

# William Beckman

[willbeckman.com](http://willbeckman.com)

[linkedin.com/in/willbeckman](https://linkedin.com/in/willbeckman)

Email : [will@willbeckman.com](mailto:will@willbeckman.com)

Mobile : +1-410-236-7933

U.S. Citizen

*Senior Machine Learning Engineer specializing in applied ML with AB-tested product impact.*

## EXPERIENCE

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### Etsy

Jun 2024 – Present

*Senior Machine Learning Engineer, Ads Search Quality (Ranking & Retrieval)*

*Jan 2025 – Present*

- **PyTorch Ranking Model Migration:** Core contributor to the migration of the second-pass ads ranking model from TensorFlow to PyTorch; built the lifecycle management system for non-weight model state.
  - \* Ramped up on **+2.92% Ads GMS** and **~\$1M/yr** in infrastructure serving cost savings.
  - \* Migrated training from Beam/Dataflow + Vertex AI to Ray: **2–3x** faster training, GPU utilization **~60%** → **~95%**, preprocessing and evaluation runtimes reduced by **60%**.
- **Neural Information Retrieval (NIR) Embedding Model:** Migrated ads retrieval to a neural query-to-listing embedding model, ramping up on **+1.04% Ads GMS** and **+\$4.21M** annualized sitewide GMS.
- **Retrieval Candidate Blending:** Redesigned retrieval blending from greedy to round-robin and doubled candidates sent to the second-pass ranker, resulting in **+\$4.21M** annualized GMS, **+0.61% Ads CVR**, and **+0.26%** sitewide CVR.
- **Semantic Relevance Filtering:** Added a semantic relevance filter in the retrieval layer to suppress low-relevance ad listings. Achieved **+\$4.98M** sitewide GMS with neutral Ads GMS impact; reduced first-page ad irrelevance from **~7%** to **<5%** as measured by an LLM teacher model, meeting the team's product quality goal.
- **Solr Minimum Match Strictness:** Tightened Solr minimum keyword match to 100% for short queries ( $\leq 3$  terms), up from **~60%**. Despite reducing ads click revenue, the relevance improvement drove **+1.33% Ads GMS**, **+1.55% Ads CVR**, and **+\$1.9M** sitewide GMS.

*Machine Learning Engineer, Contractor*

*Jun 2024 – Dec 2024*

### Sabbatical

Apr 2022 – May 2024

*Completed a thru-hike of the 2,194.3-mile Appalachian Trail; pursued independent study and personal projects.*

### Capital One

Jul 2016 – Mar 2022

*Senior Machine Learning Engineer*

*Feb 2019 – Mar 2022*

- **Fraud Detection Models:** Developed and productionized multiple ML models for credit card fraud detection, including a graph-based ring fraud algorithm (**~\$10M/yr** incremental savings), a third-party account takeover model (**>\$15M/yr** in savings), and a risky merchant classifier (**\$5–10M/yr** estimated savings).

*Software Engineer*

*Feb 2018 – Feb 2019*

- **Corporate Strategy Data Pipeline:** Built Spark/Scala pipelines processing 100s of GBs of credit bureau data for the Corporate Strategy division.

*Associate Software Engineer*

*Jul 2016 – Feb 2018*

- **AWS Network Debugger:** Built a Boto3 CLI tool for diagnosing AWS network connectivity issues; adopted company-wide by staff architects.

## EDUCATION

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### Georgia Institute of Technology

Atlanta, GA

*Master of Science in Computer Science - Specialization in Machine Learning; GPA: 3.9*

*Aug 2018 – Dec 2021*

*Relevant coursework: Machine Learning, Reinforcement Learning, Deep Learning*

### University of Maryland, College Park

College Park, MD

*Bachelor of Science in Computer Science*

*Aug 2012 – May 2016*

## PROGRAMMING SKILLS

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**Software/Infrastructure:** Python, Ray, AWS, GCP, Docker, Airflow, git, Scala

**ML/Data:** PyTorch, pyspark, SQL, pandas, numpy, scikit-learn, Databricks, Snowflake, BigQuery