

Education

BSc (Honours) in Data Science & Artificial Intelligence, *University College Cork*, Ireland

Experience

Oct 2025 – **Insight SFI Research Centre**, *Undergraduate Researcher*, Ireland

- Present ○ Investigating World Models for continuous and multi-task reasoning, developing prototypes to validate theoretical concepts
- Collaborating with IBM and UCD on [ToolBrain](#) to formulate architectures for RL-optimized agentic tool-use and autonomous reasoning.

Jun–Aug 2025 **University College Cork**, *Web Development Intern*, Ireland

- Re-engineered the booking system into a dynamic JavaScript Single-Page Application, replacing a fragmented multi-page vendor workflow.
- Implemented a FastAPI proxy for data transformation and secure third-party integration, deploying the full stack on Google Cloud.

Projects

HERMES: Hybrid Exoplanet Recognition and Multi-planet Extraction System

Python, JAX, Flax, Gin-Config, Abseil, NumPy, Astropy

- Designed a hybrid exoplanet detector from light curves, combining transformer models with physics-based orbital checks
- Engineered reproducible JAX/Flax pipelines (Gin/Abseil) with deterministic evaluation, achieving 5ms inference and 70% accuracy.

High-Performance Text Summarizer

Flan-T5, JAX/Flax, XLA jit/pmap, Mixed Precision, Google Cloud TPU

- Optimized Flan-T5 fine-tuning on TPUs by implementing XLA JIT compilation, mixed precision, and sharded inputs
- Architected a containerized Google Cloud (GKE/TPU) deployment architecture with a high-throughput streaming data pipeline for low-latency APIs

MiniGrad: Reverse-Mode Autodiff Engine

Python, PyTorch, MLflow, Docker, PyQt

- Implemented a compact PyTorch-style autodiff engine with reverse-mode differentiation, broadcasting support, dynamic computation graphs, and a minimal neural-network layer API

Attnax: Modular Transformer Library for JAX

Python, JAX, Flax

- Developed a lightweight JAX/Flax library for composable Transformer building blocks, enabling rapid prototyping and development of custom architectures.

Extracurriculars

Jan–Oct 2025 **Avionics ML Engineer**, *UCC Rocketry*, Cork, Ireland

- Adapted two foundational computer vision models (modified Faster RCNN & Pyramid Vision Transformer)
- Orchestrated a complete MLOps pipeline, leveraging transfer learning (xView, DINOv2) and reducing model deployment time by 40%

Oct 2024 **Team Leader**, *Microsoft Cybersecurity Hack 2024*, Dublin, Ireland

- Led a team to secure 3rd place (out of 10) by identifying and presenting critical vulnerabilities in an Azure Database security assessment

Skills & Technologies

Programming Python, C/C++, Java, Go, Rust, Bash

ML PyTorch, TensorFlow, JAX/Flax, Transformers, NumPy, Pandas, Scikit-learn, XGBoost, MLflow

System & DevOps PostgreSQL, MySQL, SQLite, MongoDB, Docker, Kubernetes, AWS, GCP, GitHub Actions, Colab, FastAPI, Flask, Django, REST APIs, HTML/CSS/JS