KUSHAGRA TIWARY

PERSONAL INFORMATION

website	https://kushagratiwary.com/
office	E14-374H, 75 Amherst St, Cambridge, MA
links	ktiwary@mit.edu · gScholar · linkedin

RESEARCH STATEMENT

I am a PhD Student in Ramesh Raskar's lab focused on AI-based computational discovery in the context of vision: How can we use AI to study of biological visual intelligence? How can we use biological principles to discover new forms of artificial visual intelligence? I also work closely with Brian Cheung and Tomaso Poggio.

EDUCATION

2021-Present — Massachusetts Institute of Technology

PhD
GPA: 5.0 · Department: Media, Arts & Sciences
Advisor: Ramesh Raskar · Group: Camera Culture

S.M in Science
GPA: 5.0 · Department: Media, Arts & Sciences
Thesis: *Discovering, Learning, and Exploiting Visual Cues* · Link
Advisor: Ramesh Raskar · Group: Camera Culture

2015-2019 — University of Illinois Urbana-Champaign

B.S in Electrical & Computer Engineering
Department: Grainger School of Engineering
B.S With Honors · *Focus on Computer Vision and ML*

SELECTED RESEARCH EXPERIENCE

2021–Present — Graduate Research Assistant, MIT Media Lab

PhD Student
My work broadly focuses on building AI Scientists to study natural vision and discover new forms of artificial vision?

Masters Student
My thesis focused on how can modern data-driven frameworks exploit physics-based cues to observe the hidden and invisible parts of the scene?

Student Mentor
Nikhil Behari (Research Assistant), *Bhavya Agarwal, Katie Spivakovsky* (Undergraduate at MIT), *Chaitanya Kapoor* (Undergraduate at BITS Pilani), Media Lab's SOS Program, EECS GAAP Program

Workshop Organizer
Neural Fields Beyond Conventional Cameras accepted at the European Conference on Computer Vision 2024, Accelerating Discovery at MIT Member's Week 2023

Reviewer
TPAMI'CS, CVPR (23, 24, 25), ECCV, ICCV, 3DV'2024, MakeMIT 2022 Judge, GenAI For Design Workshop

SELECTED PUBLICATIONS (*See* Google Scholar *for full list*)

Pre-print
What if Eye...? Computationally Recreating Vision Evolution
 Kushagra Tiwary*, Aaron Young*, ... Tomaso Poggio, Dan-Eric Nilsson, Brian Cheung*, Ramesh Raskar*, · *Under Submission* Science Journal
 website · blog · arXiv · Hacker News · Tedx Talk · Oral Presentation at New England Vision Conference · AI for Science

Journal/Book
A Roadmap for Generative Design of Visual Intelligence
 Kushagra Tiwary ..., Tomaso Poggio, Ramesh Raskar
 MIT Press: Impacts of Generative AI (2024) · MIT News · AI for Science

Open Source Simulations & Code
Artificial Cambrian Intelligence (ACI)
 Aaron Young*, **Kushagra Tiwary***
 Website · Github · Tools that enable AI for Science

Exhibitions
Museum of Science Boston- "*Recreating Vision Evolution*"
 Cathy Chang, Aaron Young, **Kushagra Tiwary**
 Website · *Meet a Scientist Exhibit (04/10/25)*

MIT Museum After Dark Exhibit- *"First Signs of Vision"*
Cathy Chang, Aaron Young, **Kushagra Tiwary**
WEBSITE · *MIT Museum After Dark (04/18/25)*

full length conference papers

DiSER: Designing Imaging Systems with Reinforcement Learning
Tzofi Klinghoffer*, **Kushagra Tiwary***, ..., Ramesh Raskar
WEBSITE · ARXIV · *ICCV, 2023* · AI FOR VISION DISCOVERY

Bridging the Data Provenance Gap Across Text, Speech and Video
Shayne Longpre, N Singh, M Cherep, **Kushagra Tiwary (Video Lead)**, ..., Alex Pentland, Sara Hooker, Jad Kabbara
ARXIV · MIT Technology Review · Interview at Globe · *ICLR 2025* · CV & ML

DecentNeRFs: Decentralized Neural Radiance Fields from Crowdsourced Images
Zaid Tasneem, Akshat Dave, Abhishek Singh, **Kushagra Tiwary**, Praneeth Vepakomma, Ramesh Raskar, Ashok Veeraghavan
WEBSITE · ARXIV · *ECCV 2024* · CV & ML

ORCa: Objects as Radiance Field Cameras
Kushagra Tiwary*, Akshat Dave*, ... Ashok Veeraraghavan, Ramesh Raskar
WEBSITE · arXiv · MIT News · *CVPR 2023* · CV & ML

Physics vs. Learned Priors: Rethinking Camera and Algorithm Design
Kushagra Tiwary*, Tzofi Klinghoffer*, Siddharth Somasundaram*, Ramesh Raskar
arXiv · *ICCP 2022* · **CV & ML**

SELECTED WORK EXPERIENCE

Aug 2018 - Jun 2021   AI Engineer, OPTIMUS RIDE *(Self-driving Startup)*

Vision Network Design
Lead architect for *a giant Multi-Tasking Model* deployed on the nationwide fleet; *Lead release testing* of models on next-gen vehicles in Boston. Wrote training codebase; decreased training and release time by over 25%. (Patented)

Traffic Light Detection
Lead AI research and deployment of Traffic Light detection in vehicles in Boston & Washington DC. (Patented)

Software 2.0 Framework
Designed company's first Software 2.0 that automatically sampled over *different rare-events* from disengagements across nationwide deployments. (Patented)

Labeling Schema with Scale.ai
Lead company's first Labeling Schema for AI with Scale.ai. The Schema was expanded from **10** classes to over **100** classes and attributes. Led Data Collection in Boston with Operations Team to expand dataset size by over **100x**.

SKILLS

Patents (2)
Efficient detection of structure and status of traffic lights, Crowd-Sourced Neural Radiance Fields (pending)

Programming
Python, C/C++, Tensorflow 1.x/2+, pytorch, OpenCV, TensorRT, ONNX, gRPC

Languages
English, Spanish (Professional Fluency- *lived in Spain for 5 years*), Hindi

SELECTED HONORS & AWARDS

Qualcomm Innovation Fellowship
2023 North America Winner of the Qualcomm Innovation Fellowship · Recipient List · Media Lab News · EECS News

MISTI Stem Fund Award
MIT-Israel Zuckerman STEM Fund Award $30,000 · MIT-Israel Zuckerman STEM Fund Award (one of 6 proposals selected across MIT)

MIT Generative AI Grant Winner
Invited to submit a impact paper on the impact of Generative AI to MIT Press by MIT President · MIT News (one of 16 proposals selected across MIT)

SELECTED PRESS

Globe & Mail
Interview for the article *"This is where the data to build AI comes from"*

MIT Tech Review
Work covered by article *"AI-generated video has come a long way"*

Various Outlets
Consent in Crisis paper covered by New York Times, 404 Media, Vox, and Yahoo Finance

Tedx Boston
Can AI Recreate 500 Million Years of Vision Evolution?

MIT News
Using reflections to see the world from new points of view Front Page of MIT on 05/10

scale.ai
Developing safe and reliable systems with high-quality 3D training data