

# Elena Jaramillo Rodriguez, PhD

*Data Scientist | AI Product Engineer*

\* *Secret Clearance (Interim)*

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## Executive Summary

Data scientist and product engineer with experience facilitating cooperation between business, policy, and technical teams. Published researcher in topological data analysis, unsupervised learning, graph theory, and discrete optimization.

## Professional Experience

Aug 2023- **Data Scientist | AI Product Engineer,**

Present *AI and Data Operations at Deloitte Consulting,*

- Designed and deployed end-to-end pipelines that integrate unstructured and tabular data into graph databases for community detection, centrality analysis, etc.
- Lead developer and agile project manager on workstreams of 3–6 devs of production-grade AI/ML tools in Azure and AWS environments.
- Engineered Generative AI applications, including knowledge retrieval (RAG), document-summarization, code generation, and report generation.

June 2022- **Graduate Student Researcher,**

July 2023 *Information Systems and Modeling Group at Los Alamos National Lab,*

- Developed disease-surveillance strategies for epidemiological networks based on discrete optimization techniques
- Developed novel algorithms that are scalable to massive networks (billions of edges)
- Contributed to design, data analysis, visualization, drafting, and review of published paper (citation below)

## Education

2023 **Ph.D., Mathematics,** *University of California, Davis,* Advisor: Dr. Jesus De Loera

2018 **B.A., Applied Mathematics,** *University of California, Berkeley*

## Recent Publications

Journal Articles [1] **E. Jaramillo Rodriguez**, “Combinatorial methods for barcode analysis,” *Journal of Applied and Computational Topology*, Volume 8 (2024) pages 239–270

[2] A. Browne, D. Butts, **E. Jaramillo-Rodriguez**, N. Parikh, G. Fairchild, Z. Needell, C. Poliziani, T. Wenzel, T.C. Germann, S. Del Valle, “Evaluating disease surveillance strategies for early outbreak detection in contact networks with varying community structure”, *Social Networks*, Volume 79 (2024) pages 122-132

## Skills

Programming & Data **Python:** FastAPI, Pydantic, NumPy, Matplotlib, scikit-learn, networkx, networkit  
**SQL:** PostgreSQL, SQLAlchemy, MySQL, SQLite  
**Microsoft:** PowerBI, PowerQuery

Generative AI Hugging Face/Transformers, LangChain, CrewAI, OpenAI models, Gemini models, LLaMA models, embeddings models

Cloud Extensive experience with **Azure**, some experience with **AWS**

DevOps & **Containers:** Docker/Podman (expert), Kubernetes (proficient)

Tooling **Version Control:** Git (GitHub, GitLab)