

Bipasha Sen

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Education

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
<ul style="list-style-type: none">• 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
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- **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

Massachusetts Institute of Technology Graduate Research Assistant [advised by Prof. Pukit Agrawal] • Building general purpose robots that can be deployed in houses!	Sep 2023 - Present
Mila / Université de Montréal Visiting Research Student - Robotics and Embodied AI Lab (REAL) Center [advised by Prof. Liam Paull and Prof. Florian Shkurti]	May 2023 - Sep 2023
International Institute of Information Technology - Hyderabad Research Fellow - Robotics Research Center [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).	Nov 2021 - Present
Research Fellow - Center for Visual Information Technology [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.	Feb 2021 - Mar 2023
Visiting Researcher - Speech and Vision lab, LTRC [advised by Prof. Anil Kumar Vuppala]	Oct 2019 - Jul 2020

Work Experience

Microsoft, India Research Scientist 2 - MSAI (Microsoft's Search and Assisted Intelligence) - Outlook Platform	Jul 2016 - Feb 2021
<ul style="list-style-type: none">• Led a team of 2 data scientists and 1 research intern to work on a segment of Outlook's recommendation and suggestion stack.<ul style="list-style-type: none">– Inline Suggested Attachments<ul style="list-style-type: none">* 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<ul style="list-style-type: none">* 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 3rd-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 Research Scientist - Intern (Search Technology Center India)	Dec 2015 - Feb 2016
<ul style="list-style-type: none">• Conversational Shopping Assistant Bot<ul style="list-style-type: none">– Built a conversational bot tasked for proactively engaging the users and assisting them in placing an order.– <i>Project demoed to David Ku (then CVP and CTO of Microsoft AI+R).</i>	

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

*Equal contribution

1. **ConceptGraphs: Open-Vocabulary 3D Scene Graphs for Perception and Planning** [[project page](#)]

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

- 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) - 3rd 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) (Undergrad, 50+ nominees) March 2015

Noteworthy Talks and Events

- Official “Social Media Ambassador” for RAS-ICRA 2023! May 2023
- Talk on “INR-V” at Vision India, ICGVIP Dec 2022
- Talk on “Computer vision challenges in robotic table-top rearrangement and planning” at 6th 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
- 3rd 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

- 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 **6th Summer School on AI** (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 **5th Summer School on AI** (conducted by CVIT) Aug. 2021

Mentoring

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

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

Skills

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

More to know?

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.