Megnath Ramesh

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Education

University of Waterloo, Ph.D. in Electrical and Computer Engineering — Sept 2020 – August 2025

- **Thesis:** Planning and Replanning Near-optimal Robot Coverage Paths in Partially Unknown Environments
- **Advisors:** Stephen L. Smith and Baris Fidan
- **Key Courses:** Combinatorial Optimization, Computational Geometry, Deep Learning, and Algorithm Design.
- **Awards:** Ontario Graduate Scholarship, UW President's Graduate Scholarship, QEII Graduate Scholarship

University of Alberta, B.Sc. in Electrical Engineering — Sept 2013 – May 2018

- **GPA**: 3.8/4.0 - Graduated with Distinction.

Recent Experience

Postdoctoral Fellow (*Vector Faculty Affiliate Researcher*), University of Waterloo — September 2025 – Current

- **Advisors:** Stephen L. Smith and Baris Fidan.
- Developing *generative AI models* to plan robot paths for long-horizon coverage and exploration tasks.

Ph.D. Researcher, University of Waterloo & Avidbots Corp. — Sept 2020 – August 2025

- Developed efficient *coverage planning algorithms* for industrial cleaning robots.
- Tested algorithms using *real-world robots* that encounter environmental uncertainties.
- *Collaborated with the Avidbots engineering team* on algorithm implementation and testing.
- *Mentored junior researchers* in devising and implementing solutions to difficult robotics problems.

Graduate Teaching Assistant, University of Waterloo. — Sept 2020 – April 2025

- *Courses:* Algorithm Design and Analysis, Digital Control Applications, and Analog Control Systems.

Application Software Developer (L1 & L2), ScopeAR — Jun 2018 – Aug 2020

- Developed features and fixed defects in a cross-platform *augmented reality (AR) video calling* application.
- Worked on a range of features, including *marker-based AR tracking, guest login system, and cloud-based AR*.

Junior Robotics Developer, VEERUM — Feb 2017 – Apr 2018

- Developed a pilot project using *autonomous robots* for generating *digital twins* of construction facilities.

Publications

- **BenchNPIN - Benchmarking Non-Prehensile Interactive Navigation** — Project Website
  (Under review for potential publication at an IEEE conference)
  N. Zhong, S. Caro, A. Iskander, ***M.Ramesh***, and S. L. Smith
- **Minimum-Length Coverage Path Planning for Grid Environments with Approximation Guarantees**
  IEEE Robotics and Automation Letters (RA-L), 2025
  M.Ramesh, F. Imeson, B. Fidan, and S. L. Smith
- **Approximate Environment Decompositions for Robot Coverage Planning using Submodular Set Cover**
  IEEE Conference on Decision and Control (CDC), 2024
  M.Ramesh, F. Imeson, B. Fidan, and S. L. Smith
- **Anytime Replanning of Robot Coverage Paths for Partially Unknown Environments**
  IEEE Transactions on Robotics (T-RO), 2024
  M.Ramesh, F. Imeson, B. Fidan, and S. L. Smith
- **Optimal Partitioning of Non-Convex Environments for Minimum Turn Coverage Planning**
  IEEE Robotics and Automation Letters (RA-L), 2022
  M.Ramesh, F. Imeson, B. Fidan, and S. L. Smith

Projects

RoVR the Explorer (HackED 2019 – 3rd Place Win) — Github Link

VR-controlled ground robot with a point cloud stream to visualize its environment.

Paulie Blart Security Robot (SFHacks 2018 – 1st Place Win) — Github Link

Autonomous security robot to detect intruders (using CNNs). Seen on Global News (link).