Kerria Pang-Naylor

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Education

Harvey Mudd College — Claremont, CA

B.S., Computer Science and Mathematics, with High Distinction — *Aug. 2021 – May 2025*

- **Major GPA:** 4.00/4.00 (**CGPA:** 3.98/4.00); Emphasis in Data Science, Concentration in Economics; Departmental Honors in Computer Science, Departmental Honors in Mathematics
- **Relevant coursework:** Mathematics of Machine learning [Graduate], Stochastic Processes & Calculus [Graduate], Neural Networks, Combinatorics, Mathematical Data Science & Topic Modeling, Probability, Real Analysis, AI Ethics

Research Experience

ServiceNow Research — Claremont, CA

Contract Research Intern, Student Team Lead (Spring) — *Aug. 2024 – Jul. 2025*

Controllable LLM-enabled Embeddings:

- Developed and evaluated novel methods to inject custom perspective in text embeddings
- Developed flexible experiment pipeline to run and evaluate clustering performance of modified embeddings
- Explored embedding explainability techniques through space alignment methods and feature importances
- Led internal meetings and agendas for team of 6, formed research directions of submitted paper
- Supervisors: Dr. Fabio Casati, Dr. Masoud Hashemi, Dr. Jonathan Chang (HMC Clinic Program)

AMISTAD Lab, Harvey Mudd College — Claremont, CA

Undergraduate Researcher (Advisor: Dr. George D. Montañez) — *Mar. 2023 – Jul. 2025*

Probabilistic Error Guarantees for Abductive Inference:

- Proved two novel probabilistic error guarantees for abductive inference in machine learning tasks
- Established a general framework for selective abduction based on Bayesian Decision Theory; Incorporated results of the algorithmic search framework (ASF) to derive noise-accounting probabilistic bounds
- Led non-advisor team discussions and facilitated team communication and task organization

Model Characterization via Inductive Orientation Vectors:

- Introduced inductive orientation vectors as a novel model-agnostic evaluation method
- Co-developed experiments to quantify information-theoretical metrics (Algorithmic Bias, Entropic Expressivity, and Algorithmic Capacity) of supervised classification models across hyperparameter ranges
- Co-developed framework to generate supervised models and deploy on 10+ large datasets while generating graphs of measured theoretical ML quantities
- Empirically confirmed known theoretical properties such as the bias-expressivity trade-off and algorithmic capacity upper bounds

Bayesian Multi-armed Bandit Modeling of Incentive Misalignments in Science:

- Formalizing incentive misalignment problems in the research community via MAB models
- Adapted stochastic multi-armed bandit theory to construct bounds on expected regret for scientists conditional on particular incentive structures such as grant and scholarship placements
- Corroborated derived bounds with time-series analysis of Google Scholar and citation network datasets; manuscript in preparation

Nonlinear and Complex Systems Research Group, Harvey Mudd College — Claremont, CA

Undergraduate Researcher (Advisor: Dr. Heather Zinn-Brooks) — *May 2022 – Dec. 2023*

Generating opinion distributions from data using binary classification models

- Fitted social dynamics models with Twitter datasets to study mechanics of online political polarization
- Engineered data pipeline for automated extraction, wrangling, and sentiment labeling of textual data
- Trained logistic regression and LSTM-based probabilistic classifiers for opinion estimation
- Presented results at HMC Summer Research Celebration 2022

Awards and Honors

CRA Outstanding Undergraduate Researcher Award, *Computing Research Association* 2025
- Recognized as one of 8 undergraduate students across North American colleges and universities who show outstanding research potential in an area of computing research; selected from hundreds of nominees (2-4 nominees per school)

Class of '94 Award, *HMC Department of Computer Science* 2025
- Annually recognizes top 1–3 graduates judged to have an outstanding record in coursework, research and service

Barry Goldwater Scholarship, *Barry Goldwater Scholarship and Excellence in Education Foundation* 2024
- National merit-based scholarship recognizing outstanding undergraduates in STEM research and academic achievement

Stavros Busenberg Prize in Applied Mathematics, *HMC Department of Mathematics* 2024
- Annually recognizes one senior student who shows particular promise in the study of applied mathematics

Robert James Prize for Excellence in Mathematics, *HMC Department of Mathematics* 2022
- Annually recognizes 1–3 rising sophomore student(s) for mathematics performance

Rose Hills Foundation Science & Engineering Scholarship, *Rose Hills Foundation* 2022–25

Dean's List, *Harvey Mudd College* 2022–25

Pell Grant, *Federal Student Aid* 2021–25

CAL Grant, *California Student Aid Commission* 2021–25

Publications

* Equal contribution

[1] **Pang-Naylor, K.**, Chen, E., Montañez, G. (2025). Model Characterization with Inductive Orientation Vectors. In Proceedings of the 17th International Conference on Agents and Artificial Intelligence (pp. 670–681). *17th International Conference on Agents and Artificial Intelligence. SCITEPRESS - Science and Technology Publications.* https://doi.org/10.5220/0013304400003890
- Selected as full paper and awarded extended oral presentation slot (25 minutes)

[2] **Pang-Naylor, K.**, Li, I., Rajesh, K., Montañez, G. D. (2024). Probabilistic Error Guarantees for Abductive Inference. In 2024 IEEE International Conference on Future Machine Learning and Data Science (FMLDS) (pp. 153–160). *2024 IEEE International Conference on Future Machine Learning and Data Science (FMLDS). IEEE.* https://doi.org/10.1109/fmlds63805.2024.00038

[3] **Pang-Naylor, K.**, Chen, E., Montañez, G., (in press). Analyzing and Comparing Machine Learning Models via Inductive Orientation. *In International Conference on Agents and Artificial Intelligence.* Springer International Publishing.

[4] **Pang-Naylor, K.**, Manivasagan, S., Zhong, A., Garg, M., Mondello, N., Buckner, B., Chang, J., Mahajan, K., Hashemi, M., Casati, F. Controllable Clustering with LLM-driven Embeddings. *Manuscript submitted for publication at EMNLP 2025.*

Posters & Presentations

- Pang-Naylor K. "Probabilistic Error Guarantees for Abductive Inference." Invited spotlight presentation at: Computing Research Association URA Lightning Talks (Remote), April 2025.
- Pang-Naylor K. "Model Characterization with Inductive Orientation Vectors." Presentation at: 17th International Conference on Agents and Artificial Intelligence, Porto, Portugal, February 2025.
- Pang-Naylor K. "Probabilistic Error Guarantees for Abductive Inference." Presentation at: 2024 IEEE International Conference on Future Machine Learning and Data Science, Sydney, Australia, November 2024.
- Pang-Naylor K. "Probabilistic Error Guarantees for Abductive Inference." Presentation at: 2024 Gulf Coast Undergraduate Research Symposium (GCURS), Houston, Texas, November 2024.

- Pang-Naylor K. "Model Characterization with Inductive Orientation Vectors." Invited spotlight presentation at: Pepperdine University Human-Centered AI Conference, Malibu, California, September 2024.
- Pang-Naylor K., Li I., Rajesh K., Montanez G. "Probabilistic Error Guarantees for Abductive Inference." Poster session at: HMC Summer Research & Scholarship Poster Celebration, Claremont, California, September 2023.
- —, Poster session at: Undergraduate Research USC Poster Symposium, Los Angeles, California, July 2023.
- —, Presentation at: HMC Summer of CS Event, Claremont, California, June 2023.
- Pang-Naylor K., Zinn-Brooks H. "Twitter Generated Information Cascades." Poster session at: HMC Summer Research & Scholarship Poster Celebration, Claremont, California, September 2022.

Teaching Assistantships

Machine Learning (CS158), *Teaching Assistant, HMC* 2025

Data Structures and Program Development (CS070), *Teaching Assistant, HMC* 2024

Differential Equations (MATH082), *Teaching Assistant, HMC* 2022

Industry Experience

Microsoft Redmond, WA

Software Engineer *Aug. 2025 – Present*

Microsoft Redmond, WA

Machine Learning Software Engineer Intern *May 2024 – Aug. 2024*

- Engineered multi-agent LLM system for text auto-suggestions with structured user-feedback process and multi-agent reasoning for complex queries (LangChain, LangGraph, Autogen, TensorFlow)
- Implemented RAG pipeline and supervised fine-tuning on pre-trained OpenAI LLMs for auto-suggestion feature with customer service conversational ettiquette; over 75% mean token accuracy (Langchain)
- Trained and tuned RNN and LSTM networks with chat data for auto-completion prototype (PyTorch)
- Performed data extraction, wrangling, and augmentation for fine-tuning (KQL, Pandas, NLTK, SpaCy)

Technical Skills

Programming Languages: Python, C#, C, C++, Java, R, C, Haskell, MATLAB

Frameworks / Libraries: Autogen, LangChain, LangGraph, Azure OpenAI Service, Scikit-learn, Pytorch, TensorFlow, NLTK, SpaCy, NumPy, Pandas