

# PRITHVIJIT CHATTOPADHYAY

✉ prithvijit3@gatech.edu    prithv1    www.prithv1.xyz    +1 470-535-9524

## RESEARCH INTERESTS

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*Reducing Distribution Sensitivity in Vision by Improving Benchmarking, Generalization and Reliability*

**Specific:** Robust & Reliable Machine Learning, Sim2Real Transfer, Embodied AI, Generative Models

## EDUCATION

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**Ph.D. in Computer Science**, School of Interactive Computing, Georgia Tech 2019-(May) 2024

**Advisor:** Prof. Judy Hoffman

**Award:** Rising Star Doctoral Student Research Award

**M.S. in Computer Science**, College of Computing, Georgia Tech 2017-2019

**Thesis:** Evaluating Visual Conversational Agents via Cooperative Human-AI Games

**Advisor:** Prof. Devi Parikh

**Award:** M.S. Research Award

**B.Tech. in Electrical Engineering**, Delhi Technological University (Formerly DCE) 2012-2016

## SELECTED RESEARCH EXPERIENCE

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**Research Assistant**, Hoffman Group, Georgia Tech 2019-Present

*Advised by Prof. Judy Hoffman*

Atlanta, GA

Getting vision models to work across changing visual distributions.

- Model Resilience to Distribution Shifts (Ongoing)
- Synthetic Aerial Imagery Benchmark [Preprint]
- Calibration in Sim2Real Adaptation [ICLR24]
- Sim2Real Generalization [ICCV23]
- Embodied Robustness Benchmark [ICCV21]
- Interpreting Adversarial Robustness [ECCVW20]
- Multi-source Domain Generalization [ECCV20]
- Low-Shot Robustness [ICCV23]
- Language-Guided Counterfactuals [NeurIPS23]
- Backbone Benchmark [NeurIPS23]

**Research Intern**, PRIOR, Allen Institute for AI

Summer 2022

*Mentored by Ani Kembhavi, Roozbeh Mottaghi and Judy Hoffman*

Seattle, WA

Learning representations of environments from house tours to improve sample efficiency and generalization for embodied agents across tasks and simulators

**Research Intern**, PRIOR, Allen Institute for AI

Summer 2020

*Mentored by Ani Kembhavi, Roozbeh Mottaghi and Judy Hoffman*

Atlanta, GA

Benchmark to assess robustness of embodied navigation agents [Project Page][ICCV21]

**Research Intern**, Deep Learning Group, Microsoft Research AI

Summer 2018

*Mentored by Hamid Palangi*

Redmond, WA

Improving goal-driven visually grounded dialog under the presence of an adversarial utterance evaluator

**Research Assistant**, Visual Intelligence Lab, Georgia Tech

2017-2019

*Mentored by Prof. Devi Parikh and Prof. Dhruv Batra*

Atlanta, GA

Worked on problems at the intersection of computer vision and natural language processing

- Zero-shot Learning [ECCV18]

- Cooperative Human-AI Games [HCOMP18]
- (Diverse) Generative Visual Dialog [EMNLP19]
- Sub-goals in RL [IJCAI20]
- Evaluating Explanations via Human-AI Teams [EMNLP18]
- AI Challenge Evaluation Framework [SOSPW19]

**Research Assistant**, CVMLP Lab, Virginia Tech

2016-2017

*Mentored by Prof. Devi Parikh and Prof. Dhruv Batra*

Blacksburg, VA

Worked on problems at the intersection of computer vision and natural language processing

- Counting Objects in Everyday Scenes [CVPR17]
- Human-AI Teams [CVPR17]

## AWARDS AND RECOGNITION

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- 2023 **Awarded ICCV Doctoral Consortium**
- 2023 **Outstanding Reviewer** for CVPR
- 2022 **Outstanding Reviewer** for CVPR
- 2022 **Highlighted Reviewer** for ICLR
- 2021 **Outstanding Reviewer** for CVPR
- 2021 **Outstanding Reviewer** for MLRC
- 2020 **Among Top 33% Reviewers** for ICML
- 2020 **NVIDIA Best Runner Up Paper Award** at AROW, ECCV
- 2020 **Rising Star Doctoral Student Award**, School of Interactive Computing, Georgia Tech
- 2019 **One of the best reviewers** for NeurIPS
- 2019 **Outstanding Reviewer** for ICLR
- 2018 **IC Student Travel Grant** to attend NeurIPS
- 2018 **Among Top 30% Reviewers** for NeurIPS
- 2018 **MS Research Award**, College of Computing, Georgia Tech
- 2017 **Subfinalist**, LDV Entrepreneurial Computer Vision Challenge
- 2017 **Winner**, VTHacks (MLH event at Virginia Tech)
- 2013 **Semi-Finalists** out of 30 participating teams at ROBOSUB-AUVSI
- 2013 **Finalists** out of 27 participating teams at NIOT-SAVE
- 2014 **Merit Scholarships** for Academic Performance 2012-2014
- 2013 **National Top 1%: Indian National Physics Olympiad (InPhO)**
- 2013 **Cleared Indian Statistical Institute (ISI) entrance exam** (36 students selected across the country)
- 2012 **KVPY and INSPIRE Fellowships**

## PREPRINTS

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1. S. Khose\*, A. Pal\*, A. Agarwal\*, D. Deepanshi\*, J. Hoffman, **P. Chattopadhyay**. "SkyScenes: A Synthetic Dataset for Aerial Scene Understanding." *ArXiv 2023*
2. A. Chandrasekaran\*, D.Yadav\*, **P. Chattopadhyay\***, V. Prabhu\*, D. Parikh. "It Takes Two to Tango: Towards Theory of AI's Mind." *ArXiv 2017*  
([\[Talk\]](#) at Chalearn Looking at People Workshop, CVPR 2017)

## PEER-REVIEWED CONFERENCE PAPERS

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1. **P. Chattopadhyay**, B. Goyal, B. Ecsedi, V. Prabhu, J. Hoffman. "AugCal: Improving Sim2Real Adaptation by Uncertainty Calibration on Augmented Synthetic Images." *International Conference on Learning Representations (ICLR) 2024*  
(Also presented at Workshop on Uncertainty Quantification for Computer Vision (UNCV), ICCV 2023)

2. M. Goldblum, H. Souri, R. Ni, M. Shu, V. Prabhu, G. Somepalli, **P. Chattopadhyay**, A. Bardes, M. Ibrahim, J. Hoffman, R. Chellappa, A. Wilson, T. Goldstein. “Battle of the Backbones: A Large-Scale Comparison of Pretrained Models across Computer Vision Tasks.” *Neural Information Processing Systems (NeurIPS) Datasets and Benchmarks 2023*
3. V. Prabhu, S. Yenamandra, **P. Chattopadhyay**, J. Hoffman. “LANCE: Stress-testing Visual Models by Generating Language-guided Counterfactual Images” *Neural Information Processing Systems (NeurIPS) 2023*
4. **P. Chattopadhyay**\*, K. Sarangmath\*, V. Vijaykumar, J. Hoffman. “PASTA: Proportional Amplitude Training Spectrum Augmentation for Syn-to-Real Domain Generalization.” *International Conference on Computer Vision (ICCV) 2023*
5. A. Singh, K. Sarangmath, **P. Chattopadhyay**, J. Hoffman. “Benchmarking Low-Shot Robustness to Natural Distribution Shifts.” *International Conference on Computer Vision (ICCV) 2023*
6. **P. Chattopadhyay**, J. Hoffman, R. Mottaghi, A. Kembhavi. “RobustNav: Towards Benchmarking Robustness in Embodied Navigation.” *International Conference on Computer Vision (ICCV) 2021 [Oral]*  
(Also presented at *Embodied AI Workshop, CVPR 2021*)
7. **P. Chattopadhyay**, Y. Balaji, J. Hoffman. “Learning to Balance Specificity and Invariance for In and Out of Domain Generalization.” *European Conference on Computer Vision (ECCV) 2020*  
(Also presented at *Visual Learning with Limited Labels (LwLL), CVPR 2020*)
8. N. Modhe, **P. Chattopadhyay**, M. Sharma, A. Das, D. Parikh, D. Batra, R. Vedantam. “IR-VIC: Unsupervised Discovery of Sub-goals for Transfer in RL.” *European Conference on Computer Vision (ECCV) 2020*
9. V. Murahari, **P. Chattopadhyay**, D. Batra, D. Parikh, A. Das. “Improving Generative Visual Dialog by Answering Diverse Questions.” *Empirical Methods in Natural Language Processing (EMNLP) 2019*  
(Also presented at *Visual Question Answering and Dialog Workshop, CVPR 2019*)
10. R. Selvaraju\*, **P. Chattopadhyay**\*, M. Elhoseiny, T. Sharma, D. Batra, D. Parikh, S. Lee. “Choose Your Neuron: Incorporating Domain Knowledge Through Neuron-Importance.” *European Conference on Computer Vision (ECCV) 2018*  
(Also presented at *Continual Learning Workshop, NeurIPS 2018*)  
(Also presented at *Visually Grounded Interaction and Language (ViGIL) Workshop, NeurIPS 2018*)
11. A. Chandrasekaran\*, V. Prabhu\*, D.Yadav\*, **P. Chattopadhyay**\*, D. Parikh. “Do Explanations make VQA models more predictable to a human?” *Empirical Methods in Natural Language Processing (EMNLP) 2018*
12. **P. Chattopadhyay**\*, D.Yadav\*, V. Prabhu, A. Chandrasekaran, A. Das, S. Lee, D. Batra, D. Parikh. “Evaluating Visual Conversational Agents via Cooperative Human-AI Games.” *AAAI Conference on Human Computation and Crowdsourcing (HCOMP) 2017 [Oral]*
13. **P.Chattopadhyay**\*, R.Vedantam\*, R. Selvaraju, D. Batra, D. Parikh. “Counting Everyday Objects in Everyday Scenes.” *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2017 [Spotlight]*

#### WORKSHOP PAPERS

1. F. Lin, R. Mittapali, **P. Chattopadhyay**, D. Bolya, J. Hoffman. “Likelihood Landscapes: A Unifying Principle Behind Many Adversarial Defenses.” *Adversarial Robustness in the Real World (AROW), ECCV 2020 [Talk]*  
**NVIDIA Best Paper Runner Up 🏆**
2. N. Modhe, **P. Chattopadhyay**, M. Sharma, A. Das, D. Parikh, D. Batra, R. Vedantam. “DS-VIC: Unsupervised Discovery of Decision States for Transfer in RL.” *Task-Agnostic Reinforcement Learning (TARL) Workshop, ICLR 2019 [Talk]*
3. D. Yadav, R. Jain, H. Agrawal, **P. Chattopadhyay**, T. Singh, A. Jain, S. Singh, S. Lee, D. Batra. “EvalAI: Towards Better Evaluation Systems for AI Agents.” *Workshop on AI Systems, SOSP 2019*

#### JOURNAL PAPERS

1. S. Kareer, V. Vijaykumar, H.Maheshwari, **P. Chattopadhyay**, V. Prabhu, J. Hoffman. “We’re Not Using Videos Effectively: An Updated Domain Adaptive Video Segmentation Baseline.” *Transactions on Machine Learning Research (TMLR) 2024*

## TALKS

- “Reliable Vision for a Changing World” at DRDO, India Jan 2024
- “Reliable Vision for a Changing World” at Machine Perception, Google Jan 2023  
(with Viraj Prabhu and Judy Hoffman)

## PROFESSIONAL SERVICES

### Manuscript Reviewer (🏆 indicates reviewer awards)

IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 🏆x3	2018-2024
Neural Information Processing Systems (NeurIPS) 🏆x2	2018-2023
Association for Computational Linguistics (ACL)	2019
International Conference on Learning Representations (ICLR) 🏆x2	2019-2022
IEEE International Conference on Robotics and Automation (ICRA)	2021-2022
International Conference on Machine Learning (ICML) 🏆	2019-2020
International Conference on Computer Vision (ICCV)	2023
European Conference on Computer Vision (ECCV)	2018
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)	2021-2022
Workshop on Uncertainty Quantification for Computer Vision (UNCV), ICCV	2023
Workshop on Distribution Shifts (DistShift), NeurIPS	2021-2022
Machine Learning Reproducibility Challenge (MLRC) 🏆	2021-2022
Workshop on Robustness in Sequence Modeling (RobustSeq), NeurIPS	2022
Learning from Limited and Imperfect Data (L2ID), ECCV	2022

### Challenge Organization

Visual Dialog Challenge (co-organized with Vishvak Murahari)	CVPR 2020
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## TEACHING EXPERIENCE

<b>CS 8803: Machine Learning with Limited Supervision</b> Graduate Teaching Assistant	Atlanta, GA Fall 2022
<b>CS 4476: Introduction to Computer Vision</b> Graduate Teaching Assistant	Atlanta, GA Spring 2021

## MENTORING

<b>Sahil Khose</b> , Master's, Georgia Tech	2023-Present
<b>Anisha Pal</b> , Master's, Georgia Tech	2023-Present
<b>Vivek Vijaykumar</b> , Bachelor's, Georgia Tech	2022-Present
<b>Aaditya Singh</b> , Master's, Georgia Tech	2022-2023
<b>Aayushi Agarwal</b> , Master's, Georgia Tech	2021-2023
<b>Deepanshi Deepanshi</b> , Master's, Georgia Tech	2021-2023
<b>Kartik Sarangmath</b> , Master's, Georgia Tech	2021-2022
<b>Rohit Mittapalli</b> , Bachelor's, Georgia Tech	2020-2021
<b>Fu Lin</b> , Master's, Georgia Tech	2020-2021

## PROJECTS

### Investigating Visual Dialog Models for Goal-Driven Self-Talk [PDF]

As a project for CS 7001: Grad. Studies Computing, Fall 2019

### Exploring Weak-Supervision and Generative Models for Semantic Segmentation [PDF]

As a project for CS 8803: Probabilistic Graphical Models, Spring 2018

### DTU AUV: Autonomous Underwater Vehicle [PDF]

As a part of DTU-AUV (undergraduate research) team

## SELECTED COURSEWORK

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Deep Learning, Machine Learning, Machine Learning Theory, Advanced Machine Learning, Probabilistic Graphical Models, Adaptive Control and Reinforcement Learning, Numerical Linear Algebra, High Dimensional Data Analytics, Computability and Algorithms

## OTHER RESEARCH EXPERIENCE

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**Research Intern**, Robotics Research Lab, IIIT Hyderabad Winter 2014  
*Mentored by Prof. K Madhava Krishna* Hyderabad, India

**Robotics:** Implemented an efficient strategy for a robot to discover, recognize and navigate to a selected few objects among some scattered in an environment

**Research Intern**, IACS, Kolkata Summer 2014  
*Mentored by Prof. Soumitra Sengupta* Kolkata, India

**Theoretical Physics:** Worked on finding Charged Rotating Black Hole solutions in Einstein-Gauss-Bonnet dilaton coupled gravity

**Undergraduate Researcher**, Autonomous Underwater Vehicle Team, DTU 2012-2016  
*Mentored by Prof. R K Sinha* Delhi, India

**Underwater Acoustics:** Developed and implemented range estimation algorithms for Passive Source Localization from Time Difference of Arrival (TDOA) values