

# Arijit Ray

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🌐 <https://cs-people.bu.edu/array/>

## Goal

To train machines to understand the visual world through language to collaborate better with humans.

## Appointments

- Fall'21 - ? **Research Fellow**, Boston University  
*Advised by Kate Saenko, Bryan Plummer, and Ranjay Krishna (University of Washington).*
- Summer'24 - ? **Student Collaborator**, Allen Institute for AI, PRIOR Team  
*PhD research on 3D reasoning in multimodal language models.*
- Fall'23 **Teaching Fellow**, Boston University  
*Designed and co-instructed graduate-level CS 541, Applied Machine Learning.*
- Summer'23 **AI Resident**, Google X Moonshot Labs  
*Worked in the Mineral Team- adapted multimodal language models for custom phrase localization - detecting specific diseases on strawberries described by language.*
- Summer'22 **Research Scientist Intern**, Meta (Facebook) AI (FAIR)  
*Developed a benchmark to explore adaptation strategies for compositional reasoning in vision-language models (NeurIPS 2023).*
- 2017 - 2021 **Computer Scientist**, SRI International  
*Developed vision-language models that can rationalize for DARPA Explainable AI Program.*
- Summer'16 **Deep Learning Intern**, Blue River Technology  
*Developed weed localization - the key selling point leading to John Deere acquisition for \$305M.*
- 2016 - 2017 **Graduate Research Assistant**, Virginia Tech  
*Improved robustness of models that can answer questions about images. Advised by Devi Parikh*

## Education

- 2021 - ? **Ph.D., Boston University**, Computer Science  
*Teaching machines to reason about the 3D visual world through language.  
Advised by Kate Saenko, Bryan A. Plummer.*
- 2024 - ? **Visiting PhD Student, University of Washington**, Computer Science  
*Teaching machines to reason about the 3D visual world through language.  
Advised by Ranjay Krishna*
- 2022 - 2023 **Visiting Student, MIT**, AIForImpact Venture Studio, Media Lab  
*Formulating how vision-language AI can impact various verticals.*
- 2015 - 2017 **M.S., Virginia Polytechnic Institute and State University**, Computer Engineering  
*Thesis: Developing models that can converse with humans, advised by Devi Parikh.*
- 2011 - 2015 **B.Tech., SRM University, India**, Electrical Engineering  
*GPA: 9.05/10, First-Class Distinction. Received Academic Merit Scholarship.*

## Research Publications

### Pre-prints

- 1 **A. Ray**, J. Duan, R. Tan, D. Bashkirova, R. Hendrix, K. Ehsani, A. Kembhavi, B. A. Plummer, R. Krishna, K.-H. Zeng, and K. Saenko, *Sat: Spatial aptitude training for multimodal language models*, preprint, 2024.

## Peer-reviewed Conferences

- 1 J. Zhang, Z. Huang, **A. Ray**, and E. Ohn-Bar, “Feedback-guided autonomous driving,” *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024, (Highlight, top 2.8%).
- 2 **A. Ray**, F. Radenovic, A. Dubey, B. A. Plummer, R. Krishna, and K. Saenko, “Cola: A benchmark for compositional text-to-image retrieval,” *Conference on Neural Information Processing Systems (NeurIPS)*, 2023.
- 3 R. Tan, **A. Ray**, A. Burns, B. A. Plummer, J. Salamon, O. Nieto, B. Russell, and K. Saenko, “Language-guided audio-visual source separation via trimodal consistency,” *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 10 575–10 584, 2023.
- 4 K. Alipour, **A. Ray**, X. Lin, M. Cogswell, J. P. Schulze, Y. Yao, and G. T. Burachas, “Improving users’ mental model with attention-directed counterfactual edits,” *Applied AI Letters*, vol. 2, no. 4, e47, 2021.
- 5 **A. Ray**, M. Cogswell, X. Lin, K. Alipour, A. Divakaran, Y. Yao, and G. Burachas, “Generating and evaluating explanations of attended and error-inducing input regions for vqa models,” *Applied AI Letters*, vol. 2, no. 4, e51, 2021.
- 6 K. Alipour, **A. Ray**, X. Lin, J. P. Schulze, Y. Yao, and G. T. Burachas, “The impact of explanations on ai competency prediction in vqa,” *2020 IEEE International Conference on Humanized Computing and Communication with Artificial Intelligence (HCCAI)*, pp. 25–32, 2020.
- 7 **A. Ray**, K. Sikka, A. Divakaran, S. Lee, and G. Burachas, “Sunny and dark outside?! improving answer consistency in vqa through entailed question generation,” *Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing (EMNLP)*, pp. 5860–5865, 2019.
- 8 **A. Ray**, Y. Yao, R. Kumar, A. Divakaran, and G. Burachas, “Can you explain that? lucid explanations help human-ai collaborative image retrieval,” *Proceedings of the AAI Conference on Human Computation and Crowdsourcing*, vol. 7, no. 1, pp. 153–161, 2019.
- 9 **A. Ray**, G. Christie, M. Bansal, D. Batra, and D. Parikh, “Question relevance in vqa: Identifying non-visual and false-premise questions,” *Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing (EMNLP)*, 2016.

## Workshops/Non-archival

- 1 D. Bashkirova, **A. Ray**, R. Mallick, S. Bargal, J. Zhang, R. Krishna, and K. Saenko, *Lasagna: Layered score distillation for disentangled object relighting*, arxiv:2312.00833, 2023.
- 2 K. Deng, R. Tan, S. Gabriel, B. Plummer, K. Saenko, and **A. Ray**, *Socratis: Are large multimodal models emotionally aware?* ICCV Workshop on Emotionally and Culturally Aware AI (Oral), 2023.
- 3 S. Ghosh, G. Burachas, **A. Ray**, and A. Ziskind, *Generating natural language explanations for visual question answering using scene graphs and visual attention*, IJCAI/ECAI Workshop on Explainable Artificial Intelligence, XAI 2018, 2018.

## Patents

- 1 G. Burachas, **A. Ray**, and Y. Yao, *Attention-based explanations for artificial intelligence behavior*, US Patent 10,909,401, Feb. 2021.
- 2 A. Divakaran, K. Sikka, **A. Ray**, X. Lin, and Y. Yao, *User targeted content generation using multimodal embeddings*, US Patent App. 17/191,698, Sep. 2021.

## Awards

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- 2019 **Shark Tank Award**, SRI International, Center for Vision Technologies.  
*Received \$50,000 for 6 months that supported my project on generating personalized content to convey effects of climate change. Awarded to 3 projects in the center.*
- 2016 **Employee of the Fortnight**, Blue River Technology.  
*For rapidly prototyping plant detection models, key selling point for the company.*
- 2013 **Silver Medal**, Research Day, SRM University.  
*Rank 2 out of ~300 students in the department.*
- 2012 **Academic Merit Scholarship**, SRM University.  
*Rank 3 out of ~300 students in the Electrical Engineering Department.*

## Mentoring

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- 2023 Gitika Jha (AI4All Undergraduate BU; now SDE at Amazon)  
Katherine Deng (AI4All Undergraduate BU; now SWE at Fidelity Investments)  
Jiayi Shen (AI4All Undergraduate BU; now MS student at Brown University)  
Xavier Thomas (MS BU)
- 2022 Praneeth Chandra Bogineni (MS BU; now at a startup, Oplus.ai)
- 2018-2021 Kamran Alipour (UC San Diego; now Senior AI R&D Engineer, Williams Sonoma)
- 2019 Julia Kruk (SRI International; now MS student at Georgia Tech)

## Leadership

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- Spring'23 **Student Leader**, AI For Impact Venture Studio, MIT Media Lab  
*Part of the student leadership council organizing networking events with over 100 attendees from 3 schools in the Boston area.*
- 2021 – 2022 **Co-chair**, AI+X of BU and Harvard  
*Started a graduate student workshop investigating how AI can impact contemporary research areas.*
- 2016 – 2017 **Vice President**, Tau Beta Pi Engineering Honor Society  
*Vice President of the Virginia Tech Chapter*

## Venture Experience

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- Summer'24 **Build @ Pillar VC**  
*Selected as one of the Build @ Pillar VC summer cohort for entrepreneurship in the robotics space.*

## Professional Service

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- 2016 – ? **Reviewer**  
*Neurips'22-24, CVPR'25,24,16, ECCV'24, ICLR'25, EMNLP'23, COLING'22.*
- 2022, 2017 **Judge**, Blue Ridge Highlands Regional Science Fair  
*Science fair for high-school students*

## Media

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- 2023 **The Generative AI Podcast**  
I was featured in a podcast about using AI to predict social media responses.

## Media (continued)

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- 2019    **TechXplore, Phys.org**  
*An image-guessing game to evaluate the helpfulness of machine explanations, presented also as a CVPR 2019 Demo and AAAI HCOMP 2019 Poster.*
- 2014    **Indian Express, Deccan Chronicle, Engineering.Careers360**  
*Prototyped an Unmanned Autonomous Drone for identifying disaster victims.*

## Early Achievements

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- 2011    All India Undergraduate Entrance Examination (SRM-JEE)  
*99%ile among students in India.*
- All India Central Board Examinations  
*Mathematics score: 97/100, 99%ile among students in India.*
- 2007    National Science Olympiad  
*All India Rank: 168, City Rank: 7. Maintained a national rank < 600 in National Science Olympiads 2008, 2009, 2010*
- 2006    Founded middle-school science society  
*Goal of encouraging middle-school students to take an interest in science. Won accolades in multiple school/city-level exhibitions.*