

Mark Beliaev

Research Scientist – Post-Training Multimodal Language Models

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RESEARCH EXPERIENCE

My research interests lie in developing methods that enhance Multimodal Large Language Models (MLLMs) for complex real-world tasks. My research experience spans RL [1, 4, 6, 10], adversarial ML [2, 8], multi-agent systems [3, 9, 5], and MLLM-based solutions in industry [7]. I have experience in interdisciplinary lab settings.

EDUCATION

University of California Santa Barbara	Santa Barbara, CA
• <i>PhD in Electrical and Computer Engineering</i>	<i>Jun 2020 – Dec 2024</i>
University of California Santa Barbara	Santa Barbara, CA
• <i>Master of Science in Electrical and Computer Engineering</i>	<i>Sep 2018 – Jun 2020</i>
Stony Brook University	Stony Brook, NY
• <i>Bachelor of Engineering in Electrical Engineering & Applied Mathematics and Statistics</i>	<i>Aug 2013 – Jun 2017</i>

EXPERIENCE

TikTok (ByteDance)	San Jose, CA
• <i>Research Scientist</i>	<i>Apr 2025 – Present</i>
Researching post-training methods that combine SFT and RL to improve lightweight vision-language models for content understanding and safety. Supervised a graduate intern's project on routing strategies to boost the efficiency of deployed models.	
<i>Machine Learning Engineer Intern</i>	
Contributed to the recommendation engine by implementing new training methods for production ML models. Led a research project evaluating GPT-4o and Gemini for multi-modal classification, producing actionable insights to the company. This work culminated in a workshop paper accepted at ICLR 2025.	
University of California Santa Barbara	Santa Barbara, CA
• <i>Student Mentor</i>	<i>Sep 2022 – Jun 2023</i>
Mentored undergraduates conducting NLP research on adversarial training of LLMs, providing guidance in experiment design, data pipelines, and model evaluation.	
<i>Visiting Scholar at RE Touch Lab (led by Prof Yon Visell)</i>	<i>Sep 2018 – Dec 2019</i>
Interdisciplinary lab conducting research in haptics and interactive technologies. Designed computational methods for simulating neuronal responses from measured propagating mechanical waves under the skin.	
<i>Teaching Assistant</i>	<i>Sep 2018 – Dec 2022</i>
Taught courses including Machine Learning (ECE 186, ECE 283), Advanced Probability Theory (ECE 235), and Signal Processing (ECE 130B, ECE 160). Created lab materials for a new undergraduate Machine Learning course (ECE 186), emphasizing project-based learning and fundamental pattern recognition concepts.	
<i>Private Tutor</i>	<i>Jan 2019 – Dec 2020</i>
Provided one-on-one tutoring through the Campus Learning Assistance Services program.	
Stony Brook University	Stony Brook, NY
• <i>Intern at Experimental Neuro-Rehab Lab (led by Prof Prithvi Shah)</i>	<i>Sep 2015 – Apr 2016</i>
Interdisciplinary lab researching neurorehabilitation techniques for rodent spinal cord injuries. Developed tools for electrical muscle stimulation (EMS), working closely with engineering and neuroscience teams.	

HONORS & AWARDS

- **Graduate Division Dissertation Fellowship (2024)**: Awarded by the ECE department at UCSB.
- **Outstanding Teaching Assistant Award (2018,2021)**: Awarded by the ECE department at UCSB.
- **Magna Cum Laude (2017)**: Graduated Stony Brook University with an overall GPA of 3.84.
- **University Scholar (2013)**: Enrolled into the 4-year scholar program at Stony Brook University.

REFEREED CONFERENCE & JOURNAL PUBLICATIONS

- [1] Mark Beliaev and Ramtin Pedarsani. “Inverse Reinforcement Learning by Estimating Expertise of Demonstrators”. In: *AAAI Conference on Artificial Intelligence*. 2025. URL: <https://arxiv.org/abs/2402.01886>.
- [2] Mark Beliaev, Payam Delgosha, Hamed Hassani, and Ramtin Pedarsani. “Efficient and Robust Classification for Sparse Attacks”. In: *IEEE Journal on Selected Areas in Information Theory* (2024). DOI: [10.1109/JSAIT.2024.3397187](https://doi.org/10.1109/JSAIT.2024.3397187).
- [3] Mark Beliaev, Negar Mehr, and Ramtin Pedarsani. “Pricing for multi-modal pickup and delivery problems with heterogeneous users”. In: *Transportation Research Part C: Emerging Technologies* (2024). DOI: <https://doi.org/10.1016/j.trc.2024.104864>.
- [4] Mark Beliaev*, Andy Shih*, Stefano Ermon, Dorsa Sadigh, and Ramtin Pedarsani. “Imitation Learning by Estimating Expertise of Demonstrators”. In: *ICML International Conference on Machine Learning*. 2022. URL: <https://proceedings.mlr.press/v162/beliaev22a>.
- [5] Mark Beliaev, Erdem Biyik, Daniel A. Lazar, Woodrow Z. Wang, Dorsa Sadigh, and Ramtin Pedarsani. “Incentivizing Routing Choices for Safe and Efficient Transportation”. In: *ACM/IEEE International Conference on Cyber-Physical Systems*. 2021. DOI: [10.1145/3450267.3450546](https://doi.org/10.1145/3450267.3450546).
- [6] Woodrow Z. Wang*, Mark Beliaev*, Erdem Biyik*, Daniel A. Lazar, Ramtin Pedarsani, and Dorsa Sadigh. “Emergent Prosociality in Multi-Agent Games Through Gifting”. In: *IJCAI International Joint Conference on Artificial Intelligence*. 2021. DOI: [10.24963/ijcai.2021/61](https://doi.org/10.24963/ijcai.2021/61).

CONFERENCE VERSIONS & WORKSHOP PROCEEDINGS

- [7] Mark Beliaev, Victor Yang, Madhura Raju, Jiachen Sun, and Xinghai Hu. “Optimizing GPT for Video Understanding”. In: *ICLR Workshop on Deep Generative Model in Machine Learning: Theory, Principle and Efficacy*. 2025. URL: <https://arxiv.org/abs/2502.09573>.
- [8] Mark Beliaev, Payam Delgosha, Hamed Hassani, and Ramtin Pedarsani. “Efficient and Robust Classification for Sparse Attacks”. In: *IEEE International Symposium on Information Theory*. 2022. DOI: [10.1109/ISIT50566.2022.9834832](https://doi.org/10.1109/ISIT50566.2022.9834832).
- [9] Mark Beliaev, Negar Mehr, and Ramtin Pedarsani. “Congestion-aware Bi-modal Delivery Systems Utilizing Drones”. In: *ECC European Control Conference*. 2022. DOI: [10.23919/ECC55457.2022.9838052](https://doi.org/10.23919/ECC55457.2022.9838052).
- [10] Mark Beliaev*, Woodrow Z. Wang*, Daniel A. Lazar, Erdem Biyik, Dorsa Sadigh, and Ramtin Pedarsani. “Emergent Correlated Equilibrium”. In: *RSS Workshop on Emergent Behaviors in Human-Robot Systems*. 2020. URL: <https://iliad.stanford.edu/pdfs/publications/beliaev2020emergent.pdf>.

TECHNICAL SKILLS

- **Languages:** Python, Matlab, C++, SQL
- **Deep Learning, RL & Data Tools:** PyTorch, TensorFlow, Docker, Apache Spark, Hugging Face, TRL, Accelerate, DeepSpeed, Gym, Stable-Baselines, RLlib, Ray, Scikit-learn, W&B, hydra, NumPy, Pandas