Carlos Luis

 Stuttgart, Germany

Education

- **Technische Universität Darmstadt** Darmstadt, Germany
  Ph.D. Candidate *Apr. 2021 - 2024*

- **University of Toronto** Toronto, ON
  M.A.Sc. Student (GPA: 3.74/4) *Sep. 2017 - Sep. 2019*

- **École Polytechnique de Montréal** Montreal, QC
  International Exchange Student (GPA: 3.94/4) *Sep. 2015 - Apr. 2016*

- **Universidad Simón Bolívar** Caracas, Venezuela
  B.Sc., Electronics Engineering, graduated Cum Laude (GPA: 4.59/5) *Sep. 2011 - July 2017*

Research/Work Experience

- **Bosch Center for Artificial Intelligence** Renningen, Germany
  Ph.D. Candidate *Apr. 2021 - Ongoing*
  - Research interests: model-based reinforcement learning, uncertainty quantification, exploration, offline RL, distributional RL, meta RL.
  - Managed the lifecycle of RL projects: theory, proof-of-concepts, algorithm design, large-scale experiments, visualization and debugging.
  - Supervised Master's Thesis and provided technical feedback on various RL projects.

- **Amazon Prime Air** Paris, France
  Software Development Engineer I *Oct. 2019 - Mar. 2021*
  - Developed production-level code for a large scale drone delivery project.
  - Designed safety-critical software components in collaboration with large engineering teams.
  - Kick-started a high-impact simulation project integrating the key business abstractions of drone delivery, which provided valuable technical insights.

- **Dynamic Systems Lab - University of Toronto** Toronto, ON
  Graduate Researcher *Sep. 2017 - Sep. 2019*
  - Collaborated in the design and implementation of a software architecture for controlling a swarm of quadrotors.
  - Developed novel and scalable motion planning algorithms for swarms of quadrotors, surpassing current state-of-the-art methods.
  - Created visually appealing demonstrations of my research which where routinely shown to lab visitors.

- **Institute for Aerospace Studies - University of Toronto** Toronto, ON
  Teaching Assistant *Sep. 2017 - Dec. 2018*
  - Marked homeworks and exams for two undergraduate courses: Mathematics for Robotics (ROB310) and Robotics (AER525).

- **Mobile Robotics & Autonomous Systems Lab** Montreal, QC
  Research Intern *Sep. 2015 - Aug. 2016*
  - Created a simulation environment for the trajectory control of a quadcopter.
  - Implemented two trajectory tracking controllers: cascaded PID and a linear quadratic tracker.
  - Presented the project as my Bachelor's Thesis at Universidad Simón Bolívar.

Publications

- **C. E. Luis**, A. G. Bottero, J. Vinogradska, F. Berkenkamp, and J. Peters, "Value-Distributional Model-Based Reinforcement Learning", submitted to *Journal of Machine Learning Research (JMLR)*; presented at *European Workshop on Reinforcement Learning (EWRL)*, 2023. 📄

- **C. E. Luis**, A. G. Bottero, J. Vinogradska, F. Berkenkamp, and J. Peters, "Model-Based Uncertainty in Value Functions", in *Conference on Artificial Intelligence and Statistics (AISTATS)*, 2023. 📄 ‹/› ▶

- A. G. Bottero, **C. E. Luis**, J. Vinogradska, F. Berkenkamp, and J. Peters, "Information-Theoretic Safe Exploration with Gaussian Processes", in *Conference on Neural Information Processing Systems (NeurIPS)*, 2022. 📄 ‹/›

- **C. E. Luis**, M. Vukosavljev, and A. P. Schoellig, "Online trajectory generation with distributed model predictive control for multi-robot motion planning", *IEEE Robotics and Automation Letters*, vol. 5, iss. 2, pp. 604-611, 2020. 📄 ‹/› ▶

- **C. E. Luis**, A. P. Schoellig, "Distributed Trajectory Generation for Multiagent Systems", Master Thesis, University of Toronto, Canada, 2019. 📄

- **C. E. Luis**, M. Vukosavljev, and A. P. Schoellig, "Towards scalable online trajectory generation for multi-robot", *Abstract and Poster, in Proc. of the Resilient Robot Teams Workshop at the IEEE International Conference on Robotics and Automation (ICRA)*, 2019 📄

- **C. E. Luis** and A. P. Schoellig, "Trajectory Generation for Multiagent Point-To-Point Transitions via Distributed Model Predictive Control", *IEEE Robotics and Automation Letters*, vol. 4, iss. 2, pp. 357-382, 2019. 📄 ‹/› ▶

- X. Du, **C. E. Luis**, M. Vukosavljev, and A. P. Schoellig, "Fast and In Sync: Periodic Swarm Patterns for Quadrotors", in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, pp. 9143–9149, 2019. 📄 ▶

- **C. E. Luis** and J. Le Ny, "Design of a Trajectory Tracking Controller for a Nanoquadcopter", Technical report, Polytechnique Montreal, 2016. 📄 ‹/› ▶

Mentorships

- Akash R., "Model-Based Reinforcement Learning under Sparse Rewards", Master's Thesis, University of Stuttgart, 2023. 📄

Skills

Programming Languages: Python, C/C++, Java, JavaScript/TypeScript.

Software & Libraries: Docker/Singularity, MLFlow, Pytorch, Numpy, Pandas, MuJoCo, OpenAI Gym, ROS (Robot Operating System), Git, Bash.

Languages: Spanish (mother language), English (proficient-TOEFL iBT 105/120), French (fluent), German (basic).