# Tejas Gokhale


**Contact**

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Website: https://www.tejasgokhale.com
Mail: 1000 Hilltop Circle, ITE 214, Baltimore MD 21250


**Appointment**

**Assistant Professor**
Department of Computer Science & Electrical Engineering
University of Maryland, Baltimore County

**Affiliated Faculty**
UMBC AI Center. https://ai.umbc.edu/

**Research area**

Robust computing for perception, communication, learning, and reasoning.
Computer Vision, Machine Learning, Robustness & Reliability, Multimodal Learning

**Education**

**Doctor of Philosophy**, Arizona State University — 08/2018–05/2023
School of Computing and Augmented Intelligence
*Advisors:* Yezhou Yang, Chitta Baral
*Thesis:* Towards Reliable Semantic Vision

**Master of Science**, Carnegie Mellon University — 08/2016–12/2017
Department of Electrical and Computer Engineering
*Mentor:* Aswin Sankaranarayanan

**Bachelor of Engineering (Honours)**, BITS Pilani — 08/2011–05/2015
Department of Electrical and Electronics Engineering

**Employment history**

**Microsoft Research** — Summer 2022
Research Intern, Adaptive Systems and Interaction Group
*Mentors:* Hamid Palangi, Besa Nushi, Vibhav Vineet, Eric Horvitz

**Lawrence Livermore National Laboratory** — Summer 2021, 2020
Research Scholar, Machine Intelligence Group
*Mentors:* Rushil Anirudh, Jay Thiagarajan, Bhavya Kailkhura

**Arizona State University**
Graduate Research Associate, School of Computing and AI — 2018–2023
Graduate Teaching Associate, School of Computing and AI — 2018–2020

**Snap Research** — Summer 2018
Research Intern, Computational Imaging Group
*Mentors:* Guru Krishnan, Shree Nayar

**Carnegie Mellon University** — 2017–2018
Graduate Student Researcher, Dept. of Electrical and Computer Engineering

**ST Microelectronics** — Fall 2014
Intern, High Speed Links Group

**Steel Authority of India Limited** Summer 2013
Summer Intern, Bhilai Steel Plant

## Teaching

**Instructor**, UMBC

| | |
|---|---|
| CMSC 491/691 Computer Vision | Spring 2024 |
| CMSC 491/691 Computer Vision | Fall 2023 |
| CMSC 898 Pre-Doctoral Candidacy Research | Spring 2024 |
| CMSC 699 Independent Study | Spring 2024 |
| CMSC 699 Independent Study | Fall 2023 |

**Teaching Assistant**, Arizona State University

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|---|---|
| CSE310: Data Structures & Algorithms | Spring 2020 |
| CSE408: Multimedia Information Systems | Spring 2019 |
| CSE110: Introduction to Programming, | Fall 2018 |

**Guest Lecturer**, Arizona State University

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|---|---|
| CSE598, Perception in Robotics | Spring 2022 |
| CSE408, Multimedia Information Systems | Spring 2019 |

**Student Instructor**, BITS Pilani Goa Campus

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|---|---|
| CTE: Advanced Image Processing | Spring 2015 |

## Publications

See my Google Scholar page for recent updates and citation information.
Ψ: student mentee at ASU; underlined: my graduate advisee; ∗: co-first author

### Conference Proceedings

[C1] Agneet Chatterjee[Ψ], **Tejas Gokhale**, Chitta Baral, Yezhou Yang. On the Robustness of Language Guidance for Low-Level Vision Tasks: Findings from Depth Estimation
(to appear in) CVPR 2024

[C2] Maitreya Patel[Ψ], **Tejas Gokhale**, Chitta Baral, Yezhou Yang. ConceptBed: Evaluating Concept Learning Abilities of Text-to-Image Diffusion Models. In Proceedings of the AAAI Conference on Artificial Intelligence, 2024.
https://arxiv.org/abs/2306.04695 AAAI 2024

[C3] Sheng Cheng, **Tejas Gokhale**, Yezhou Yang. Adversarial Bayesian Augmentation for Single-Source Domain Generalization. In Proceedings of the IEEE/CVF International Conference on Computer Vision, 2023
https://arxiv.org/abs/2307.09520 ICCV 2023

[C4] Man Luo, Zhiyuan Fang, **Tejas Gokhale**, Yezhou Yang, Chitta Baral. End-to-end Knowledge Retrieval for Multi-modal Queries. In Proceedings of the 61st Annual Meeting of the Association for Computational Linguistics. Association for Computational Linguistics.
https://arxiv.org/abs/2306.00424 ACL 2023

[C5] **Tejas Gokhale**, Rushil Anirudh, Jayaraman J. Thiagarajan, Bhavya Kailkhura, Chitta Baral, and Yezhou Yang. Improving Diversity with Adversarially Learned Transformations for Domain Generalization. In Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision, pp. 434-443. 2023.
https://arxiv.org/abs/2206.07736 WACV 2023

[C6] Maitreya Patel$^{\Psi}$, **Tejas Gokhale**, Chitta Baral, and Yezhou Yang. 2022. CRIPP-VQA: Counterfactual Reasoning about Implicit Physical Properties via Video Question Answering. In Proceedings of the 2022 Conference on Empirical Methods in Natural Language Processing, pages 9856–9870, Abu Dhabi, United Arab Emirates. Association for Computational Linguistics.
https://arxiv.org/abs/2211.03779 EMNLP 2022

[C7] **Tejas Gokhale**, Abhishek Chaudhary$^{\Psi}$, Pratyay Banerjee, Chitta Baral, and Yezhou Yang. 2022. Semantically Distributed Robust Optimization for Vision-and-Language Inference. In Findings of the Association for Computational Linguistics: ACL 2022, pages 1493–1513, Dublin, Ireland. Association for Computational Linguistics.
https://arxiv.org/abs/2110.07165 ACL Findings 2022

[C8] **Tejas Gokhale**, Swaroop Mishra, Man Luo, Bhavdeep Sachdeva, and Chitta Baral. 2022. Generalized but not Robust? Comparing the Effects of Data Modification Methods on Out-of-Domain Generalization and Adversarial Robustness. In Findings of the Association for Computational Linguistics: ACL 2022, pages 2705–2718, Dublin, Ireland. Association for Computational Linguistics.
https://arxiv.org/abs/2203.07653 ACL Findings 2022

[C9] Neeraj Varshney, Pratyay Banerjee, **Tejas Gokhale**, and Chitta Baral. 2022. Unsupervised Natural Language Inference Using PHL Triplet Generation. In Findings of the Association for Computational Linguistics: ACL 2022, pages 2003–2016, Dublin, Ireland. Association for Computational Linguistics.
https://arxiv.org/abs/2110.08438 ACL Findings 2022

[C10] Yiran Luo, Pratyay Banerjee, **Tejas Gokhale**, Yezhou Yang, and Chitta Baral. 2022. To Find Waldo You Need Contextual Cues: Debiasing Who's Waldo. In Proceedings of the 60th Annual Meeting of the Association for Computational Linguistics (Volume 2: Short Papers), pages 355–361, Dublin, Ireland. Association for Computational Linguistics.
https://arxiv.org/abs/2203.16682 ACL 2022

[C11] Man Luo, Arindam Mitra, **Tejas Gokhale**, and Chitta Baral. Improving biomedical information retrieval with neural retrievers. In Proceedings of the AAAI Conference on Artificial Intelligence, vol. 36, no. 10, pp. 11038-11046. 2022.
https://arxiv.org/abs/2201.07745 AAAI 2022

[C12] Pratyay Banerjee, **Tejas Gokhale**, Yezhou Yang, and Chitta Baral. "Weakly supervised relative spatial reasoning for visual question answering." In Proceedings of the IEEE/CVF International Conference on Computer Vision, pp. 1908-1918. 2021.
https://arxiv.org/abs/2109.01934 ICCV 2021

[C13] Pratyay Banerjee, **Tejas Gokhale**, Yezhou Yang, and Chitta Baral. 2021. WeaQA: Weak Supervision via Captions for Visual Question Answering. In Findings of the Association for Computational Linguistics: ACL-IJCNLP 2021, pages 3420–3435, Online. Association for Computational Linguis-

tics.
https://arxiv.org/abs/2012.02356 ACL Findings 2021

[C14] Pratyay Banerjee, **Tejas Gokhale**, and Chitta Baral. 2021. Self-Supervised Test-Time Learning for Reading Comprehension. In Proceedings of the 2021 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, pages 1200–1211, Online. Association for Computational Linguistics.
https://arxiv.org/abs/2103.11263 NAACL 2021

[C15] **Tejas Gokhale**, Rushil Anirudh, Bhavya Kailkhura, Jayaraman J. Thiagarajan, Chitta Baral, and Yezhou Yang. Attribute-guided adversarial training for robustness to natural perturbations. In Proceedings of the AAAI Conference on Artificial Intelligence, vol. 35, no. 9, pp. 7574-7582. 2021.
https://arxiv.org/abs/2012.01806 AAAI 2021

[C16] **Tejas Gokhale***, Pratyay Banerjee*, Chitta Baral, and Yezhou Yang. 2020. MUTANT: A Training Paradigm for Out-of-Distribution Generalization in Visual Question Answering. In Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing (EMNLP), pages 878–892, Online. Association for Computational Linguistics.
https://arxiv.org/abs/2009.08566 EMNLP 2020

[C17] Zhiyuan Fang*, **Tejas Gokhale***, Pratyay Banerjee, Chitta Baral, and Yezhou Yang. 2020. Video2Commonsense: Generating Commonsense Descriptions to Enrich Video Captioning. In Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing (EMNLP), pages 840–860, Online. Association for Computational Linguistics.
https://arxiv.org/abs/2003.05162 EMNLP 2020

[C18] **Tejas Gokhale***, Pratyay Banerjee*, Chitta Baral, and Yezhou Yang. Vqa-lol: Visual question answering under the lens of logic. In Computer Vision–ECCV 2020: 16th European Conference, Glasgow, UK, August 23–28, 2020, Proceedings, Part XXI 16, pp. 379-396. Springer International Publishing, 2020
https://arxiv.org/abs/2002.08325 ECCV 2020

## Peer Reviewed Extended Abstracts

[W1] **Tejas Gokhale**. Towards Robust Visual Understanding: from Recognition to Reasoning. (to appear) In AAAI 2024. AAAI New Faculty Highlights

[W2] Sourajit Saha and **Tejas Gokhale**. Improving Shift Invariance in Convolutional Neural Networks with Translation Invariant Polyphase Sampling. In Workshop on Out of Distribution Generalization in Computer Vision at ICCV 2023. OOD-CV @ ICCV 2023

[W3] **Tejas Gokhale***, Joshua Feinglass*, and Yezhou Yang. Covariate Shift Detection via Domain Interpolation Sensitivity. In First Workshop on Interpolation Regularizers and Beyond at NeurIPS 2022. https://openreview.net/pdf?id=YkPjTHZDdm
[SPOTLIGHT] NeurIPS 2022 Interpolation Workshop

[W4] Kuldeep Kulkarni, **Tejas Gokhale**, Rajhans Singh, Pavan Turaga, Aswin C. Sankaranarayanan. Halluci-Net: Scene Completion by Exploiting Object Co-occurrence Relationships. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops. 2021.
https://arxiv.org/abs/2004.08614 AI for Content Creation @ CVPR 2021

[W5] **Tejas Gokhale**, Shailaja Sampat, Zhiyuan Fang, Yezhou Yang, and Chitta Baral. Cooking with blocks: A recipe for visual reasoning on image-pairs. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops, pp. 5-8. 2019.
Long version: https://arxiv.org/abs/1905.12042 Vision Meets Cognition @ CVPR'19

[W6] **Tejas Gokhale**. Vision beyond Pixels: Visual Reasoning via Blocksworld Abstractions. In IJCAI, pp. 6436-6437. 2019.
https://www.ijcai.org/Proceedings/2019/0907.pdf IJCAI Doctoral Consortium

## Preprints

[P1] Agneet Chatterjee[Ψ], Gabriela Ben Melech Stan, Estelle Guez Aflalo, Sayak Paul, Dhruba Ghosh, **Tejas Gokhale**, Ludwig Schmidt, Hannaneh Hajishirzi, Vasudev Lal, Chitta Baral, Yezhou Yang. Getting it Right: Improving Spatial Consistency in Text-to-Image Models in review

[P2] Agneet Chatterjee[Ψ], Yiran Luo, **Tejas Gokhale**, Chitta Baral, Yezhou Yang. Rendering Tools Enable Spatial Fidelity in Vision-Language Models in review

[P3] Maitreya Patel[Ψ], Neeraj Varshney, Agneet Chatterjee[Ψ], **Tejas Gokhale**, Yezhou Yang, Chitta Baral. Reliability-Checklist: A Framework for Comprehensively Evaluating the Reliability of NLP Systems https://github.com/Maitreyapatel/reliability-checklist in review

[P4] **Tejas Gokhale**, Hamid Palangi, Besmira Nushi, Vibhav Vineet, Eric Horvitz, Ece Kamar, Chitta Baral, and Yezhou Yang. Benchmarking Spatial Relationships in Text-to-Image Generation. arXiv preprint arXiv:2212.10015 (2022).
https://arxiv.org/abs/2212.10015 in review

[P5] Ethan Wisdom[Ψ], **Tejas Gokhale**, Chaowei Xiao, and Yezhou Yang. Mole Recruitment: Poisoning of Image Classifiers via Selective Batch Sampling.
https://arxiv.org/abs/2303.17080 in review

[P6] Yiran Luo, Joshua Feinglass, **Tejas Gokhale**, Chitta Baral, Yezhou Yang. Grounding Stylistic Domain Generalization with Quantitative Domain Shift Measures and Synthetic Scenes in review

## Ph.D. Dissertation

[T1] **Tejas Gokhale**. 2023. Towards Reliable Semantic Vision. Order No. 30426752, Arizona State University. https://www.proquest.com/docview/2813822780

## Books and Monographs

[B1] *Advances in Multimodal Information Retrieval and Generation* Springer
*Synthesis Lectures in Computer Vision*, ISBN: 978-3-031-57815-1
Man Luo, **Tejas Gokhale**, Neeraj Varshney, Yezhou Yang, Chitta Baral. [website]

[B2] *Advances in Robust Learning for Computer Vision*
(In Preparation) Springer

## Intellectual Property

[IP1] *Automated Evaluation of Spatial Relationships in Images* (US Patent App. 18/198,593)

[IP2] *Systems, Methods, and Apparatuses for Implementing Improved Diversity using Adversarially Learned Transformations for Domain Generalization* (US Patent App. 63/468,653)

## Grants

"A Framework for Quantifying Typicality of AI-Generated Images"
Microsoft Research, Accelerate Foundation Models Academic Research Initiative
$20,000; 2024

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| Google Cloud Education Credits | $2350; 09/2023 – 09/2024 |
| *(applied)* UMBC Summer Research Faculty Fellowship | $8,000; Summer 2024 |
| *(applied)* UMBC Strategic Awards for Research Transitions | $25,000; 2024 |
| *(applied)* DARPA Young Faculty Award | $1,000,000; 08/2024–07/2027 |
| *(applied)* Amazon Research Award | $70,000; 2024 |
| *(applied)* Google Research Scholar Program | $60,000; 2024 |
| Google Cloud Education Credits | $2350; 09/2023 – 09/2024 |

## Students

**PhD**

- Sourajit Saha — Ph.D. CS [current], UMBC
- Ethan Wisdom (see publication [P5]) — Ph.D. CS [current], ASU
- Maitreya Patel (see publication [C6]) — Ph.D. CS [current], ASU
- Agneet Chatterjee — Ph.D. CS [current], ASU

**MS Thesis**

- Neel Patel — M.S. CS [current] UMBC
- Varun Magotra — M.S. CS [current] UMBC

**MS Thesis (as Committee Member)**

- Naoma Angela Tack — M.S. CS 2024 UMBC

**Undergraduate**

- UMBC CWIT Scholar: Danielle Burton — 2023-24

**MS (Thesis) Mentees (before UMBC)**

- Maitreya Patel (see publication [C6]) — M.S. CS 2022 ASU [thesis]
- Abhishek Chaudhary (see publication [C7]) — M.S. CS 2021 [thesis]

**Undergraduate Mentees (before UMBC)**

- ASU FURI Program: Mertay Dayanc — BS CS, 2020
- ASU Capstone Project: Paul Butler, Jace Lord, Aashwin Ranjan, Sagarika Pannase, William Tith — AY 2019-20

## Presentations

(Invited Talk), AAAI New Faculty Highlights — 02/2024
*"Towards Robust Visual Understanding: from Recognition to Reasoning"* [website]

(Lightning Talk), IARPA Video-LINCS Proposers Day — 02/2024

*"Robust Visual Understanding: Knowledge-Guided and Multimodal Reasoning"*

(Tutorial), Winter Conference on Applications of Computer Vision 01/2024
*"Challenges with Evaluation of Text-to-Image Models"* [website]

(Invited Talk), PRG Seminar, UMIACS (University of Maryland) 11/2023
*"Robust Visual Understanding in the Multimodal Era"*

(Invited Talk) *"Towards Reliable Semantic Vision"* Spring 2023

- Temple University, 04/2023
- Colorado School of Mines, 03/2023
- Case Western Reserve Univesity, 03/2023
- Indiana University, 03/2023
- University of Maryland Baltimore County, 03/2023
- Binghamton University, 03/2023
- Rochester Institute of Technology, 02/2023

(Tutorial), Winter Conference on Applications of Computer Vision 01/2023
*"Semantic Data Engineering for Robustness Under Multimodal Settings"* [website]

(Invited Talk) University of Illinois at Chicago 10/2022
*"Robust Semantic Vision"*

(Invited Talk) Microsoft Research 10/2022
*"Benchmarking Spatial Relationships in Text-to-Image Generation"*

(Doctoral Consortium) CVPR, New Orleans 06/2022
*"Discovering Transformations for Generalization in Semantic Vision"*

(Guest Lecture) Arizona State University CSE 598 03/2022
*"Introduction to Generalization in Semantic Vision"*

(Invited Talk) Arizona State University ML Club 09/2021
*"Robust Visual Understanding"*

(Doctoral Consortium), IJCAI, Macao 08/2019
*"Vision Beyond Pixels"*

(Tutorial) Telluride Neuromorphic Cognition Engineering Workshop, 07/2019
*"Reasoning about Objects and Actions via Block-Play"*

(Invited) Birla Institute of Technology and Science (BITS Pilani) 04/2018
*"Deep Learning Methods in Imaging and Computer Vision"*

## Academic Service

**Area Chair:**

- North American Chapter of the ACL (NAACL) 2024

**Reviewer / Program Committee:**

- Conference on Computer Vision and Pattern Recognition (CVPR) 2023-24
- International Conference on Computer Vision (ICCV) 2023
- International Conference on Machine Learning (ICML) 2023–24
- Advances in Neural Information Processing Systems (NeurIPS) 2022–23
- International Conference on Learning Representations (ICLR) 2022–24
- AAAI Conference on Artificial Intelligence (AAAI) 2021–24
- European Conference on Computer Vision (ECCV) 2022-24
- Association for Computational Linguistics (ACL) 2021–24
- Empirical Methods in Natural Language Processing (EMNLP) 2021–23
- North American Chapter of the ACL (NAACL) 2021–23
- Winter Conference on Applications of Computer Vision (WACV) 2021–24
- International Conference on Robotics and Automation (ICRA) 2019–2023
- International Conference on Intelligent Robots and Systems (IROS) 2022
- IEEE Robotics and Automation Letter (RA-L) 2020-24
- IEEE Transactions of Pattern Analysis and Machine Intelligence (T-PAMI) 2024
- Springer Machine Vision and Applications (MVAP) 2020

**Award Committee:**

- Best Student Abstract Award Committee, AAAI 2024

**Leadership:**

- Mentor, Undergraduate Student Consortium (AAAI-UC) AAAI 2024
- Organizer, Tutorial on Reliability of Generative Models in Vision [Website] WACV'24
- Organizer, Workshop on Open-Domain Reasoning under Multi-Modal Settings (ODRUM), [Website] [YouTube] CVPR'23
- Organizer, Workshop on Open-Domain Retrieval under Multi-Modal Settings (ODRUM), [Website] [YouTube] CVPR'22
- Organizer, Tutorial on Semantic Data Engineering under Multimodal Settings (SERUM) [Website] WACV'23
- Organizer, 2021 Frontiers of V&L Seminar Series, [Website], [YouTube] ASU

## University Service

**University Service (at UMBC):**

- Course Development, CMSC 491/691: Computer Vision [Website]
- PPR Seminar: Advances in Perception, Prediction, and Reasoning [Website]
- Undergraduate Student Advisor Fall 2023
- CSEE Lightning Talks and Open House Fall 2023
- Graduate Admissions Committee AY 2023-24
- Department Publicity Committee AY 2023-24
- Faculty Mentor, Center for Women in Technology AY 2023-24

**University Service (at ASU):**

- Founder, Summer Vision Reading Group, [Website]
- Course Development, CSE591: Frontier Topics in Vision & Language [website] Spring 2021, ASU [YouTube]
- Volunteer, 2019 Southwest Robotics Symposium, Tempe AZ
- Volunteer, International Conference on Machine Learning 2020, Virtual
- Advisor, ASU Machine Learning Club, ASU
- Award Reviewer, GPSA Teaching Award Reviewer ASU
- Mentor, Graduate Student Mentorship Program, ASU
- Project Mentor, CSE598 - Perception in Robotics, ASU Spring 2022
- Project Mentor, CSE576 - Natural Language Processing, ASU Fall 2018

## Awards

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|---|---|
| Research Excellence Award, ASU GPSA | 2022 |
| Outstanding Mentor Award, ASU GPSA | 2022 |
| NeurIPS Top Reviewer | NeurIPS 2022 |
| CVPR 2022 Doctoral Consortium | CVPR 2022 |
| ICLR Best Reviewer | ICLR 2022 |
| SCAI Doctoral Fellowship (ASU), | 2022, 2021, 2020 |
| Engineering Graduate Fellowship, (ASU Engineering) | 2023, 2020 |
| ASU GPSA Travel Award | for WACV 2023 |
| Graduate College Travel Award (declined) | WACV'23, CVPR'22 |
| Graduate College Travel Award (accepted) | ICCV'21, EMNLP'20, ECCV'20 |
| IJCAI 2019 Doctoral Consortium | IJCAI 2019 |
| Inducted, IEEE Eta Kappa Nu, Sigma Chapter | CMU, 2017 |
| National Talent Scholarship, National Council of Educational Research and Training (Govt. of India) | 2007–2015 |

## References

Available upon request