



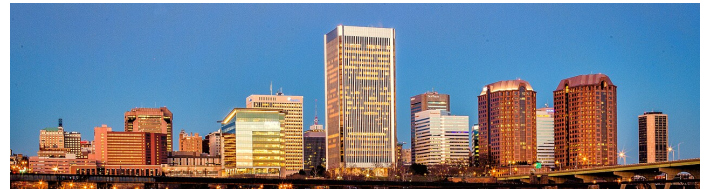
PhD Opportunity in Robotics

Virginia Commonwealth University | Richmond, Virginia, USA

Department of Mechanical & Nuclear Engineering • College of Engineering



VCU Innovation Courtyard. Photo: VCU College of Engineering.



Richmond: Mobilus In Mobili, CC BY 2.0; cropped.

Join PARCE-LAB

PARCE-LAB invites prospective PhD students to express interest in working with Prof. Gustavo A. Cardona on robot planning, autonomy, and reliable control. Research connects mathematical reasoning with experiments on robots interacting with people and other robots under uncertainty.

PARCE stands for *Planning, Autonomy, and Reliable Control for Embodied-Systems*. In Colombia, *parce* is a familiar way to address a friend or companion, reflecting the lab's emphasis on collaboration.

Research directions

- **Human–robot interaction and shared autonomy.** Interpret human behavior and adapt robot assistance while accounting for uncertain intent, physical interaction, and safety constraints.
- **Safe planning and control under uncertainty.** Develop optimization-based planning and feedback control methods that account for imperfect models, disturbances, and robots' physical limits.
- **Formal methods and temporal logic.** Encode task requirements, timing constraints, and competing objectives; develop algorithms to plan, monitor, and quantify task satisfaction.
- **Multi-robot coordination.** Coordinate robot motion and tasks under limited communication, differing capabilities, or failures, while maintaining safety and mission performance.

Projects may combine control theory, optimization, formal methods, and learning, with applications to humanoids, ground robots, and quadrotor teams. Topics will reflect student interests and lab research priorities.

Relevant preparation

Applicants from mechanical or electrical engineering, computer science, applied mathematics, and related fields are encouraged to express interest. Useful preparation includes linear algebra, dynamical systems, probability, control, optimization, or algorithms, together with programming. Python, C++, ROS/ROS 2, simulation, or robot hardware experience is welcome. Experience in every area is not expected; coursework, research, industry, or personal projects can demonstrate preparation. Prior publications are not required.

VCU and Richmond

VCU is a public R1 research university with robotics research across several engineering departments. Its urban campus is part of Richmond, Virginia's capital. The city offers museums, an active arts community, and a varied restaurant scene. The James River Park System provides trails and opportunities for hiking, cycling, and paddling within the city.

How to express interest

Complete the prospective PhD student interest form with your academic background, preferred start term, research interests, a technical project and your contribution, and a CV. Publications and links to other work are optional.

Interest form: <https://forms.gle/NcR4qFgH77d4eNb28>

This form is an initial expression of interest. It does not replace the formal VCU graduate application or constitute an offer of admission or funding.