John Graham Reynolds

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Technical Expertise

Coding and Tools : Python, C/C++, SQL, Bash/Zsh, LaTeX, Git, Docker, Linux/macOS/Windows

ML Specializations : NLP (BERT, RoBERTa, T5, FLAN-T5, GPT, etc.), RL (PPO, Q-Learning, DQN, etc.)

ML/AI Frameworks : PyTorch, Hugging Face, MLFlow, LangChain, Gymnasium, SB3, RL Zoo, Scikit-learn, Cirq, etc.

Cloud, Platform : Azure, Databricks, Terraform, Delta Lake, Apache Spark, GitHub/GitLab, VSCode, Colab

Physics, Math : String Theory, Quantum Field Theory, Information Theory, Quantum Computing, General Relativity, Tensor Calculus, Abstract Algebra, Differential Geometry, Complex Analysis, etc.

Key Projects & Publications

CyberSolve-LinAlg - Fine-tuned FLAN-T5 Model *Published on Hugging Face* 2024-2025

- Parallelized multiple Nvidia A100 GPUs to fine-tune FLAN-T5 on Google DeepMind Mathematics dataset, achieving **90.7% accuracy** on linear equation solving benchmarks
- Optimized training pipeline using Nvidia Apex fused kernels for normalization layers and AdamW optimizer, reducing training time and GPU memory overhead
- Implemented distributed training workflow on Azure Databricks processing **2M+** mathematical problems using PyTorch and Hugging Face Accelerate
- **Created novel evaluation dataset** to measure partial correctness in mathematical reasoning, enabling fine-grained analysis of model performance beyond binary accuracy metrics
- Built GPU-optimized inference application using Streamlit, enabling real-time model querying with optimized memory usage and reduced inference latency

Professional Experience

Data & ML Engineer, AI Research Engineer Jan 2022 – *Present*
Vanderbilt University Medical Center - Data Platform Services *Nashville, TN*

- **Spearheaded development of Vanderbilt's first AI Assistant** prototype, architecting enterprise-grade NLP system using DBRX LLM with LangChain RAG on vector-indexed institutional data and production-ready beta inference app
- Architected and manage **$600K annual** Azure cloud infrastructure supporting 100+ Databricks workspaces across Vanderbilt research and corporate departments, serving **400+ analysts, engineers, and data scientists**
- Engineered petabyte-scale data lake using Apache Spark, Azure Data Factory, and Delta Lake with large-scale ETL pipelines processing **150+ data sources** from SQL Server, RESTful APIs, and other systems
- Developed and maintained custom Python pipeline orchestration package with optimized wheel builds, enabling efficient deployment and management of production data workflows across multiple engineering teams
- Built production DataOps and MLOps infrastructure with Docker containers, GitLab CI/CD pipelines, and Terraform
- Led cloud migration from Bicep to Terraform while mentoring **2 engineers I recommended for hire**

Theoretical Physicist Jan 2019 – May 2020
Johns Hopkins University *Baltimore, MD*

- Conducted **quantum black hole research** under Professor David Kaplan, developing novel mathematical approaches to resolve paradox between General Relativity and Quantum Field Theory
- Accelerated research workflows by using Python and Mathematica for solving large systems of nonlinear equations

CLASS Telescope Engineer Sept 2017 – Jan 2019
Johns Hopkins University *Baltimore, MD*

- Designed cryogenic systems for cosmology telescope using Python and SolidWorks, achieving target **temperature of 100mK (-273°C)**
- Deployed telescope infrastructure at 17,000ft research site in Chilean Andes

Education

University of Texas at Austin — Austin, TX
Master of Science in Artificial Intelligence — *Aug 2025 – Dec 2026, expected*

Johns Hopkins University — Baltimore, MD
Bachelor of Science in Physics, Mathematics — *Aug 2016 – May 2020*

Awards & Recognition

Johns Hopkins Bloomberg Distinguished Professor STAR Award — 2018
$4000 research grant, nominated by Professor Charles L. Bennett

Harvard Prize Book — 2015
Excellence in academic achievement and character

Interests

Marathon Running — 640 miles in 2025
Top 15% Derby Festival miniMarathon, Top 32% San Diego Marathon