MICHAEL L. GEIS

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SUMMARY

Math PhD and data scientist with 6 years of experience solving research problems in partial differential equations and quantum mechanics. Interested in all stages of the design, construction, and maintenance of large-scale data pipelines and machine learning models. Excited to join a diverse community of hard workers who share a commitment to leveraging machine learning for the good of all. Seeking positions in the greater Chicago area.

TECHNICAL SKILLS

Languages	python, SQL, git, bash
Libraries	numpy, pandas, sklearn, pytorch, regex, beautifulsoup, seaborn, transformers, NLTK, pyspark
ML Techniques	data collection & cleaning, regression, classification, clustering, deep learning, NLP, error analysis
Other skills	AWS Sagemaker, Databricks, BigQuery, Vim, MS Office Suite

SELECTED PROJECTS

arXiv Mathematics Subject Classifier, (Test it out here), (Github)

- Built an **end-to-end pipeline** predicting the subject of math articles based on title only.
- Deployed model using Huggingface spaces using a Gradio interface.
- Technical skills: Huggingface API, transformers, skmulti-learn, git-lfs, pytorch, fine-tuning NLP models

arXiv Recommender System, (Test it out here), (Github)

- Proposed the project and **led a team** creating a CBF system suggesting similar articles to a user input.
- Based on a k-NN search with respect to cosine distance of transformer embeddings of abstracts.
- Technical skills: Web-scraping, sentence transformers, UMAP, HDBSCAN clustering, BERTopic, git

Stanford CS229 Intro to ML Course, F. 2018 (Solutions to problem sets)

- Topics covered: General linear models, regularization, feature engineering, bias-variance control, SVMs, GDA, k-NN, K-means, PCA, hierarchical clustering, random forests, boosted decision trees, bagging, neural networks

RESEARCH AND TEACHING EXPERIENCE

Graduate Researcher and Teaching Assistant Sept, 2015 - Sept, 2022
Northwestern University Mathematics Department. *Evanston, IL*

- **Communication:** Presented research findings and complex ideas to both technical and non-technical audiences.
- **Complexity Management:** Ability to quickly understand and work with complex, unfamiliar systems with little to no assistance. Can rapidly digest technical writing and communicate it to others.
- **Continuous Learning:** Developed a routine of continuous learning. Extremely comfortable keeping up with the cutting edge of rapidly evolving fields. Willingness to adapt new, state-of-the-art methods.
- **Interdisciplinary Work:** Experience collaborating with teams from multiple disciplines. Can easily communicate and work with statisticians, computer scientists, and domain-specific experts.

EDUCATION

Data Science Bootcamp, Erdös Institute May, 2023 - June, 2023

Mathematics PhD, Northwestern University Sept, 2015 - Sept, 2022
Thesis: Empirical Measures for Integrable Eigenfunctions Restricted to Invariant Curves
Advised by Professor Steven Zelditch
Awarded NSF RTG Fellowship in Geometric Analysis Sept, 2015 - Sept, 2020

B.S. Material Science Engineering, Rutgers University Sept, 2010 - Sept, 2015
Major in Mathematics

PUBLICATIONS

- *Scaling Asymptotics for Ladder Sequences of Spherical Harmonics at Caustic Latitudes*, Pre-print, arXiv:2208.02770.
- *Concentration of Quantum Integrable Eigenfunctions on a Convex Surface of Revolution*, arXiv: 2008.12482, submitted for review, *Journal of Spectral Theory*.