

RAUNIT KOHLI

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RESEARCH INTERESTS

Reinforcement learning for autonomous robotic behavior, multi-agent systems, sim-to-real transfer, bio-inspired exploration-exploitation dynamics, and agentic AI applications for software engineering.

EDUCATION

University of California – San Diego

09/2020 – 12/2023

Bachelor of Science, Machine Learning and Neural Computation

Major GPA: 3.91/4.0

Minor: Computer Science; **Program of Concentration:** Philosophy

Awards: President & Recruitment Advisor – Phi Sigma Pi National Honor Fraternity; Provost Honors (Warren College)

PUBLICATIONS

I. Jackson, **R. Kohli**, E. Leonardis, V. R. de Sa, S. Fei, L. Quinn, Y. Lou, A. A. Chiba. “Explore-Exploit Behaviors During Rat-Robot Interactions Optimize Social and Spatial Security.” *2025 IEEE International Conference on Development and Learning (ICDL)*, 2025. [\[Paper\]](#)

E. J. Leonardis, L. Breston, R. Lucero-Moore, L. Sena, **R. Kohli**, L. Schuster, L. Barton-Gluzman, L. K. Quinn, J. Wiles, A. A. Chiba. “Interactive neurorobotics: Behavioral and neural dynamics of agent interactions.” *Frontiers in Psychology*, Sec. Cognitive Science, Vol. 13, 2022. [\[Paper\]](#)

I. Jackson, **R. Kohli**, R. Lucero-Moore, Y. Lou, L. K. Quinn, L. Breston, J. Wiles, A. A. Chiba, E. Leonardis. “Robotic Exploratory Control Via Subcortical Oscillations.” *11th International Brain-Computer Interface Meeting*, 2025 (Abstract). [\[Paper\]](#)

RESEARCH EXPERIENCE

Robotics Using Bayesian Inference Lab – UC San Diego

San Diego, CA

Machine Learning Research Consultant [\(Published\)](#)

09/2024 – Present

- Architected composable spatial and neural signal analysis pipeline and presented IEEE ICDL 2025 publication (2nd author) on explore-exploit dynamics in rat-robot social interactions, characterizing homebase-derived proxemic features for social behavior.
- Developing bio-influenced deep RL regulation framework in MuJoCo simulation using multiple policy optimization algorithms to model exploration-regulation dynamics in autonomous robotic behavior.
- Founding engineer hired for multi-million dollar AI-powered classroom project; designed PTPv2-synchronized multi-modal embedded system achieving sub-second synchronization across all data streams, integrating Lab Streaming Layer (LSL) and high-precision Basler cameras.
- Wrote custom Arduino firmware for OpenBCI Emotibit biophysical sensors to capture and stream biophysical signals within the synchronized classroom recording architecture.
- Hired, onboarded, and trained team of undergraduate research assistants on lab protocols, software systems, and analysis methodologies; conducted exhaustive knowledge transfer sessions with new hires.

Staff Machine Learning Research Engineer [\(Published\)](#)

01/2021 – 09/2024

- Spearheaded implementation of Reinforcement Learning algorithms in PyTorch for robotic PiRat over ROS2, utilizing extensive neural and positional data from 2500+ multi-agent experiments to model and predict multi-agent interaction dynamics.
- Developed live multi-agent pose estimation system using SLEAP neural networks with multi-threaded architecture.
- Built real-time Homebase Detection Algorithm with convolution feature extractor for novel experiment apparatus; autonomous homebase-influenced behavioral routines simulated and transferred via sim-to-real pipeline to physical PiRat velocity commands.
- Enhanced and scaled production-deployed Computer Vision-based live Pose-Estimation Software in C++ to validate statistical accuracy of Kinect Tracker, introducing new features and parameter logging, leading to 300% processing speed improvement.
- Developed signal processing applications for live and post analysis, leveraging advanced filtering techniques to enhance identification of stress-inducing behaviors from neural and physiological signals (HRV, PPG) of project subjects.
- Built data visualization and statistical analysis pipelines for cleaning, wrangling, and interpreting multi-modal experimental datasets, producing publication-ready figures and results.

INDUSTRY EXPERIENCE

Rocket Software

Boston, MA

Machine Learning Software Engineer III

09/2024 – Present

- Owns core features of Rocket EVA™ AI platform: sanitized RESTful API, end-to-end OIDC authorization, streaming telemetry, async MCP tool execution engine, and structured Docker deployment for company-wide release.
- Built SAS-to-Python code translation tool on specialized team using DSPy ReAct agent, collaborating on Agentic Context Engineering (ACE) optimization framework; created multi-agent workflows for architecture design, test generation, and automated code execution refinement with MLflow evaluation.
- Designed and implemented novel Large Language Model Citation Generator for SmartChat™ using multi-Gaussian clustering algorithms and dynamic content similarity techniques, yielding 80% more relevant document references for production-grade RAG model.
- Developed proof-of-concept few-shot LLM prompting framework to translate natural language queries into executable SQL, integrating regex-based syntax validation, enhancing table-based document retrieval and question answering.
- Performed experimental process of fine-tuning, testing, and evaluating multiple transformer-based sentence embedding models with custom tokenizers to balance keyword relevance and semantic similarity for improved document reranking.
- Deployed RESTful API endpoint for user query feedback in parallel collaboration with cross-functional teams against time-critical deadline, enabling immediate customer feedback for gold-standard dataset creation.
- Led technical engagement with trial customers, producing tracked product environments and capturing actionable feedback to advance model iterations.
- Utilized AWS CloudWatch and developed multi-purpose scripts to parse and analyze on-going trial logs, enabling proactive troubleshooting and data-driven responses to customer requests.

IBM (International Business Machines)

San Jose, CA

Automation and Testing Developer Intern

06/2023 – 09/2023

- Scripted in Ruby to automate API endpoint testing for entire IBM Aspera on Cloud Workflows application designed to automate workflows of global content transfer and exchange across on-premises and multi-cloud environments.
- Developed and documented comprehensive automated regression framework with 780+ API tests covering all endpoints.
- Identified 15+ critical issues and bugs on live production server, communicated with developers to determine ideal expected behavior, and raised issues in project management tools to expertly report relevant failure details.
- Executed full development cycle to outline and implement API Endpoint Test Controller for collaborative QA repository.
- Contributed to global company-wide hackathon focused on emerging enterprise-ready watsonx AI platform.

Rocket Software

Boston, MA

Software Engineering Intern

06/2022 – 09/2022

- Launched project building foundational Unit Test regression framework to maximize Code Line Coverage.
- Achieved over 30% Line Coverage in live code base, surpassing initial annual Objective and Key Result goal of 10% and identifying multiple redundant external dependencies.
- Designed and presented operational model and corresponding research plan to implement Reinforcement Learning into MultiValue Database Performance tracking tool for predictive data analytics and error identification.
- Piloted BASIC and Rocket Tools training series with senior engineer for MultiValue intern team by using Agile Workflow to deliver lesson plans highlighting introductory coding techniques for REST API and demonstrating Rocket products.

Yonder Dynamics

San Diego, CA

Software Team Programmer

09/2020 – 01/2021

- Researched and implemented robot path following algorithms for autonomous Mars rover exploration utilizing Hermite Splines, Pure Pursuit, and Trajectory Motion Profiling for the National University Model Rover Challenge.

TEACHING EXPERIENCE

Rocket Software

Boston, MA

AI Enablement Lecture Series Creator & Instructor

2024 – 2025

- Create and deliver AI foundations lecture series for company apprenticeship program at global offices, achieving 100% content application rate; leading coordination of enterprise-wide AI enablement program for 1800+ engineers.
- Lecture series covers GenAI foundations, understanding LLMs at a technical level, prompt engineering, model tuning, workflow building, and AI-assisted coding.

- Workshops based around solving real-world problems and optimizations on existing Rocket engineering teams, resulting in high cross-team satisfaction with useful fixes to product management systems.

UC San Diego – Cognitive Science Department

San Diego, CA

Data Science Teaching Assistant (COGS 108)

09/2022 – 12/2023

- Created weekly section presentations, podcasted to 800+ students, for content review and interactively guiding students at all coding-experience levels through programming assignments by demonstrating live debugging and problem-solving.
- Formulated weekly exams, held tutoring sessions, scripted automated grading pipelines to optimize multi-LMS system.
- Instructed on systematically leveraging Exploratory Data Analysis techniques to answer complex data-focused questions.

Grafton High School (Massachusetts)

VEX Robotics Competition Coach

- Mentoring competitive VEX Robotics team in autonomous path planning algorithms including PID control, cubic spline trajectory generation, odometry-based localization, and sensor fusion.

HIGHLIGHTED PROJECTS

VLM-Guided Hierarchical RL in Habitat-Lab (WPI, 2024) – Hierarchical PPO/SAC for Fetch robot with VLM high-level planner for autonomous navigation and manipulation from language instructions; [details](#).

Smart Scrum Master – Rocket.Build 2025 “Most Innovative” Winner – LLM-powered Agile assistant and MCP Server optimizing Jira workflows via reasoning agent, winning 1 of 6 awards from 650+ global projects; [details](#).

NeuroPos Composable Analysis Pipeline (Chiba Lab) – Built modular Python pipeline for integrated pose-estimation and neural signal data analysis across 2500+ experimental sessions, producing publication-ready visualizations and statistical results.

TECHNICAL SKILLS

Languages: Python, C++, C, Ruby, Java, SQL, Bash

Libraries & Frameworks: PyTorch, DSPy, LangChain, HuggingFace, MLflow, Pandas, NumPy, SciPy, Scikit-learn, Kivy, OpenBCI

Domains: Reinforcement Learning, Multi-Agent Systems, Agentic AI, Natural Language Processing, Computer Vision, Sim-to-Real Transfer, Policy Optimization (PPO/SAC), Signal Processing, Pose Estimation, Neurorobotics, Embedded Systems

Tools & Platforms: ROS2, MuJoCo, SLEAP, Habitat-Lab, Docker, AWS (CloudWatch), Kubernetes, Git/GitHub, Atlassian Suite (Jira, Confluence), Arduino, PTPv2, Lab Streaming Layer (LSL)

RELEVANT COURSEWORK

Deep Learning for NLP • Neural Networks • Data Modeling • Advanced Topics in LLMs • Supervised & Unsupervised Machine Learning • Data Structures & Algorithms • Reinforcement Learning (WPI)

LEADERSHIP & SERVICE

Phi Sigma Pi National Honor Fraternity – President & Recruitment Advisor, Zeta Alpha Chapter (UCSD). Increased membership by 250% over two recruitment cycles. Represented chapter at [2022 PSP National Convention](#) in Washington, DC.

Provost Honors – Warren College, UC San Diego.