

# Bipasha Sen

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## Education

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### Massachusetts Institute of Technology

Ph.D. in EECS (CSAIL)

Ida M. Green Fellowship

Sep '23 - Present

4.0/4.0

### International Institute of Information Technology, Hyderabad

Masters by Research (Center for Visual Information Technology, Robotics Research Center)

Aug '21 - Mar 2023

10.0/10.0

- **Thesis:** Improved Representation Spaces for Videos

### K.C.College of Engineering, University of Mumbai

B.E. in Computer Engineering

Jul 2012 - Jun 2016

8.13/10.0, Distinction

- **Best Outgoing Student award by the Dean**

Based on outstanding senior year research, academic contributions, and representing the school at national venues.

One out of 620 graduating students

## Research Experience

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### Massachusetts Institute of Technology

Graduate Research Assitant

Sep 2023 - Present

[ advised by **Prof. Pulkit Agrawal** ]

- Building general purpose robots that can be deployed in houses!

### Mila / Université de Montréal

Visiting Research Student - Robotics and Embodied AI Lab (REAL) Center

May 2023 - Sep 2023

[ advised by **Prof. Liam Paull** and **Prof. Florian Shkurti** ]

### International Institute of Information Technology - Hyderabad

Research Fellow - Robotics Research Center

Nov 2021 - Present

[ advised by **Prof. Madhav Krishna** and **Prof. Srinath Sridhar** ]

- Led a team of 4 undergraduate researchers to solve table-top rearrangement and planning challenges – 3D generalization (NeurIPS 2023), rotation invariant shape-completion (ICRA 2023), and motion planning (CASE 2023, ICRA 2024).

Research Fellow - Center for Visual Information Technology

Feb 2021 - Mar 2023

[ advised by **Prof. CV Jawahar** and **Prof. Vinay Namboodiri** ]

- Worked on diverse topics such as few-shot domain adaption (BMVC 2022), video-to-video face-swapping (WACV 2023), user-study for lipreading training platforms (WACV 2023), representation space for video-based generative tasks using hypernetworks and implicit neural representations (TMLR 2022), and ethical generative modeling.

Visiting Researcher - Speech and Vision lab, LTRC

Oct 2019 - Jul 2020

[advised by **Prof. Anil Kumar Vuppala**]

## Work Experience

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### Microsoft, India

Jul 2016 - Feb 2021

Research Scientist 2 - MSAI (Microsoft's Search and Assisted Intelligence) - Outlook Platform

- Led a team of 2 data scientists and 1 research intern to work on a segment of Outlook's recommendation and suggestion stack.

- **Inline Suggested Attachments**

- \* Built a high-precision classification model for suggestion of potential document as attachments to a half-composed email. Correct suggestions generated by our pipeline reduced the number of clicks to attach a file by 25%.

- **Meeting Insights Relevance**

- \* Built a high-recall classification model for the recommendation of relevant email and documents to upcoming and past meetings with a 34% improvement over the existing pipeline.

- Worked on several other diverse topics such as (1) Named entity recognition in emails, (2) Detecting trips and loops in hotel/cab/train/airplane through 3<sup>rd</sup>-party booking emails, (3) Bing Instant Answers experience for Game of Thrones (GOT) season 7, (4) News recommendation, (5) Natural language photo retrieval, and (6) Meeting Summarization on Teams.

### Microsoft, India

Dec 2015 - Feb 2016

Research Scientist - Intern (Search Technology Center India)

- **Conversational Shopping Assistant Bot**

- Built a conversational bot tasked for proactively engaging the users and assisting them in placing an order.
- *Project demoed to David Ku (then CVP and CTO of Microsoft AI+R).*

## Founder at TheBhaad: Cloud-Based Group-Oriented file-sharing network [ [video](#) ]

2014

- Single-handedly developed and operated a fully-fledged cloud-based file-sharing network with windows like user-interface specifically designed for undergraduate students and professors. Features: Secure folder/file upload and storage, Groups, Search, Contacts, Groups (Classrooms), Personalized Document Alignment, Discussion Forum.

## Selected Publications and Patents

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\*Equal contribution

1. **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  
*International Conference on Robotics and Automation (ICRA)*, 2024  
*Multiple Workshops at Conference for Robot Learning (CoRL-W)*, 2023
2. **EDMP: Ensemble-of-costs-guided Diffusion for Motion Planning**, [ [project page](#) ]  
Kallol Shah\*, Vishal Mandadi\*, Jayaram Reddy\*, Ajit Srikanth, Aditya Agarwal, **Bipasha Sen (in advising capacity)**, Arun Singh, K. Madhava Krishna  
*International Conference on Robotics and Automation (ICRA)*, 2024  
*Pretraining for Robot Learning, Conference for Robot Learning Workshop (CoRL-W)*, 2023
3. **HyP-NeRF: Learning Improved NeRF Priors using a HyperNetwork**, [ [project page](#) ]  
**Bipasha Sen\***, Gaurav Singh\*, Aditya Agarwal\*, Rohith Agaram, K. Madhava Krishna, Srinath Sridhar  
*Neural Information Processing Systems (NeurIPS)*, 2023
4. **SYSTEM AND METHOD FOR AUTOMATICALLY GENERATING SYNTHETIC HEAD VIDEOS USING A MACHINE LEARNING MODEL**  
C V Jawahar, Aditya Agarwal, **Bipasha Sen**, Rudrabha Mukhopadhyay, Vinay Namboodiri  
US Patent App. 18/120,375, 2023
5. **SCARP: 3D Shape Completion in ARbitrary Poses for Improved Grasping**, [ [project page](#) ]  
**Bipasha Sen\***, Aditya Agarwal\*, Gaurav Singh\*, Srinath Sridhar, K. Madhava Krishna  
*International Conference on Robotics and Automation (ICRA)*, 2023  
*Robot Representations For Scene Understanding, Reasoning and Planning Workshop (RSS-W)*, 2023
6. **INR-V: A Continuous Representation Space for Video-based Generative Tasks**, [ [project page](#) ]  
**Bipasha Sen\***, Aditya Agarwal\*, Vinay Namboodiri, C V Jawahar  
*Transactions on Machine Learning Research (TMLR)*, 2022
7. **Towards MOOCs for Lip Reading: Using Synthetic Talking Heads to Train Humans in Lipreading at Scale**  
Aditya Agarwal\*, **Bipasha Sen\***, Rudrabha Mukhopadhyay, Vinay Namboodiri, C V Jawahar  
*IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2023
8. **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
9. **Personalized One-Shot Lipreading for an ALS Patient**, [ [paper](#) ]  
**Bipasha Sen\***, Aditya Agarwal\*, Rudrabha Mukhopadhyay, Vinay Namboodiri, C V Jawahar  
*British Machine Vision Conference (BMVC)*, 2021

## Awards and Achievements

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- Awarded a travel grant by NeurIPS 2023 June 2023
- Awarded a travel grant of YEN 30000 by ICMPC7-APSCOM17 June 2023
- Awarded a travel grant of \$2250 by ICRA RAS for ICRA 2023 March 2023
- Awarded a travel grant of \$500 by VUB to act as a Social Media Ambassador for ICRA 2023 January 2023
- Awarded a travel grant of \$2000 by Microsoft Research for WACV 2023 September 2022
- Prize money of \$1000 (to the team) - 3<sup>rd</sup> in ICRA 2022's Robotic Manipulation Competitions May 2022
- Spot award for 'Innovation and Impact' by Microsoft MSAI. January 2021
- Awarded Dean's Best Outgoing Undergraduate Student (One out of 620 graduating students) March 2016
- Awarded Dean's Best Entrepreneur (founder of TheBhaad that hosted 5000+ users) March 2015  
(Undergrad, 50+ nominees)

## Noteworthy Talks and Events

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- Official “Social Media Ambassador” for RAS-ICRA 2023! May 2023
- Talk on “INR-V” at Vision India, ICVGIP Dec 2022
- Talk on “Computer vision challenges in robotic table-top rearrangement and planning” at 6<sup>th</sup> Summer School on AI with a focus on Computer Vision & Machine Learning at IIIT-H [ [talk recording](#) ] Aug 2022
- Talk on Quick Bootstrapping of Multilingual Models and AiGraph at MLADS-SYNAPSE (internal Microsoft conference with an acceptance rate of ~8%) July 2020
- 3<sup>rd</sup> in Microsoft One Week Hackathon - Mobile Endpoint (3k+ participants) Aug 2016
- Indian Rank of 126 in TCS CodeVita '15 Round 2 (20k+ participants) Feb 2016
- Selected to build low-cost solutions for expensive eye-related treatments using machine learning at MIT Media Lab's REDX Camp in collaboration with India's leading Eyecare LVPI. Aug 2015

## Academic Contributions and Outreach

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Teacher at K12 Professional Development Program by MIT	Jun. 2024
AI Facilitator at GenAI Program for Accenture by MIT	Mar. 2024 - Present
Coordinator for CSL Seminar at MIT CSAIL	Nov. 2023 - Present
Teaching Assistant for CS7.503 Mobile Robotics (course taught by Prof. K. Madhav Krishna)	Aug. - Nov. 2022
Coordinator for <a href="#">6<sup>th</sup> Summer School on AI</a> (conducted by CVIT)	Aug. 2022
Tutor at Robotics Research Center (RRC) Summer School 2022	May. 2022
Tutor at CSE-DU Machine Learning-AI Workshop (conducted by IIIT-H, IIT-H, and IIT-Delhi)	Mar. 2022
Coordinator for <a href="#">5<sup>th</sup> Summer School on AI</a> (conducted by CVIT)	Aug. 2021

## Mentoring

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**MIT:** Nandini Thakur (MEng), Michelle Wang, Yash Prabhu, and Kevin Garcia (Undergraduate Researchers)

**IIIT-H:** Gaurav Singh, Vishal Reddy Mandadi, Dipanwita Guhathakurta, Nomaan Qureshi (Undergraduate Researchers), Shankara Narayanan, Yuvnish Malhotra, and Kallol Shah (Research Assistants)

**Microsoft:** Srimukha Paturi and Sourav Maity (Data Scientists) and Jay Paranjape (Research Intern)

## Reviewing

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ICLR-Workshop 2023, **SIGGRAPH Asia** 2023, **ICRA** 2024, **CVPR** 2024, **CoRL**-Workshop 2024, **RA-L** 2024

## Skills

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<b>Languages</b>	Python, Spark.net, SQL, C#, C/C++, HTML, CSS, jQuery
<b>Framework</b>	Pytorch
<b>Techonologies</b>	Apache Spark and HDInsight, Full-Stack Web Development
<b>Tools</b>	draw.io, TLC (The Learning Code), Adobe Premiere Pro

## More to know?

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I am a musician: vocalist, guitarist, and composer. I've toured around India along with my previous band, Andrometa. I've also traveled to 6 countries, 11 states solo over a period of 5 months and interviewed 70+ independent music bands (180+ artists) about their struggles as independent artists that broadened my perspective of life and passion.