# BATUHAN KARAMAN

✉ kbk46@cornell.edu batuhankmkaraman.github.io

## INTERESTS

**LLM post-training** Reasoning LLMs, VLLMs, RLVR/RLHF, Alignment, Responsible AI

## EDUCATION

**Cornell University** Ithaca, NY
Ph.D. in Machine Learning (ECE) 2020 - Present
Advisor: Mert Sabuncu

**Middle East Technical University** Ankara, Turkey
B.S. in Electrical Engineering 2015 - 2020

## SKILLS

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|---|---|
| **Languages** | Python, R, MATLAB, C/C++ |
| **Frameworks** | PyTorch, Verl, Huggingface, TensorFlow, NetworkX |
| **Statistical Analysis** | Hypothesis testing, Data visualization |
| **Others** | AWS, Kubernetes, Ray, Azure, Linux |

## EXPERIENCE

**Cornell University** New York, NY
Graduate Research Assistant Sep 2020 - Present
Supervisors: Mert Sabuncu, Ray Razlighi (from Weill Cornell Medicine Radiology)

- My PhD research focuses on developing computer vision and time-series methods to predict clinical outcomes from multimodal biomedical data.

**Amazon AGI** Sunnyvale, CA
Applied Scientist Intern Jun 2025 - Sep 2025
Supervisors: Mohammad Ghavamzadeh, Arijit Biswas, Ruida Zhou

- Developed a novel REINFORCE-based RLVR algorithm that achieves state-of-the-art performance on various math reasoning benchmarks using Qwen- and Llama-family models.
- Analyzed the sources of instability in the REINFORCE Algorithm.

**Microsoft AI** Redmond, WA
Applied Scientist Intern Jun 2024 - Aug 2024
Supervisors: Xia Song, Alon Benhaim, Maggie Engler (previously at Inflection AI)

- Worked on the safety and usefulness balance of Llama- and Phi-family models through SFT and preference optimization.
- Developed a novel preference optimization method, achieving a 30% reduction in model overrefusals.

**Spectral AI** Dallas, TX (Remote)
Deep Learning Scientist Intern (Part-time) Aug 2023 - Nov 2023

- Designed a multimodal cross-attention-based model for diabetic foot ulcer healing prediction, combining multi-spectral imagery and clinical data. Achieved improved lesion localization.

**Spectral AI** Dallas, TX
Deep Learning Scientist Intern Jun 2023 - Aug 2023

- Enhanced a multimodal convolutional model for diabetic foot ulcer healing prediction, integrating multispectral imagery and clinical data. Improved classification accuracy by 8%.

## PUBLICATIONS

1. **Karaman, B.K.**[†], Rawal, A., Ghavamzadeh, M., Shakiah S., Biswas, A., Zhou, R., "DISPO: Enhancing Training Efficiency and Stability in Reinforcement Learning for Large Language Model Mathematical Reasoning", submitted to AISTATS 2026.
2. **Karaman, B.K.**[‡], Zabir, I., Benhaim, A., Chaudhary V., Sabuncu, M.R., Song, X., "POROver: Improving Safety and Reducing Overrefusal in Large Language Models with Overgeneration and Preference Optimization", ICML 2025. [Paper]
3. Nguyen, M.*, **Karaman, B.K.***, Kim, H.*, Wang, A.Q.*, Liu, F.*, Sabuncu, M.R., "Knockout: A Simple Way to Handle Missing Inputs.", TMLR, 2025. [Paper]
4. **Karaman, B.K.**, Nguyen, M., Kim, H., Sabuncu, M.R., "A Deep Survival Model for Predicting Alzheimer's Diagnosis based on Multi-modal Longitudinal Data", accepted in IEEE BDMA, 2025.
5. **Karaman, B.K.**, Sabuncu, M.R., "Assessing the Significance of Longitudinal Data in Alzheimer's Disease Forecasting", AIiH 2024 (Best Paper Award). [Paper]
6. **Karaman, B.K.**, Dodelzon, K., Akar, G.B., Sabuncu, M.R., "Longitudinal Mammogram Risk Prediction.", MICCAI 2024. [Paper]
7. Kim, H., **Karaman, B.K.**, Zhao, Q., Wang, A.Q., Sabuncu, M.R., "Learning-based Inference of Longitudinal Image Changes: Applications in Embryo Development, Wound Healing, and Aging Brain", PNAS, 2024. [Paper]
8. Wang A.Q., **Karaman B.K.**, Kim H., Rosenthal J., Saluja R., Young S.I., Sabuncu M.R., "A Framework for Interpretability in Machine Learning for Medical Imaging", IEEE Access, 2023. [Paper]
9. **Karaman B.K.**, Mormino E.C., Sabuncu M.R., "Machine learning based multi-modal prediction of future decline toward Alzheimer's disease: An empirical study", PLoS ONE, 2022. [Paper] [Code] (Highlighted at Cornell Chronicle on Nov 23rd, 2022. [Article])

## INVITED TALKS & SYMPOSIUMS

1. Distinguished speaker at the 6th Global Conclave on Neurology and Neurological Disorders (NEURO Conclave 2025): "Assessing the Significance of Longitudinal Data in Alzheimer's Disease Forecasting".
2. Distinguished speaker at the 5th International Conference on Future of Preventive Medicine and Public Health (Future of PMPH 2025): "Longitudinal Mammogram Risk Prediction".
3. Machine Learning in Medicine Symposium (MLIM 2022): "Machine learning based multi-modal prediction of future decline toward Alzheimer's Disease".

## HONORS & AWARDS

- Best Paper Award, International Conference on AI in Healthcare (AIiH), 2024.
- Irwin Jacobs Scholar Fellowship, Cornell University, 2020.
- METU High Honor Award, based on graduation grades, METU, 2020.
- EEE STAR Award, given by the Electrical and Electronics Engineering Department at METU for participation in research, METU, 2019.

## SERVICE

- **Reviewer:** ICLR, ICML, AISTATS, AIiH, Nature, PloS, MELBA, Journal of Alzheimer's, etc.
- **Teaching:** Mentored multiple Cornell Master's and undergraduate students on their graduation projects and theses.

[†]Work done during an internship at Amazon AGI.
[‡]Work done during an internship at Microsoft AI.
*Indicates equal contribution.