

# BATUHAN KARAMAN

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## INTERESTS

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**LLM research & product** Reasoning LLMs, VLLMs, RLVR/RLHF, Alignment, Agent, Responsible AI

## EDUCATION

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**Cornell University** Ithaca, NY  
Ph.D. in Machine Learning (ECE) 2020 - 2026  
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

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**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%.

**Cornell University** New York, NY  
Graduate Research Assistant Sep 2020 - Early 2026  
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.

## PUBLICATIONS

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1. **Karaman, B.K.**<sup>†</sup>, 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”, AISTATS 2026. (All reviewers scored Accept (6); official decision on Jan 23rd.). [\[Paper\]](#)
2. **Karaman, B.K.**<sup>‡</sup>, 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.<sup>\*</sup>, **Karaman, B.K.**<sup>\*</sup>, Kim, H.<sup>\*</sup>, Wang, A.Q.<sup>\*</sup>, Liu, F.<sup>\*</sup>, 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 23<sup>rd</sup>, 2022. [\[Article\]](#))

## INVITED TALKS & SYMPOSIUMS

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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

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- 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

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- **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.

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<sup>†</sup>Work done during an internship at Amazon AGI.

<sup>‡</sup>Work done during an internship at Microsoft AI.

<sup>\*</sup>Indicates equal contribution.