

**Education****Carnegie Mellon University — Robotics Institute, Pittsburgh, PA***PhD in Robotics**Aug. 2021 – Current.***Carnegie Mellon University — Robotics Institute, Pittsburgh, PA***Master of Science in Robotics**GPA: 4.14 / 4.33**Aug. 2019 – Aug. 2021***University of Maryland — A James Clark School of Engineering, College Park, MD***Bachelor of Science in Electrical Engineering**GPA: 4.0 / 4.0 (Summa Cum Laude)**Aug. 2012 – Dec. 2016***Research Experience****Carnegie Mellon University - Robotics Institute***Advisor: Dr. Michael Kaess*

- I am interested in developing methods for efficient and robust inference at the intersection of linear algebra and probabilistic graphical models.
  - Recent work presented a primal-dual constrained optimization framework formulated as message passing on the Bayes tree. It incorporates hard constraints into iSAM2 (an incremental least squares solver mostly used for state estimation).
  - Recently interested in non-Gaussian inference for solving SLAM problems.
- Working on underwater 3D reconstruction and mapping. Investigating recent techniques for view synthesis from computer graphics and non-light-of-sight imaging (NLOS) and their application to the problem of 3D sonar imaging.

**Carnegie Mellon University - Robotics Institute***Advisor: Dr. George Kantor*

Research in the area of simultaneous localization and mapping (SLAM), 3D reconstruction, and mobile manipulation in agricultural fields.

- Worked on SLAM algorithms that combine advances in deep learning with traditional vision pipelines to create object-level 3D models of agricultural fields.
- Developed a computed vision application to estimate the width of apple fruitlets from stereo images. Achieved a 1mm estimation error on the testing dataset.
- Developed a manipulation and planning strategy for autonomous data collection in apple orchards using an in-hand robotic arm which was further integrated with a fully autonomous navigation pipeline.
- Proposed a 3D reconstruction system that uses the in-hand camera images as well as preliminary algorithms to perform apple fruitlet mapping in tree canopies.

**Carnegie Mellon University - Robotics Institute***Advisors: Dr. Laszlo Jeni and Dr. Simon Lucey*

Research in the area of 3D reconstruction (non-rigid structure from motion, single image 3D reconstruction) and semi-supervised learning.

- Investigated the usage of geometric priors for better utilization of unlabeled data for image-based 3D reconstruction using deep networks.
- Developed a computer vision system, with a deep network at its core, to estimate the 3D pose and shape of hands from a single image. (system ranked first for several months in the Freihand CodaLab competition).

**University of Maryland - College Park — Maryland Cybersecurity Center (MC2)***Advisor: Dr. Charalampos (Babis) Papamanthou**Sep. 2016 – Dec. 2016*

- **Secure Storage with Bitcoin:** Prototyped a new Bitcoin transaction (prototyped using the Java Bitcoinj library) to provide payment to cloud storage provider if the stored files in the cloud are proven not to have been modified or corrupted.

**ViaSat, Inc***Undergraduate Research Fellowship**Oct. 2015 – May. 2016*

- Implemented a web based portal for primary and Virtual Network Operator access.
- Designed and implemented data analytics to derive insight into network operation and event/performance correlation.
- Evaluated Key Performance Indicators for cellular sites and developed tiered access and data views.

**Work Experience****ViaSat, Inc, Germantown, MD***Software Engineer**Jan. 2017 – Aug. 2019*

- Developed and maintained a high availability configuration management platform for the ground segment of the ViaSat satellite internet network.
- Developed and maintained a Monitoring and Control System software currently deployed for customers in South America and Australia. Assisted customers with the deployment and integration of the product.
- Troubleshoot ViaSat GSM network faults in South America.

*Software Engineering Intern**May. 2016 – Dec. 2016*

- Developed a Monitoring and Control System software for a satellite-based communication system product which expands existing Global System for Mobile communications (GSM) and land telephony networks via satellite.

- Developed a Pseudo-random Noise (PN) audit tool based on sector's coordinate and frequency to detect interference issues in 3G networks.

- Monitored network reconfiguration and deployment of 3G and 4G wireless networks.
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## Publications and Pre-Prints

1. Qadri Mohamad, Paloma Sodhi, Joshua Mangelson, Frank Dellaert, and Michael Kaess, "Incopt: Incremental constrained optimization using the bayes tree" In IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS). Vol. 6. (2022).
  2. Bakhshalipour, Mohammad, Seyed Borna Ehsani, Mohamad Qadri, Dominic Guri, Maxim Likhachev, and Phillip B. Gibbons. "RACOD: algorithm/hardware co-design for mobile robot path planning." In Proceedings of the 49th Annual International Symposium on Computer Architecture, pp. 597-609. (2022).
  3. Qadri, Mohamad, Michael Kaess, and Ioannis Gkioulekas. "Neural Implicit Surface Reconstruction using Imaging Sonar." arXiv preprint arXiv:2209.08221 (2022).
  4. Lin, Tianxiang, Akshay Hinduja, Mohamad Qadri, and Michael Kaess. "Conditional GANs for Sonar Image Filtering with Applications to Underwater Occupancy Mapping." arXiv preprint arXiv:2209.11757 (2022).
  5. Qadri, Mohamad, Harry Freeman, Franz Eric Schneider, and George Kantor. "Toward Semantic Scene Understanding for Fine-Grained 3D Modeling of Plants." In AI for Agriculture and Food Systems. (2021).
  6. Qadri, Mohamad. Robotic Vision for 3D Modeling and Sizing in Agriculture. Master's thesis, Carnegie Mellon University, Pittsburgh, PA (2021)
  7. Qadri, Mohamad, and George Kantor. "Semantic Feature Matching for Robust Mapping in Agriculture." arXiv preprint arXiv:2107.04178 (2021).
  8. Bakhshalipour, Mohammad, Mohamad Qadri, and Dominic Guri. "Speculative Path Planning." arXiv preprint arXiv:2102.06261 (2021).
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## Presentations

- Exploring the link between Geodesically Convex Optimization and Contraction Analysis (Carnegie Mellon University, December 2019).
  - Non-Rigid Structure from Motion: A Python implementation of Dai et al solution (Carnegie Mellon University, December 2019)
  - Secure Storage with Bitcoin (University of Maryland - College Park, December 2016)
  - Calculus of Variations and a Solution to the Brachistochrone Problem (University of Maryland - College Park, May 2013)
  - Topology and Geometry on Surfaces the study of a two-torus (University of Maryland - College Park, December 2013)
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## Skills

**Programming languages:** C, C++, Python, JavaScript

**Databases:** MySQL, InfluxDB, PostgreSQL.

**Virtualization:** VMWare ESXI, Virtual Box.

**Software:** ROS, Matlab, Autodesk inventor, Cadence Design Entry, PSpice, Simulink, AutoCAD.

**Simulators:** Mujoco, Rviz, Gazebo

**Packages and Frameworks:** Tensorflow, Pytorch, OpenCV, GTSAM

**Languages:** Fluent in French, Arabic and English. Proficient in Spanish.

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## Courses

Probabilistic Graphical Models, Optimal Control and Reinforcement Learning, Planning and Decision Making in Robotics, Statistical Techniques in Robotics, Machine Learning, Kinematics Dynamics and Control, Computer Vision, Digital Signal Processing, Control Systems, Digital Control Systems, Computer Systems Security, Electromagnetic Wave Propagation, Signal and System Theory, Electronic Circuit Design.

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## Services

- Autonomous Robots 2021 (Reviewer)
- ICRA 2021 (Reviewer)
- Autonomous Robots 2022 (Reviewer)
- CMU Masters in Robotics Admission Committee (2022)
- CMU AI Mentoring Program (2022)