

Aditya Agarwal

skymanaditya1@gmail.com, adityaag@mit.edu, [Personal Website](#)

Cambridge, Massachusetts

EDUCATION

Massachusetts Institute of Technology

PhD in Electrical Engineering and Computer Science; GPA: 5.0/5.0

Cambridge, USA

Sep 2023 - Current

International Institute of Information Technology Hyderabad

Masters by Research in Computer Science and Engineering; GPA: 9.83/10.0 (Top 2%)

Hyderabad, India

Aug 2021 - May 2023

PES University (formerly PES Institute of Technology)

Bachelor of Engineering in Computer Science and Engineering; GPA: 9.31/10.0 (Top 10%)

Bangalore, India

Aug 2013 - May 2017

Kendriya Vidyalaya

Class XII AISSE, CBSE; 94.2% (Top 1.5% in India); Class X AISSE, CBSE; 10.0/10.0 (Top 1% in India)

New Delhi, India

Apr 2010 - Mar 2013

EXPERIENCE

Massachusetts Institute of Technology

Graduate Research Assistant – Working in the areas of general-purpose robotic perception, learning, and planning

Cambridge, USA

Sep 2023 - Present

- **Learning and Intelligent Systems Group (CSAIL):** Supervised by Professors **Leslie Pack Kaelbling** and **Tomás Lozano-Pérez**.

- * Built the first open-world robotic perception system that composes general-purpose perception models for open-ended embodied robot manipulation in complex environments.
- * Working on an LLM-driven agent that orchestrates perception, planners, grounding models, and robot skills via tool-calling to synthesize parameterized skill programs from natural language instructions for open-ended robot tasks.
- * Designing representation-centric robot learning policies that leverage structured explicit and intermediate (state, geometry, affordances) scene representations to achieve better generalization, increased sample efficiency, and improved task performance over standard visuomotor policies.

Autodesk Robotics

Research Intern Robotics Perception – Worked in the areas of robotic perception for general-purpose manipulation.

San Francisco, USA

May 2025 - Aug 2025

- **Adaptive Product Assembly (APA):** Supervised by **Yotto Koga** and **Sachin Chitta**.

- * Developed a feed-forward 6-DoF pose estimation model *Rivet6D*, that disentangles rotation and translation, and is trained purely on synthetic data for in-the-wild generalization, using foundation models and equivariant point-cloud networks. *In preparation for submission to a conference*.

Université de Montréal & Mila

Visiting Researcher – Worked in the areas of representation learning and robotic manipulation

Montreal, Canada

May 2023 - Aug 2023

- **Robotics and Embodied AI Lab (REAL):** Supervised by Professors **Liam Paull** and **Florian Shkurti**.

- * Worked on integrating a novel graph based scene representation *ConceptGraphs* with a robotic tabletop manipulator. *(ICRA 2024)*

IIT Hyderabad

Research Fellow – Working in the broad areas of Robotics, Generative Modeling and 3D Computer Vision.

Hyderabad, India

Feb 2021 - May 2023

- **Robotics Research Center:** Supervised by Professors **Madhava Krishna** and **Srinath Sridhar**.

- * Advised undergraduate and graduate students towards learning generalizable motion planning motion by learning to generate collision-free kinematically valid trajectories guided through an ensemble of cost-guidance functions. *(ICRA 2024)*
- * Worked on learning NeRF priors for generating high-resolution NeRFs (512× spatial resolution) across categories. *[NeurIPS 2023]*
- * Worked on 3D shape completion of pointclouds in arbitrary poses for improved grasp pose estimation. *[ICRA 2023]*
- * Leading a group of four undergrad researchers on tabletop manipulation by exploring synergies between pushing and grasping.
- * Developed an end-to-end pipeline for tabletop rearrangement and planning. Secured 3rd place in an international robotics competition [Robotic Grasping and Manipulation Competitions](#) hosted by ICRA. *[ICRA 2022]*

- **Centre for Visual Information Technology:** Supervised by Professors **C V Jawahar** and **Vinay Namboodiri**.

- * Proposed a novel area of video-to-video face-swapping for swapping a double's face (target) with a starring actor's (source) in movie scenes by preserving the facial features and expressions of the source and pose and background features of the target using techniques in blending and generative modeling. Outperformed existing SOTA networks on multiple metrics. *[WACV 2023]*
- * Developed a novel formulation for bootstrapping lipreading training platforms at scale by building on SOTA talking-head generation and TTS models for training hard-of-hearing people to lipread in any accent/language without vocabulary constraints and with real-world variations. *[WACV 2023]*
- * Proposed a novel video representation network where the videos are parameterized as implicit neural representations (INRs). A hypernetwork learns a prior over these INRs. Achieved SOTA performance in several video-based generative tasks. *[TMLR 2022]*
- * Developed a lipreading model for an ALS patient using data augmentation and domain adaptation techniques. *[BMVC 2021]*

Microsoft India R&D*Data Scientist II - Bing Search Technology Center India*

Hyderabad, India

Jan 2018 - Mar 2021

- **Related QnA (People Also Ask), Bing STCI:** PAA experience shows a block of related questions and answers on the search page for any given user query. We aid the user in query exploration and reformulation.
 - * Developed deep-learning techniques to improve the coverage and relevance of PAA in English, French, and German markets.
 - * Worked on universalization techniques to enable PAA in 100+ languages and 200+ markets for millions of users at scale.
- **Azure Health Data Workbench, Azure Global Engineering:** We try to leverage the power of AI and the Cloud to solve some of the challenging problems in the sphere of healthcare in India and the world impacting the lives of millions of people.
 - * Built an Azure Data workbench to pull medical health records from on-premise healthcare systems to the cloud performing a series of pre-processing, de-identification and ingestion steps to store data in a secure and queryable format ensuring interoperability.
 - * Worked on several data analysis and visualization techniques to draw intelligent insights from the data.
- **Project Sangam - Digital Learning Platform, Azure Global Engineering:** Project Sangam is cloud-hosted, mobile-first community learning platform built to deliver content at large scale.
 - * Owned several key areas like setting up the deployment health monitoring framework, API automation, developed the reward based program called Certificates, automated creation of deployments etc. to help us scale quickly and in customer acquisition.
 - * Seamlessly on-boarded the Swachhbharat Mission program to our platform which helped train 110,000+ municipal functionaries across 4000+ cities in India on best sanitation practices. The result was a partnership between Microsoft India and Ministry of Urban and Housing Affairs (MoHUA), Government of India that received widespread media coverage, [Link](#).

IIT Hyderabad*Visiting Researcher – Supervised by Professor Anil Kumar Vuppala*

Hyderabad, India

Oct 2019 - Jul 2020

- **Reed: An Approach Towards Quickly Bootstrapping Multilingual Acoustic Models.**
 - * Built a multilingual acoustic model based on convolutional networks operating on raw speech signals to validate the compatibility of different languages in building a robust multilingual system. Achieved SOTA on three low-resource Indic languages. [\[SLT 2021\]](#)

VMWare India R&D*Member of Technical Staff*

Bangalore, India

Jul 2017 - Dec 2017

- **Workspace One - SSO vIDM for VMWare's SAAS offering:** Workspace One is a digital platform that delivers and manages any app on any device by integrating access control, application management and multi-platform endpoint management.
 - * Worked on automating several release pipelines and processes ensuring the highest quality of code in the production systems.

Microsoft Research*Research Intern*

Bangalore, India

Nov 2016 - May 2017

- **Second Opinion:** Second Opinion is a medical application platform to detect the onset of an oncoming serious illness.
 - * Developed a platform to connect patients with doctors from multi-specialty hospitals in India. Implemented several ML models to predict commonly occurring diseases in patients in India from their medical history and lab tests.

*This work was done in collaboration with the Microsoft Intelligent Network for Eyecare (MINE), Microsoft India Development Center***University of Calgary***MITACS Research Intern – Supervised by Professor Mike Smith*

Calgary, Canada

May 2016 - Aug 2016

- **The Ranchlands Hum:** A low-frequency audio noise nuisance plaguing the residents of the Ranchlands community of Calgary.
 - * Developed a low-cost smartphone application to store and analyze low-frequency audio noise data using techniques in DSP.
 - * Developed techniques to perform large scale calibration of android device microphones, [code](#).

Microsoft Research*Software Engineering Intern*

Bangalore, India

Nov 2015 - May 2016

- **MEC - Massively Empowered Classrooms:** MEC is a flagship project developed by Microsoft Research India designed to explore how online educational content and techniques in blended learning can be used for undergraduate education in India. [MEC](#)
 - * Worked on automating several data retrieval tasks and providing insights into data with interactive data visualization techniques.
 - * Worked on developing and deploying this platform for education in Mauritius called Virtual Campus which was launched as a *partnership between Microsoft Research India and Mauritius Institute of Education that received widespread media coverage*.

PUBLICATIONS

- **Rivet6D: Rapid Industrial 6D Object Pose Estimation via View Encoded Templates:**
Aditya Agarwal, Sai Shruthi Balaji, Sean Liu, Sachin Chitta, Yotto Koga
In Preparation, 2025
- **SceneComplete: Open-World 3D Scene Completion in Complex Real World Environments for Robot Manipulation:**
Aditya Agarwal, Gaurav Singh, Bipasha Sen, Tomás Lozano-Pérez, Leslie Pack Kaelbling
IEEE Robotics and Automation Letters (RA-L), 2025
- **Vector Quantized Feature Fields for Fast 3D Semantic Lifting:**
- **Learning to Look Around: Enhancing Teleoperation and Learning with a Human-like Actuated Neck:**
Bipasha Sen, Michelle Wang, Nandini Thakur, Aditya Agarwal, Pulkit Agrawal
Spotlight Presentation, CoRL WCBM Workshop (CoRL-W), 2024
- **ConceptGraphs: Open-Vocabulary 3D Scene Graphs for Perception and Planning:**
Qiao Gu*, Ali Kuwajerwala*, Sacha Morin*, Krishna Murthy Jatavallabhula*, Bipasha Sen, Aditya Agarwal, Kirsty Ellis, Celso Miguel de Melo, Corban Rivera, William Paul, Rama Chellappa, Chuang Gan, Joshua B. Tenenbaum, Antonio Torralba, Florian Shkurti, Liam Paull
IEEE International Conference on Robotics and Automation (ICRA), 2024; CoRL PRL Workshop (CoRL-W), 2023
- **EDMP: Ensemble-of-costs-guided Diffusion for Motion Planning:**
Kallol Saha*, Vishal Mandadi*, Jayaram Reddy*, Ajit Srikanth, Aditya Agarwal (advising), Bipasha Sen, Arun Singh, Madhava Krishna
IEEE International Conference on Robotics and Automation (ICRA), 2024; CoRL LangRob & TGR Workshops (CoRL-W), 2023
- **HyP-NeRF: Learning Improved NeRF Priors using a Hypernetwork:**
Bipasha Sen*, Gaurav Singh*, Aditya Agarwal*, Rohith Agaram, Madhava Krishna, Srinath Sridhar
NeurIPS, 2023
- **Disentangling Planning and Control for Non-prehensile Tabletop Manipulation:**
Vishal Reddy Mandadi, Kallol Saha, Dipanwita Guhathakurta, Mohammad Nomaan Qureshi, Aditya Agarwal (advising), Bipasha Sen, Dipanjan Das, Brojeshwar Bhowmick, Arun Kumar Singh, Madhava Krishna
IEEE International Conference on Automation Science and Engineering (CASE), 2023
- **SCARP: 3D Shape Completion in ARbitrary Poses for Improved Grasping, [project page](#):**
Bipasha Sen*, Aditya Agarwal*, Gaurav Singh*, Brojeshwar B., Srinath Sridhar, Madhava Krishna
IEEE International Conference on Robotics and Automation (ICRA), 2023; RSS Robot Representations Workshop (RSS-W), 2023
- **Towards MOOCs for Lip Reading: Using Synthetic Talking Heads to Train Humans in Lipreading at Scale, [project page](#):**
Aditya Agarwal*, Bipasha Sen*, Rudrabha Mukhopadhyay, Vinay Namboodiri, C V Jawahar
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2023
- **FaceOff: A Video-to-Video Face Swapping System, [project page](#):**
Aditya Agarwal*, Bipasha Sen*, Rudrabha Mukhopadhyay, Vinay Namboodiri, C V Jawahar
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2023
- **INR-V: A Continuous Representation Space for Video-based Generative Tasks, [OpenReview](#), [project page](#):**
Bipasha Sen*, Aditya Agarwal*, Vinay Namboodiri, C V Jawahar
Transactions on Machine Learning Research (TMLR), 2022
- **Approaches and Challenges in Robotic Perception for Table-top Rearrangement and Planning, [paper](#):**
Aditya Agarwal*, Bipasha Sen*, Shankara Narayanan V*, Vishal Reddy Mandadi*, Brojeshwar Bhowmick, K Madhava Krishna
Robotic Grasping and Manipulation Competition, ICRA, 2022
- **Rethinking Approaches to Training Humans with Hearing Loss in Lipreading:**
C V Jawahar, Aditya Agarwal, Bipasha Sen, Rudrabha Mukhopadhyay, Vinay Namboodiri
Provisional US Patent 2021
- **Personalized One-Shot Lipreading for an ALS Patient, [paper](#):**
Bipasha Sen*, Aditya Agarwal*, Rudrabha Mukhopadhyay, Vinay Namboodiri, C V Jawahar
The British Machine Vision Conference (BMVC), 2021
- **REED: An Approach Towards Quickly Bootstrapping Multilingual Acoustic Models, [paper](#), [presentation](#):**
Bipasha Sen*, Aditya Agarwal*, Mirishkar Sai Ganesh, Anil Kumar Vuppala
Spoken Language Technology (SLT), 2021

* indicates equal contribution | Full publication list at [Google Scholar](#) | Project details at skymanaditya1.github.io

ADDITIONAL EXPERIENCE & ACHIEVEMENTS

- Awarded Outstanding Reviewer at CVPR 2025 held at Nashville, TN, [Link](#)
- Awarded *NeurIPS Scholar Award of \$1700* to attend NeurIPS 2023 in New Orleans, Louisiana.
- Awarded a *travel grant of ¥30,000* to attend ICMPC17-APSCOM7 in Tokyo, Japan.
- Awarded a *travel grant of \$2250* by IEEE RAS to attend ICRA 2023 in London, UK.
- Secured *3rd place (prize money of \$1000)* in the ICRA 2022 Robotic Tabletop Manipulation Competition, [Link](#), 2022
- Selected among 6000+ employees at Microsoft for a video shoot conducted for Microsoft's campus hiring program, [Link](#), 2020
- Awarded *Delight Your Customer, Azure Global Engineering, Microsoft*, for being among the top performing employees in the org., 2018
- Winners at VMWare Global Relay Open Source Borathon; a global hackathon conducted across all teams from VMWare. [Link](#), 2017
- Received *Academic Distinction Award* from PES University for exceptional academic performance, 2013-17
- Awarded *MITACS Globalink Award*, for carrying out a fully funded summer research internship at The University of Calgary, 2016.
- Co-Founded the *Official Android Community* of PES University called AndroidLabs., 2015
- Won the Best Application Award at Ayana'15 (a 24-hour hackathon),, 2015
- Awarded *Certificate of Excellence* by CBSE for being among the top 0.1% of successful candidates of AISSCE 2013 in Computer Science, 2012
- Recipient of *INSPIRE scholarship* (deferred) for academic performance within top 1% of successful candidates of AISSCE 2013
- Represented the country as an *Indian delegate* (selected among 250 students across India) during a fortnight long Exchange Program at Nagano and Tokyo as part of the *JENESYS Program* in Nov'11., 2011
- *Extra curricular:* Drummer Keyboard and Tabla player (*distinction*), Fitness Enthusiast, Traveler, Badminton player.

ACADEMIC SERVICE

- MIT EECS GAAP mentor for FY2024 cohort & EECS GSA Executive Member.
- Reviewer for NeurIPS 2024, CVPR 2024, ICRA 2024/2023, IROS 2023, SIGGRAPH Asia 2023, ICLR Workshops 2023.
- Coordinator for the 5th and 6th Summer School on AI (CVIT, IIITH), 2021 & 2022.
- TA for CSEDU-ML Workshop conducted jointly by IIIT-H, IIT-H, and IIT-D

STUDENTS MENTORED/MENTORING

- Vishal Reddy Mandadi ([Website](#)) – Undergrad CS student at IIIT-Hyderabad – Oct '21 - Sep '21; *Current* - MSR student at CMU
- Shankara Narayanan V ([Website](#)) – Visiting research student at IIIT-Hyderabad – Oct '21 - May '21; *Current* - CRO at Stealth Robotics Startup
- Gaurav Singh ([Website](#)) – Undergrad research student at IIIT-Hyderabad – Jan '22 - Feb '25; *Current* - PhD student at Brown University
- Kallol Saha ([Website](#)) – Visiting research student at IIIT-Hyderabad – Jan '23 - Sep '23; *Current* - MSR student at CMU
- Eugenia Feng ([Website](#)) – MEng student in EECS at MIT – Jan '24 - Dec '25; *Current* - Software Engineer at Databricks
- Benjamin Soria ([Website](#)) – Senior undergrad in EECS at MIT – Jun '24 - Dec '25; *Current* - CTO at Stealth Robotics Startup
- Maggie Yao ([Website](#)) – MEng student in EECS at MIT – Sep '25 - Present
- Lucy Cai ([Website](#)) – MEng student in EECS at MIT – Sep '25 - Present
- Kelly Lu ([Website](#)) – MEng student in EECS at MIT – Sep '25 - Present
- Akash Anand ([Website](#)) – Senior undergrad in EECS at MIT – Sep '25 - Present