# HENRY DEUTSCH

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## EDUCATION

**Johns Hopkins University | B.S. in Computer Science**, minor in Robotics | Baltimore, MD **Expected May 2025**
**Courses**: Data Structures, Algorithms, Intermediate Programming (C++), Computer System Fundamentals, Computer Graphics, Full-Stack JavaScript, Artificial Intelligence, Machine Learning, ML: Deep Learning, Practical Generative AI, Calculus III, Physics II
**Awards**: Placed 3rd / 43 teams in HopHacks (Hackathon) 2022 with this project

## WORK EXPERIENCE

**KnoWhiz |** *Software Engineering Intern* May 2024 - Sep 2024
Summary: Developed full-stack features for 1.1v of the LLM-based AI Learning platform with personalized courses
- Led development of full stack features across **React** and **TypeScript** frontend, **Java** backend. One such feature allowed users to transfer an existing Quizlet flashcard set into a native KnoWhiz flashcard set; developed an explore page and led **SEO** track
- Designed and implemented **RESTful APIs** in **Java Spring Boot** to fetch and serve **JSON data** to the front-end
- **Mentored** a junior front-end developer in **React** and **TypeScript.** Helped with bug fixes, learning resources, pull requests, etc.

**Helpful Engineering |** *Web Development Intern* May 2024 - Sep 2024
Summary: Led development of an internal platform that allows other devs to work on open projects requiring technical expertise
- Developed **React** components and optimized deployment workflows using **CI/CD** processes with **AWS Amplify**
- Created dashboard, sign-up, sign-in pages from scratch with **React** and **JavaScript** for their 2.0 website
- Proactively researched and evaluated alternative tooling for Figma-to-frontend development workflows including AWS Amplify, Figma plugins, and Cursor.ai. Delivered presentation to software engineering teams across Helpful

**National Institute of Standards and Technology (NIST) |** *Software Engineering Intern* May 2023 - Aug 2023
Summary: Developed full-stack app to analyze video taken from disaster relief sites by NIST for statistical analysis
- Developed a **Python** and **SQL** backend and **Dash** frontend, following a 2-week **agile sprint** cycle using **Scrum** methodology
- Led revision of **SQL** database for uploading broader data, and of Dash UI to support text queries and more video analysis features
- Integrated **transformer**-based **deep neural network** model in back-end to run data science analyses of structured audio data

**FinMark Partners |** *Software Development Intern* May 2022 - Aug 2022
Summary: Contributed to frontend of the company website, and developed HTML emails for FinMark's clients
- Translated Figma design mockups into web components using **React** and **JavaScript**, adhering to mobile-first design principles
- Used **Salesforce CRM** to develop and manage HTML email campaigns targeting FinTech firms, which collectively converted 1k+ clicks and pageviews. Optimized Click-Through Rate (CTR) by 3% with **A/B testing**

**Freelance |** *Full Stack Developer* Sep 2021 - Aug 2022
Summary: Created a personal site and learning platform for Vincent Dunn, a Ret. Chief of the NYC Fire Dept
- Used custom script in **Java** to dynamically and automatically generate **HTML** and **CSS** with content from the book
- Developed an interactive quiz page with **React** and **JavaScript**, content page for learning, and an about page from scratch
- Improved **SEO**, increasing traffic from <100 to 2.2k visits per mo. Enhanced SEO led to >50% increase in book sales for client

## SOFTWARE PROJECTS

**C++ Ray Tracing Engine**
- Architected high-performance ray tracing engine with **C++**, **OpenGL** acceleration, and **multithreaded** parallel computation.
- Engineered 3D rendering using computational geometry, **GLSL** shader-based rendering pipeline, and intersection algorithms.
- Developed Phong illumination with quaternion camera controls, bilinear **texture mapping**, and ray-traced shadow systems.

**N-Body Orbit Simulations**
Studied **Artificial Intelligence** & **Machine Learning** tools to create a compressed numerical representation of simulated orbit paths
- Built **convolutional, dense, autoencoder** neural networks with **PyTorch**; Used **Scikit-Learn**, **Numpy, NEMO** to model orbits
- Classified orbit paths by their latent space in the NN with **K-means, Hierarchical, Agglomerative** clustering methods in **Python**
- Integrated **EC2 AWS Cloud** service for development of scalable machine learning models

## TECHNICAL SKILLS

**Languages**: Python, JavaScript, TypeScript, Java, C++, SQL, HTML, CSS
**Web Dev**: React, Node.js, Express.js, MongoDB (MERN stack), Next.js, Tailwind
**Other Software**: Git, GitHub, Unix/Linux, Docker, Dash, PyTorch, AWS DevOps, AWS Amplify, EC2