

Sina Malakouti

✉ siinamalakouti@gmail.com or sem238@pitt.edu | 🏠 sinamalakouti.github.io | 📧 sinamalakouti | 🌐 sinamalakouti

Legal status in the US: Permanent Resident (Green Card holder)

Education

University of Pittsburgh

PhD in Computer Science

Expected: Jan 2026

Pittsburgh, PA

- Committee: **Adriana Kovashka (Advisor)**, Boqing Gong, Xiang Lorraine Li, Milos Hauskrecht

Amirkabir University of Technology

B.Sc. in Software Engineering

2015 – 2020

Tehran, Iran

Recent Experiences

University of Pittsburgh | Graduate Research Assistant

2022 - Present | Pittsburgh

Vision-Language Models, Multimodal LLMs, Text-to-Image Generation, Compositional Generalization, Domain Robustness, Labeled Efficient Methods

Advisor: Adriana Kovashka

- Uncovered critical biases and generalization failures in foundational models by designing new benchmarks, especially where scaling training data is ineffective.
- Improved cross-cultural understanding in vision-language and text-to-image models through efficient adapter methods and soft prompting.
- Achieved 15.2-point bias reduction and >70% human preference in action-based relation generation through synthetic data generation and knowledge distillation-based fine-tuning.
- Curated benchmark for creative ads with unusual objects and improved multimodal LLM visual reasoning and ads understanding by 40% through chain-of-thought prompting.
- Improved object detection robustness by 12% through contrastive learning without additional labeled data

Amazon, Prime Video | Applied Scientist Intern

Summer 2024 | New York City

Vision-Language Models, S3, Sagemaker

Mentors: Daniel Peterson, Qipin Chen, Zongyi Liu

- Led research on multimodal content understanding & duplicate detection, building an end-to-end pipeline from data acquisition, cleaning, and modeling.
- Achieved 10% improvement via new CLIP and BERT data fusion and chain-of-thought multimodal prompting.

eBay, Search Science | Applied Research Intern

Summer 2023 | San Jose

Vision-Language Models, Transformers, Imbalanced Data, Hadoop, Spark

Mentors: Mustafa Devrim, Atiq Islam

- Improved search ranking by 4% via new mixture-of-modality expert model.
- Curated effective training/validation datasets addressing heavily imbalanced data challenges.

Apple | Computer Vision Intern

Summer 2022 | Cupertino

Image Processing, OnDevice Modeling, PyTorch, Matlab

Mentors: David Pope, Maxim Smirnov

- Developed a new neural network with 10x smaller model size outperforming baselines on low-level vision tasks.

Johannes Gutenberg University | Machine Learning Intern

2018 - 2019 | Mainz, Germany

Symbolic Netowrks, Hoeffding Trees, Naive Bayes

Mentors: Zahra Ahmadi, Stefen Kramer

- Designed an efficient symbolic deep network using differentiable decision trees, effective on imbalanced data.

Selected Peer-Reviewed Publications

- **S. Malakouti**, A. Kovashka. Role Bias in Text-to-Image Diffusion Models: Diagnosing and Mitigating Compositional Failures through Intermediate Decomposition. Under Review at **NeurIPS**
- **S. Malakouti***, A. Aghazadeh*, A. Khandelwal, A. Kovashka. Benchmarking VLMs' Reasoning About Persuasive Atypical Images. **WACV 2025**
- K. Buettner, **S. Malakouti** (*major contributor*), X.L. Li, A. Kovashka. Incorporating Geo-Diverse Knowledge into Prompting for Increased Geographical Robustness in Object Recognition. **CVPR 2024**
- **S. Malakouti**, A. Kovashka. Semi-Supervised Domain Generalization for Object Detection via Language-Guided Feature Alignment. **BMVC 2023**
- **S. Malakouti***, Z. Ahmadi*, S. Kramer. DeepTreeNetworks: A New Symbolic Deep Architecture. DeCoDeML Workshop, **ECML PKDD 2019**

Technical Skills

Programming Languages	Python, Java, MATLAB, SQL, C, R, JavaScript, HTML/CSS
ML Tools	PyTorch, TensorFlow, Keras, Scikit-learn, DL4j, Weka, Numpy, Pandas
AI & CV Methods	CNNs, RNNs, Transformers & Attention Mechanism, Vision-Language Models (VLMS), Large Language Models (LLMs), Multimodal LLMs (MLLMs), Text-to-Image (T2I) Generative Models, Diffusion Models, Contrastive Learning, Semi-Supervised, Domain Adaptation/Generalization (e.g., Pseudo Labeling, Student-Teacher, Consistency Regularization)
Big Data & Databases	Hadoop, Spark, S3, MySQL, MongoDB, SQLite
Other	Data Engineering, Object-Oriented Design, MVC, Problem-Solving

Other Related Projects

- **Compositional Generalization of Text-to-Image Generative Models** Ongoing
Text-to-Image Models, Compositional Generalization, Curriculum Learning
 - Benchmarking text-to-image models on compositional generalization to test extrapolation from simpler to more complex prompts
 - Building curriculum-based training method to improve T2I model generalizability.
- **Cross-Cultural Creative ads Generation** Ongoing
Multimodal-LLM as a Judge, T2I models, Image Editing, Learning with Human Feedback (DPO)
 - Developing cross-cultural theory-based metrics to evaluate cultural relevance across diverse regions.
 - Building reward models and feedback-based editing to generate more effective ads for cultures around the world.
- **Weakly Supervised Object Detectors (WSOD) Robustness Toward Domain Shift**
Python, PyTorch, Weakly-Supervised Object Detection (WSOD), Domain Robustness
 - Revealed WSOD models' higher reliance on domain-specific features compared to fully supervised approaches.
 - Developed consistency regularization method with style transfer, improving unseen domain detection by 2%
- **Multimodal Transformer Fusion For Depression Prediction**
 - Achieved 13% improvement in depression severity prediction through multimodal transformer-based fusion of video, audio, and language.
- **MuST for Semi-Supervised Medical Image Segmentation**
Semi-Supervised Learning, Data Augmentation, Consistency Regularization, Student-Teacher Framework
 - Developed student-teacher method with multi-scale feature-space consistency, enabling fine-grained boundary detection.
 - Achieved SOTA on semi-supervised brain lesion segmentation using only 3% labeled data.

Professional Services

Conference Reviewer: CVPR, ICCV, ECCV, NeurIPS, AAAI, EMNLP, WACV
Co-Organizer: Demographic Diversity in Computer Vision Workshop, CVPR 2025

Honors & Awards

- **Doctoral Consortium**, Winter Conference on Applications of Computer Vision (WACV), 2025
- **Outstanding Reviewer Award**, European Conference on Computer Vision (ECCV), 2024
- **Travel Award**, Department of Computer Science University of Pittsburgh (2023)
- **Full SCI Fellowship**, University of Pittsburgh (2020)
- **Honored as an outstanding student**, Amirkabir University of Technology (2015-2020)

Extra Curricular & Leadership

President of Student Scientific Chapter Jan 2017 - March 2018
Computer Engineering, Amirkabir University of Technology Tehran, Iran

- Organized 70+ national and international contests, talks, and workshops in collaboration with Technische Universität München, Germany, and KTH Royal Institute of Technology, Sweden.