John Graham Reynolds

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Technical Knowledge

Languages, CLI : Python, C/C++, SQL, Bash, Zsh, Pwsh, Mathematica, LaTeX

Libraries, Frameworks : PyTorch, Hugging Face:{Transformers, Accelerate, Datasets, Evaluate}, Nvidia Apex, MLFlow, LangChain, Spark, Pandas, Numpy, Scikit-learn, Matplotlib, Cirq, Gradio, Streamlit, Poetry, etc.

Cloud and Tools : MS Azure, Terraform, Delta Lake, Docker, Databricks, Git{Hub,Lab}, Google Colabs, VSCode, etc.

OS, CPU, GPU : Linux, macOS, Windows | {ARM, AMD}64 CPUs | Apple Silicon, Nvidia {Volta, Turing, Ampere} GPUs

LLMs,Tokenizers: T5, FLAN-T5, BERT, RoBERTa, GPT-{2,3,4}, Meta Llama, DBRX, Claude | BPE, WordPiece, Unigram

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

Professional Engineering Experience

Data, Machine Learning Engineer Jan 2022 – *Present*
Vanderbilt University Medical Center *Remote – Nashville, TN*

- Designed custom Python APIs and large-scale ETL pipelines using Apache Spark, Azure Data Factory, Databricks, Delta Lake, and high-performance computing techniques (clustering, asynchronous threading, etc.) to engineer a multi-TB data lake
- Created AI/ML applications like the first-generation **Vanderbilt AI Assistant** chatbot; supervised the distributed training of transformer-based neural models with various ML frameworks while embedding VUMC-specific data for vector search and RAG
- Built, optimized, and maintained multi-platform Docker containers and virtualization environments, GitLab CI/CD pipelines, project Python wheels, SQL Server databases, underlying VMs of various system infrastructure, and more
- Developed VUMC's Azure cloud infrastructure with Bicep before translating and migrating platform to Terraform
- Initiated, led, and owned countless projects while regularly pair programming and mentoring recommended new-hires

Research - AI, Mathematical Physics, etc.

AI Research Engineer, Mathematical Physicist Jan 2022 – *Present*
Vanderbilt University + Vanderbilt University Medical Center *Nashville, TN*

- Parallelized multiple Nvidia A100 GPUs to train and publish **CyberSolve-LinAlg**, a downstream version of the FLAN-T5 LLM fine-tuned on the Google DeepMind Mathematics dataset, achieving a 90.7% benchmark on solving linear equations
- Trained and published other ML models for diverse tasks: **RoBERTa-base-DReiFT** for the text classification of 805 medical conditions, **DistilBERT-DeNiro** for domain-adapted masked language modeling, and more - ** models on Hugging Face **
- Put out issues and *contributed bug fixes to open-source deep learning libraries* like Hugging Face Transformers, Evaluate
- Studied String Theory, Quantum Field Theory, and Quantum Information Theory while attending seminars, conversing with various Vanderbilt faculty, and solving hundreds of problems from renowned graduate texts - ** solutions on GitHub and HF **
- Used Cirq to code and implement various quantum computing algorithms (Deutsch, Deutsch-Jozsa, Grover's Search) while studying Quantum Information Theory
- Added experimental mathematical tooling to the inference of Anthropic's Claude by using Python and Bash to compile the model's LaTeX formatted text responses into fully formatted LaTeX PDFs

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

- Conducted theoretical physics research on the quantum nature of black holes in an attempt to rectify paradox between General Relativity and Quantum Field Theory under the direction of Professor David Kaplan
- Wrote Python and Mathematica code to expedite the analytical solving of large systems of highly non-linear equations

CLASS Telescope Scientist, Engineer Sept 2017 – Jan 2019
Johns Hopkins University | https://sites.krieger.jhu.edu/class/ *Baltimore, MD*

- Used Python and SolidWorks in the development of the cryogenic refrigeration and the cryostat optical filters of a large cosmology telescope, helping focal planes and transition-edge sensors reach near-absolute zero (100mK, -273 C)
- Traveled internationally with faculty to install the CLASS telescope at research site atop Chilean volcano (17000 ft)

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, Honors

Johns Hopkins University Bloomberg Distinguished Professor STAR award 2018
$4000 award to conduct summer research, nominated by JHU Bloomberg Distinguished Professor Charles L. Bennett

Harvard Prize Book 2015
"The winners of this award ... exemplify Harvard's commitment to excellence."