# Milena Rmus

github.com/MilenaCCNlab | milena_rmus@berkeley.edu | Munich, Germany

## EDUCATION

**University of California, Berkeley** Aug. 2019 – May 2024
PhD, Cognitive Science Berkeley, CA

**Brown University** Aug. 2014 – May 2018
BS, Cognitive Neuroscience (Magna Cum Laude) Providence, RI

## EXPERIENCE

**Helmholtz Institute for Human-Centered AI** May 2024 – present
Research Scientist Munich, Germany

- Led a team of researchers to develop and test LLM-based approaches for reverse-engineering interpretable algorithms from behavioral data
- **Applied prompt engineering and quantitative model evaluation techniques to systematically improve prediction accuracy and interpretability of LLM-generated models**
- Published a proof-of-concept framework demonstrating that LLM-generated cognitive models can **outperform literature baselines in accuracy and parsimony**

**Lawrence Livermore National Laboratory** May 2022 – Aug. 2022
Data Science Intern Livermore, CA

- Optimized amino acid sequences as mathematical expressions using Pareto optimization in Deep Symbolic Regression
- **Achieved a 2+ term reduction in model complexity while preserving performance**
- Built random forest classifiers (AUC = 0.88) to predict compound binding affinity from molecular descriptors

**UC Berkeley** Sep. 2020 – Dec. 2020; Sep. 2023 – Dec. 2023
Graduate Student Instructor (Computational Models of Cognition) Berkeley, CA

- Designed and delivered discussion materials on algorithmic and neural network parallels between cognitive science and artificial intelligence.
- Synthesized advanced course content into accessible formats for diverse student backgrounds.
- Set up and maintained course infrastructure in collaboration with UC Berkeleys Data Lab, deploying Jupyter Notebook servers for interactive, reproducible problem sets.

**Princeton University** Jun. 2018 – Jun. 2019
Research Specialist Princeton, NJ

- Oversaw experiment rollout, cross-site data integrity, and ran fMRI scanning sessions
- **Developed a web app hosted on Amazon Mechanical Turk in JavaScript** (jQuery, jsPsych) to run decision-making experiments, and stored data on Firebase
- Analyzed behavioral data using machine learning tools (SVMs, PCA, and clustering) in Python

## SELECTED PROJECTS

### Using Large Language Models to generate Computational Models of Behavior

- Developed a framework using LLMs (GPT, Llama3, Qwen2.5, R1) to generate executable Python code for cognitive models based on behavior data
- **Achieved proof-of-concept results demonstrating LLM-generated models outperform baseline literature models on prediction accuracy and model parsimony**
- Engineered a feedback loop for automatic scientific error correction and model revision

### Using artificial neural networks for fitting computational cognitive models

- Simulated artificial agents using generative cognitive models (Reinforcement Learning, Bayesian inference) in Python
- Estimated cognitive model parameters with traditional Maximum Likelihood Estimation and Approximate Bayesian Computation as benchmarks. Conducted model comparison using likelihood-based (AIC/BIC) metrics
- **Created and trained custom LSTM and GRU neural networks in Keras/TensorFlow** for cognitive model parameter estimation and model identification. **Achieved 3x higher accuracy and 4x faster performance in parameter estimation, and nearly 2x better accuracy and at least 3x faster speed in model identification compared to traditional methods**

Detailed research interests and publications available **<here>**.

## Technical Skills

- **Languages**: Python (expert), MATLAB (expert), JavaScript (fluent), R (fluent), LaTeX (fluent), SQL (prior experience)
- **Libraries & Tools**: Pandas, NumPy, Scikit-learn, TensorFlow, Keras, PyTorch, Matplotlib, Seaborn, ggplot2, Git, Adobe Illustrator, Procreate