Daniel De Dios Allegue

+34 638240707 danieldediosallegue@gmail.com linkedin.com/in/danielallegue github.com/daniallegue

Education

University of Cambridge **October 2026 – June 2027**
MPhil Advanced Computer Science (Incoming) *Delft, NL*

Royal Institute of Technology, KTH **August 2024 – February 2025**
*Exchange, Minor in Applied Mathematics. (**Grade: A**)* *Stockholm, SE*

Coursework: (Postgraduate) Probability Theory, Stochastic Simulation and Reinforcement Learning. A1 in Swedish.

Delft University of Technology **September 2022 – June 2025**
*BSc Computer Science + Applied Maths. Graduated **Cum Laude**.* *Delft, NL*

Coursework (Data Variant): OOP, Algorithms & Data Structures, Algorithm Design, Machine Learning, Probability and Statistics, Linear Algebra, Software Engineering Methods, Measure Theory, PDEs, Optimization, Quantum Information, Collaborative Artificial Intelligence. Thesis awarded a **9.5/10**.

Publications

Daniel De Dios Allegue, Jinke He, Frans A. Oliehoek. *Scaling Transformer-Based World Models with Learnable Structural Mechanisms.* **In Review**, 2026

Daniel De Dios Allegue, Jinke He, Frans A. Oliehoek. *Learning to Focus: Prioritizing Informative Histories with Structured Attention Mechanisms in Partially Observable Reinforcement Learning.* **NeurIPS, Workshop on Embodied World Models for Decision Making**, 2025.

Research Experience

Table Representation Learning Lab @ Centrum Wiskunde & Informatica **October 2025 – Current**
Research Assistant *Amsterdam, NL*

- Working on addressing attention dilution and attention sinks in Tabular Foundation Models (TFMs) under the supervision of Dr Madelon Huselbos.

Sequential Decision Making Group @ TU Delft **April 2025 – February 2026**
Research Assistant *Delft, NL*

- Research in inductive biases and theoretical bounds of attention mechanisms in Transformer-based world models under the supervision of Prof. Frans Oliehoek.
- Implemented and optimized learnable attention spans in PyTorch by parameterizing span tensors with softplus transforms, embedding computations directly into the multi-head attention forward pass, and writing unit tests to verify end-to-end gradient flow, yielding fully differentiable, efficient attention masks with negligible overhead.
- Designed, executed, and debugged large-scale research experiments using distributed computing frameworks and High-Performance Computing (HPC) clusters (200+ GPU days).

Professional Experience

Google **July 2025 – October 2025**
Software Engineering Intern, Video AI Mobile Team (Google Meet) *Stockholm, SE*

- Designed and developed an application to streamline the bug diagnosis for Bluetooth audio routing, reducing testing setup times by an estimated 91%.
- Proposed a new paradigm change to implement an automated testing suite to prevent errors related to the Original Equipment Manufacturers (OEMs) personalization layer in the Bluetooth Stack, potentially involving 5+ teams across different organizations.
- Implemented logic to differentiate wearable devices from standard Bluetooth devices and designed a user-friendly interface in collaboration with UX teams, improving user experience and explainability regarding watch device connectivity for more than 300 million users.

Lufthansa Group, Open Grant **April 2024 – July 2024**
Software Engineer Intern *Delft, NL*

- Designed a microservice using Django to extract multiple fields from grant documents, ranging from budgets to titles and descriptions, by implementing a modular and sequential pipeline with Meta's Hydra framework and diverse NLP methods like a finetuned BERTopic model to categorise grant documents into a set of classes.

- Carried out an exhaustive evaluation process to measure the correctness and reliability of the extracted fields by combining automatic evaluation metrics such as F1-score to measure the quality of summarization methods, reaching an average score of 0.772 on the evaluation dataset.
- Implemented a continuous testing strategy by creating unit, integration and mutation tests with frameworks like unittest and pytest, achieving over 95% line coverage and a 98% average mutation score across all repositories.

Team Epoch **February 2024 – July 2024**

Research Engineer *Delft, NL*

- Collaborated with researchers in the Dutch National Archive to design and develop a novel narrative map generator proof of concept over a database with more than 120,000 documents by implementing advanced data mining algorithms such as Node2Vec to create graph embeddings and enhance the dataset properties.
- Constructed and fine-tuned a Latent Dirichlet Allocation (LDA) model to extract topics from a large document corpus and compute the topical similarity between document clusters, achieving a coherence measure of 0.84 and creating a meaningful set of topical clusters within the dataset.
- Participated in a NeurIPS competition to predict chemical bindings with a dataset of over 98 million molecules, achieving a top 9% result.
- Led the development of Graph Neural Network models to represent molecules, reducing the training time by about 95% by replacing Convolutional layers with Transformer layers and designing a new library module to train Pytorch networks with custom graph datasets and multi-GPU programming with CUDA.

Technical Skills

Languages and Frameworks: Git, Java (JavaFX, Spring Boot), Kotlin, Python (Pandas, NumPy, SciPy, Sklearn, NLTK), C++, JavaScript (React, Express, Node), Typescript, TensorFlow, Keras, JAX, PyTorch, HTML, CSS, PostgreSQL, Scala (Spark, Flink), Apache Kafka.
Certifications/Training: ELLIS Foundation Models (FoMo) Winter School @ ELLIS Amsterdam, TensorFlow Deep-Learning Developer Certificate, Computational Methods in Asset Pricing and Optimization Methods by Columbia University, Desing Patterns, Basic AWS, Distributed Computing.