Ayush Chopra

Graduate Research Assistant
Massachusetts Institute of Technology

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research linkedin scholar website

Education

Massachusetts Institute of Technology, Cambridge, MA June 2022 - September 2025 (Expected)
Ph.D in Media Arts and Sciences (MIT Media Lab)
Advisor: Ramesh Raskar

University of Oxford, Oxford, UK Sept 2022 - Oct 2022
Visiting PhD Researcher, Department of Computer Science
Host: Michael Wooldridge and Ani Calinescu

Massachusetts Institute of Technology, Cambridge, MA September 2020 - May 2022
S.M. in Media Arts and Sciences (MIT Media Lab)
Thesis: Decision Making for Populations; GPA: 5.0/5.0
Committee: Ramesh Raskar (Prof, MIT); Anil Kamath (Fellow and VP, Adobe); Jayashree Cramer (Prof, Harvard)

Delhi Technological University, Delhi, India August 2014 - May 2018
B.Tech in Computer Science and Engineering
CGPA: 9.23/10.0

Work Experience

MIT Media Lab
Graduate Research Assistant September 2020 - Present

- Interdisciplinary research in multi-agent systems and machine learning for applications in health and life sciences. Thesis research focused on large population models and brief summary of my work is here.
- Research published at top-tier AI conferences, received academic awards, referenced by global agencies, deployed in products and featured by popular press (Reuters, Weather Channel, etc).
- Checkout my project: `github.com/AgentTorch/AgentTorch`.

Basis Research Institute
Research Scientist Intern June 2024 - August 2024

- Exploring applications of large population models in scientific discovery and neuroscience

Mayo Clinic
Visiting Researcher, Epidemiology and Vaccine Research Group June 2023 - Present

- Exploring applications of large population models in immuno-epidemiology

JP Morgan AI Research
Research Scientist Intern June 2023 - August 2023

- Exploring applications of large population models in finance

Media and Data Science Research Lab, Adobe Inc
Senior Member of Technical Staff June 2019 - August 2020
Member of Technical Staff August 2018 - May 2019
Intern June 2017 - April 2018

- Research in machine learning with applications in computer vision and large-scale data mining
- Delivered innovation talks at **Adobe Marketing Summit 2020** and **Adobe Tech Summit 2019**
- Awarded the Adobe **Outstanding Young Engineer Award 2020** (youngest recipient at Adobe)
- Work covered by various media outlets including Venture Beat, AdWeek, WWD.

RemoteHQ
Founding Engineer, Head of Machine Learning March 2017 - March 2021

- Making video conferencing fun by sharing browsers not screens!
- RemoteHQ voted #1 product on Product Hunt launch and raised a seed round (acquired by Presence)

Patents

25 patents in *machine learning, computer vision, data mining* filed across **4** countries.
Select Patent IDs: *US* 16/417,373; *US* 16/564,831; *US* 16/534,856; *US* 16/659,147; *US* 16/673,574; *US* 16/679,165;

US 16/793,551; *US* 16/865,572; *US* 16/906,954; *GB* 2013277.5; *AU* 2020220153; *CN* 202010813038.6

Publications (selected), google-scholar

Ayush Chopra, Shashank Kumar, Nuruallah Giray-Kuru, Ramesh Raskar, Arnau Quera-bofarull. "On the limits of agency in agent-based models". **AAMAS 2025** (Oral, pdf)

Ayush Chopra, Arnau Quera-bofarull, Sijin Zhang. "Differentiable Agent-based Modeling: Systems, Method and Applications". **AAMAS 2024** (Tutorial, slides)
Ayush Chopra, Arnau Quera-bofarull, Nuruallah Giray-Kuru, Michael Wooldridge, Ramesh Raskar. "Private Agent-based Modeling". **AAMAS 2024** (Oral, pdf)

Ayush Chopra, Jayakumar Subramanian, Ramesh Raskar. "flame: a Framework for Learning in Agent-based Models". **AAMAS 2024** (Oral, pdf)

Gauri Gupta, Ritwik Kapila, **Ayush Chopra**, Ramesh Raskar. "First 100 days of pandemic: an interplay of pharmaceutical, behavioral and digital interventions". **AAMAS 2024** (Oral, pdf)

Ayush Chopra, Alex Rodriguez, Aditya Prakash, Ramesh Raskar, Tom Kingsley. "Neural Calibration of Agent Based Models Enables Improved Regional Evidence for Vaccine Strategy and Policy." **Vaccine 2023** (Journal, pdf)

Ayush Chopra*, Alex Rodriguez*, Jayakumar Subramanian, Aditya Prakash, Ramesh Raskar. "Differentiable Agent-based Epidemiology". **AAMAS 2023** (Oral) and **ICML Workshop 2022** (**Best Paper Award**, Oral, pdf)

Arnau Quera-bofarull, **Ayush Chopra**, Joseph Aylett-Bullock, Ani Calinescu, Ramesh Raskar, Mike Wooldridge. "Don't Simulate Twice: One-shot sensitivity analyses via automatic differentiation." **AAMAS 2023**(Oral, pdf)

Ayush Chopra, Surya Sahu, Abhishek Singh, Praneeth Vepakomma, Ramesh Raskar. "Adaptive Split Learning." **FLSys 2023** (Poster, pdf)

Ayush Chopra, Abhinav Java, Abhishek Singh, Vivek Sharma, Ramesh Raskar. "Learning to Censor by Noisy Sampling." **ECCV 2022**. (Poster, pdf)

Abhishek Singh, Ethan Garza, **Ayush Chopra**, Praneeth Vepakomma, Vivek Sharma, Ramesh Raskar. "Protecting Sensitive Information in Task-agnostic Data Release." **ECCV 2022**. (Poster, pdf)

Santiago Romero, **Ayush Chopra**, Alex Ryu, Ramesh Raskar, Tom Kingsley et al. "Public health impact of delaying second dose of BNT162b2 vaccine". **British Medical Journal 2021**. (Journal, pdf)

Ayush Chopra, Esma Gel, Jayakumar Subramanian, Ramesh Raskar, Tom Kingsley et al. "DeepABM: Scalable and Efficient Agent-based Modeling via Invariant Message Passing". **WSC 2021**. (Oral, pdf)

Ayush Chopra, Rishabh Jain, Mayur Hemani, Balaji Krishnamurthy. "ZFlow: Gated Appearance Flow-based Virtual Try-on". **ICCV 2021** (Poster, pdf)

Abhishek Singh, **Ayush Chopra**, Vivek Sharma, Ramesh Raskar. "DISCO: Dynamic and Invariant Sensitive Channel Obfuscation of Deep Neural Networks". **CVPR 2021** (Poster, pdf)

Siddharth Gairola, **Ayush Chopra***, Mayur Hemani*, Balaji Krishnamurthy. "SimPropNet: Improved Similarity Propagation for Few-shot Image Segmentation." **IJCAI 2020**. (Poster, pdf)

Ayush Chopra*, Surgan Jandial*, Mausoom Sarkar, Balaji Krishnamurthy, Vineet Balasubramanian. "Retrospective Loss: Looking Back to Improve Training of Deep Neural Networks". **KDD 2020**. (Oral, pdf)

Surgan Jandial*, **Ayush Chopra***, Kumar Ayush*, Mayur Hemani, Balaji Krishnamurthy. "SieveNet: A Unified Framework for Robust Image-Based Virtual Try-on". **WACV 2020**. (Oral, pdf, demo)

Ayush Chopra*, Abhishek Sinha*, Hiresh Gupta*, Mausoom Sarkar, Balaji K. "Powering Robust Fashion Retrieval With Information Rich Feature Embeddings".**CVPR Workshop 2019**. (Oral, **Best Paper Award**, pdf)

Pre-prints

Ayush Chopra, Santanu Bhattacharya, Joel Leibo, Ramesh Raskar. "Protocol-centric Intelligence for Agentic Systems". (pdf)
Abhijin Adiga*, **Ayush Chopra***, Mandy Wilson, Samarth Swarup, Bryan Lewis, Ramesh Raskar, Madhav Marathe. "Modeling End-to-End Dynamics of H5N1 in United States" (pdf)

Talks

Large Population Models [Slides] [Video (Long)] [Video (Short)]

Oak Ridge National Laboratory, Knoxville, Tennessee	February 2025
University of Delhi, India	January 2025
Multi-agent and Game Intelligence - Google DeepMind, London, UK	September 2024
University of Michigan, Ann Arbor	September 2024
Amazon Web Services, Boston, Massachusetts	September 2024
Crown Environmental Science and Research Institute, New Zealand Government	November 2023
JP Morgan AI Research, New York City, NY	April 2023
MIT-Google Workshop on Future of Computing	January 2025
Columbia University Public Health, New York City, NY	July 2023
Rising Stars at MIT Media Lab, MIT	October 2024
MIT Decentralized AI Summit	September 2024
Google, Cambridge, Massachusetts	August 2024
Basis Research Insitute, New York	July 2024
University of Vermont, Burlington, Vermont	August 2023
ACM Goa, Goa, India	August 2023
Complex Human-Environmental Systems Simulation Lab, Oxford, UK	November 2022
Institute for New Economic Thinking, Oxford, UK	October 2022

Visual Intelligence for the Enterprise

Project Clothes Swap: Adobe Marketing Summit, Vegas Nevada [Video]	March 2020
Panoptic Shopping: Adobe Tech Summit, San Francisco, CA [Slides]	February 2019

Awards and Grants

Best Student Paper (Runner-Up) Award - AAMAS 2024
Received the best student paper award: runner-up at Autonomous Agents and Multi-agent Systems (AAMAS) 2024

Outstanding Reviewer Award: ECCV 2024
Recognized as an outstanding reviewer at European Conference on Computer Vision (ECCV) 2024.

JP Morgan Research Award 2023 - MIT Media Lab
Grant award for advancing PhD research in differentiable agent-based modeling for finance.

NSF Predictive Intelligence for Pandemic Prevention - MIT Media Lab
Grant award for advancing PhD research in differentiable agent-based modeling for pandemic prevention.

Best Paper Award - ICML 2022 Workshop
Won the best paper award at AI for Agent-based Models workshop at ICML 2022.

Adobe Data Science Research Award 2021 - MIT Media Lab
Grant award for advancing research in differentiable agent-based modeling for opinion dynamics.

Outstanding Young Engineer Award 2020 - Adobe
Youngest recipient of the award at Adobe, in my first full year of employment. 1 of 3 annual winners worldwide.

Best Paper Award - CVPR 2019 Workshop
Won the best paper award at (FFSS-USAD) held at CVPR 2019 [Details].

#1 Product of the Day - Product Hunt
RemoteHQ voted the best product on launch day (24 October 2019). [Details]

Positions of Responsibility

Reviewer & **Program Committee: AAMAS, CVPR, ICCV, ECCV, IJCAI, WACV, TPAMI**
Reviewer and organizer for top-tier conferences in Machine Learning, Computer Vision and AI.

Co-Chair: ICLR 2023 Workshop on AI for Agent-based Models
Reviewed and accepted papers, invited speakers and raised funding.