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Ramón Calvo González

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Research Interests

My research interests lies where data-driven control methods, machine perception and large scale models converge, enabling autonomous systems to build a rich world model that helps them comprehend their surroundings and reason about their actions.

Skills

Python | C | C++ | Git | GDB | MATLAB | CMake | PyTorch | CUDA | Isaac | Warp | OpenGL | OpenCV | Linux | Deep Learning | Reinforcement Learning | Machine Perception | Docker | ROS | Gazebo | Point Cloud Library | OpenGL | Sysadmin | LaTeX | Rust | Julia | Blender | Embedded Systems | Spanish (native) | English (bilingual) | Catalan (proficient)

Education

MSc Robotics, Systems and Control — **ETH Zürich** — Zürich, CH — 9/2021 – Present

- ESOP Scholar: Merit based scholarship and mentorship given to the top 3% of ETH MSc applicants of 2021.

BEng Robotics Engineering — **University of Alicante** — Alicante, ES — 9/2017 – 6/2021

- Extraordinary award: graduated best-in-class (1st out of 271 students).

Experience

Master Thesis — **Robotics Systems Lab** — Zürich, CH — 4/2023 – Present

- Creating end-to-end safe navigation reinforcement learning policies for wheeled-legged robots that leverage perceived terrain semantics, using PyTorch, IsaacGym and Warp.
- Made a framework for creating realistic procedural terrains with hiking trails, using Blender and its Python API.
- Supervised by Joonho Lee and Marko Bjelonic.

Research Engineer Intern — **SONY R&D Center** — Zürich, CH — 9/2022 – 2/2023

- Researched on small Deep Learning models for object detection with event cameras on embedded hardware.
- Implemented a CNN-RNN baseline architecture using Pytorch, Lightning and Hydra.
- Implemented a state-of-the-art Vision Transformer (ViT) model that outperformed the baseline's IoU by 50% while having 5x less parameters.
- Created a large dataset pipeline: speed-up of 100x while handling 1TB of data.

Research Assistant — **Computational Robotics Lab** — Zürich, CH — 7/2022 – 8/2022

- Researched the use of learned actuator dynamics using neural networks in a Whole Body Controller (WBC).
- Supervised by Dongho Kang, Joonho Lee and Prof. Stelian Coros.

Research Intern — **Human Robotics** — Alicante, ES — 10/2020 – 6/2021

- Research funded by the merit based Collaboration Grant issued by the Spanish Ministry of Education.
- Bipedal gait generation and tracking through trajectory optimization and a custom made WBC, using C++ and ROS.
- Supervised by Prof. Jorge Pomares.

Engineering Intern — **QuixMind** — Alicante, ES — 10/2019 – 6/2020

- Created a robot forklift simulation with ROS, Gazebo and Docker.
- Pallet pose estimation and alignment on a real forklift, using the Point Cloud Library, ROS Controllers and C++.

Publications

- Path generation and control of humanoid robots during extravehicular activities.
  Ramón JL, **Calvo R**, Trujillo A, Pomares J, Felicetti L. 73rd International Astronautical Congress (IAC-22), 18-22 September 2022, Paris, France
- Trajectory optimization and control of a free-floating two arms humanoid.
  Ramón JL, **Calvo R**, Trujillo A, Pomares J, Felicetti L. Journal of Guidance, Control and Dynamics 45 (9), 1661-1675. 2022

References

- Stelian Coros | Associate Professor at ETH Zürich | scoros@inf.ethz.ch
- Jorge Pomares Baeza | Full Professor at the University of Alicante | jpomares@ua.es
- Valentina Cavinato, Senior Engineer at SONY Europe B.V. | +41 (0) 79 766 38 99 | valentina.cavinato@sony.com

Awards

Ideathon For a Novel Sustainable Packaging Material — Student Biolab – ETH Zurich
First prize (Proposed a method to obtain PHA candidates using ML and produce them at scale) — *November 2022*

ESOP (Excelence Scholarship & Opportunity Program) — ETH Zurich
Merit based scholarship and mentorship awarded to the top 3% MSc applicants of 2021 at ETH Zürich. — *March 2021*

Extraordinary Bachelor's Award — University of Alicante
Graduated with Honors — *November 2021*

National Graduate Ranking — SEDEA (Spain)
2nd position in my engineering category — *November 2021*

Santander's Progreso Grant — Santander Bank
Awarded for being one of the best students in campus. — *December 2020*

Ministry Collaboration Grant — Spanish Ministry of Education
Research internship in University of Alicante's DFESTS department. — *2020 – 2021*

Volunteering

- Volunteer at ICIAM 2019.
- Volunteer at IROS 2018 (IEEE stand).