engineering Presentation Award (86%).** Retrained a **ResNet50 CNN** by transfer learning on **~3,500 ISIC-archive images** across five classes, adding a **Grad-CAM explainability layer**, confidence scoring and a **normalised SQL schema**. Model, app and database delivered in **one week**.
- How to Change the World Award 2026 — winning project.** UCL Engineering's interdisciplinary challenge set with TfL: decomposed a system-level transport brief into a bounded, evidence-backed intervention using TfL open data.
- Synthetic Bone Analogues — UCL Instron Prize for Best Group Research Project 2025 (89%).** Analysed **50,000+ data points per sample** in MATLAB, propagating instrument uncertainty into reported values and diagnosing three systematic causes of divergence from published data. **Invited to mark the following year's cohort.**

SKILLS

Languages & tools: Python (pandas, NumPy, SciPy, OpenCV, matplotlib, seaborn, PyYAML) · MATLAB (**MathWorks Certified**, +12 Academy certificates) · SQL · C (embedded)

Statistics: maximum likelihood estimation · confidence intervals · hypothesis testing · OLS regression · Monte Carlo simulation · uncertainty propagation · design of experiments

Machine learning: transfer learning · CNNs (ResNet50) · Isolation Forests · autoencoders · **Grad-CAM / model explainability** · model validation

Data: computer vision (three tracking/detection systems built across Python and MATLAB) · pipelines, validation and provenance · Spanish and English (bilingual), French B2

LEADERSHIP

Treasurer, UCL MPBE Society (2026–) — manage a **£10,000 annual budget** for a **600+ member** society: expenditure control, procurement, sponsor contracting and event risk assessment. Previously Treasurer, UCL Women's Engineering Society (2025–26), £4,000 budget.

Head of Sponsorship, UCL Engineering Society (Jun – Dec 2025) — closed sponsorship agreements including **Bloomberg L.P.** and **White & Case LLP**; led three executives; segmented a ten-sector prospect pipeline with tiered pricing.

Academic Representative (2024–) — 120+ students, elected every year. **Student Recruitment** and **MPBE Student Ambassador**.