

# Mosam Dabhi

PH.D. STUDENT

1502D Newell Simon Hall

☎ (+1) 412-726-4454 | ✉ mosam@cmu.edu | 🏠 mosamdabhi.github.io | 📠 mosam-dabhi-9395b09a/ | 🐦 @mosamdabhi | 📄 Mosam Dabhi

## Research Interests

- Computer vision** 3D reconstruction, Multi-view geometry, neural 3D representations
- Deep Learning** Self-supervised learning, Active labeling, Structured optimization
- Robotics** Mapping, Active Perception, Planning and Control

## Education

### Carnegie Mellon University

PH.D. IN ROBOTICS

- **Advisor:** Simon Lucey and Laszlo Attila Jeni

Pittsburgh, PA, USA

Aug. 2021 - Present

### Carnegie Mellon University

M.S. IN ROBOTICS

- **Advisor:** Simon Lucey
- Thesis: Multi-view NRSfM: Affordable Setup for High-Fidelity 3D Reconstruction

Pittsburgh, PA, USA

Aug. 2019 - May 2021

### National Institute of Technology

B.TECH. IN ELECTRONICS AND COMMUNICATION ENGINEERING

Surat, Gujarat, India

Aug. 2013 - May 2017

## Research Experiences

### Carnegie Mellon University

GRADUATE RESEARCH ASSISTANT

- **Advisor:** Simon Lucey, Laszlo Attila Jeni
- Generating high-fidelity 3D reconstructions using substantially reduced number of uncalibrated physical views. [1,2]

Pittsburgh, PA, USA

Aug. 2019 - Present

### Apple, Inc.

RESEARCH INTERN

- **Mentor:** Ian Fasel
- Research in active labeling and self-supervised learning.

San Francisco, CA, USA

May 2021 - Aug. 2021

### Apple, Inc.

RESEARCH INTERN

- **Mentor:** Ian Fasel
- Research on affordable setups to generate 3D groundtruth for computer vision applications [1].

San Francisco, CA, USA

May 2020 - Aug. 2020

### Carnegie Mellon University

RESEARCH ASSISTANT

- **Advisor:** Nathan Michael, Wennie Tabib, Vishnu Desaraju
- Exploration & mapping for search and rescue, planetary exploration, and tactical operations where robots must share information in realtime [3].
- Aggressive autonomous flight in unstructured, GPS-denied environments at accelerations exceeding  $12 \text{ m/s}^2$  in outdoor field experiments [4].
- Experience-driven Model Predictive Control (EPC) strategies for aggressive flight performance on computationally constrained platforms. [5,6].
- Planning optimal and aggressive trajectories in cluttered environments using mixed-integer programming. [7]

Pittsburgh, PA, USA

May 2017 - May. 2019

### Indian Institute of Science

RESEARCH INTERN

- **Advisor:** Prasanta Kumar Ghosh
- Home automation prototype using speaking rate and pitch of the user voice from a mobile android device.
- Speech based digit identification using Support Vector Machines classifiers.

Bangalore, India

May 2015 - Jul. 2015

### National Institute of Technology

UNDERGRADUATE RESEARCH ASSISTANT

- **Advisor:** Anand Darji
- Precision farming using a Multi-rotor robot.

Surat, India

May 2016 - May 2017

## Publications

- [1] **Mosam Dabhi**, Chaoyang Wang, Kunal Saluja, Laszlo Jeni, Ian Fasel, and Simon Lucey. High fidelity 3d reconstructions with limited physical views. In *2021 International Conference on 3D Vision (3DV)*. IEEE, 2021.
- [2] **Mosam Dabhi**. Multi-view nrsfm: Affordable setup for high-fidelity 3d reconstruction. Master's thesis, Carnegie Mellon University, Pittsburgh, PA, May 2021.
- [3] Wennie Tabib, Kshitij Goel, John Yao, **Mosam Dabhi**, Curtis Boirum, and Nathan Michael. Real-time information-theoretic exploration with gaussian mixture model maps. In *Robotics: Science and Systems*, 2019.
- [4] Alex Spitzer, Xuning Yang, John Yao, Aditya Dhawale, Kshitij Goel, **Mosam Dabhi**, Matt Collins, Curtis Boirum, and Nathan Michael. Fast and agile vision-based flight with teleoperation and collision avoidance on a multirotor. In *International Symposium on Experimental Robotics*, pages 524–535. Springer, 2018.
- [5] **Mosam Dabhi**, Alexander Spitzer, and Nathan Michael. Aggressive flight performance using robust experience-driven predictive control strategies: Experimentation and analysis. Technical Report CMU-RI-TR-19-08, Carnegie Mellon University, Pittsburgh, PA, June 2019.
- [6] **Mosam Dabhi**, Vishnu R Desaraju, and Nathan Michael. Evaluation of explicit experience-driven predictive control on a computationally constrained platform. Technical report, Carnegie Mellon University, Pittsburgh, PA, June 2017.
- [7] **Mosam Dabhi**, Vishnu Desaraju, and Nathan Michael. Planning aggressive, dynamically feasible and optimal trajectories for autonomous vehicles in cluttered environments using mixed integer programming. Technical report, Carnegie Mellon University, Pittsburgh, PA, 2016.

## Honors & Awards

2020-Present	<b>Graduate Fellowship</b> , Apple Inc.	Pittsburgh, PA, USA
2017	<b>Research Scholarship</b> , Federation of Indian Chambers of Commerce & Industry Research Scholarship (FICCI)	Pittsburgh, PA, USA
2016-17	<b>Summer Scholar</b> , Robotics Institute Summer Scholar	Pittsburgh, PA, USA
2016	<b>Undergraduate thesis funding</b> , Technical Education Quality Improvement Programme (TEQIP) Award, Ministry of Human Resource Development(MHRD), Government of India	Surat, India

## Academic Services

2021	<b>Conference Paper Reviewer</b> , IROS: IEEE/RSJ International Conference on Intelligent Robots and Systems	Prague, Czech Republic
2020	<b>Conference Paper Reviewer</b> , IEEE-RAS International Conference on Humanoid Robots	Munich, Germany
2017-18	<b>Admissions &amp; Administrative Coordinator</b> , Robotics Institute Summer Scholars (RISS)	Pittsburgh, PA, USA

## Teaching Experiences

<b>Carnegie Mellon University</b>	Pittsburgh, PA, USA
TEACHING ASSISTANT	Spring 2022
<ul style="list-style-type: none"><li>• <b>Course:</b> Robot Localization and Mapping</li><li>• <b>Instructor:</b> Michael Kaess</li></ul>	

## Selected coursework

<b>Carnegie Mellon University</b>	Pittsburgh, PA, USA
COMPUTER VISION (A), MACHINE LEARNING (A), CONVEX OPTIMIZATION (A), LOCALIZATION AND MAPPING FOR ROBOTICS (A+), MATHEMATICS FUNDAMENTALS FOR ROBOTICS (A), KINEMATICS, DYNAMICS, AND CONTROLS (A+), ETHICS IN ROBOTICS (A)	Aug. 2019 - Present

## Proficient Skills

<b>Programming Languages</b>	Python, C/C++, MATLAB, HTML, Lua
<b>Software Libraries</b>	PyTorch, TensorFlow, OpenAI Gym, Torch, Caffe, OpenCV, Blender, Robot Operating System (ROS)