

FIRAS DARWISH

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EDUCATION

University of Oxford

2025 - 2029

Statistics and Machine Learning (PhD)

Rhodes Scholar

- Joint Program with Imperial College London
- Projects: Learning Planning Budgets in **Real-Time Reinforcement Learning**, Representation Learning for Goal-Conditioned **World Model**-based Action Policies

New York University Abu Dhabi

2021 - 2025

Bachelor of Science in Computer Engineering

GPA: 4.000/4.000 - Summa Cum Laude

- NYU Tandon School of Engineering & NYU Stern School of Business Fall 2023
- NYU Shanghai January 2024
- NYU Tandon School of Engineering & NYU Courant Institute of Mathematical Sciences Spring 2024

PUBLICATIONS

- **Firas Darwish**, George Nicholson, Aiden Doherty, Hang Yuan. “**Motion Capture is Not the Target Domain: Scaling Synthetic Data for Learning Motion Representations.**” **Accepted** to DATA-FM @ **ICLR** 2026.
- **Firas Darwish**, Aneesh Muppidi, Dylan Cope, Joao F. Henriques, Jakob Nicolaus Foerster. “**Finding the Time to Think: Learning Planning Budgets in Real-Time RL.**” Submitted for Review.
- **Firas Darwish**, Dhiyaa Al Jorf, Eion Tyacke, Costanza Armanini, Farah E. Shamout, S. Farokh Atashzar. “**Enhancing the Efficiency of Hand Gesture Classification by Harnessing Muscle Synergies.**” **Accepted** to **IEEE EMBC** 2025 (Poster Presentation).
- Leopoldo Lopez, Shaza Elsharief, Dhiyaa Al Jorf, **Firas Darwish**, Congbo Ma, Farah E. Shamout. “**Uncertainty Quantification for Machine Learning in Healthcare: A Survey.**” **Accepted** to **CHIL** 2025 (Poster Presentation).
- **Firas Darwish**, Dhiyaa Al Jorf, Eion Tyacke, Costanza Armanini, Farah E. Shamout, S. Farokh Atashzar. “**Leveraging Agonistic-Antagonistic Coactivation in Single-Grid HDsEMG for Hand Gesture Recognition.**” **Accepted** to **EMBC** 2026.
- Shaza Elsharief, Leopoldo Julian Lechuga Lopez, **Firas Darwish**, Dhiyaa Al Jorf, Mahlet Atrsaw Andargei, Farah E. Shamout. “**Leveraging Agonistic-Antagonistic Coactivation in Single-Grid HDsEMG for Hand Gesture Recognition.**” Submitted for Review.

RESEARCH EXPERIENCE

Applied Artificial Intelligence, University of Oxford

Oxford, UK

Research Placement

Nov 2025 – Present

- Designing representations for robots to **learn from analogy** in offline settings.
- Working with pick-and-place, cube stack, mughang, and drawer task data simulated in **MuJoCo** and collected from teloperation on a **bimanual robot**.

Oxford Wearables Group, University of Oxford

Oxford, UK

Research Placement

Nov 2025 – Present

- **Pretraining** motion time-series models using **synthetic data** and evaluating their {0, 1, 2, 3, 5, 10}-shot transfer across 18 diverse downstream Human Activity Recognition tasks.
- Investigating **scaling laws** properties of pretraining for wearables using real and synthetic motion-capture-derived data.

Center for Artificial Intelligence and Robotics (CAIR), NYU

Abu Dhabi, UAE

Research Assistant

Feb 2024 – June 2025

- Used **PyTorch** and **Lightning** to efficiently conduct experiments, log results, and **schedule multi-GPU and multi-node runs on NYU's High Performance Computing system** to train and evaluate neural networks.
- **MedCAM Project**: Pretrained adaptation module for enriching CXR representations with EHR data using global and contrastive loss, and tested in downstream classification and OOD detection tasks.

- **HD-sEMG Electrode Dropping Project:** Investigated redundant muscle pair activity patterns in the forearm to motivate channel dropping and reduce the computational cost of hand gesture recognition task (utilized ablation studies and GradCAM on different 3D and 4D CNN architectures).
- **Uncertainty Quantification Project:** Conducted literature review with 300+ multimodality, healthcare, and review papers scanned on Covidence.

Engineering Capstone Project

Researcher

Abu Dhabi, UAE

Aug 2024 – May 2025

- **Fusing two modalities:** 1) **sEMG signals** from myoelectric armband with 2) **vision** through pose detection from camera to enhance prediction of user's grasp.
- **Pre-trained multi-kernel CNN** for gesture recognition using EMG signals and **fine-tuned** on new subjects with linear head using **Pytorch**.
- Deployed and **tested system on VR with 6 subjects** through setting up UDP connection between Python scripts and Unity.

Open-Source ML Tools

Developer

Abu Dhabi, UAE

June 2024 - July 2024

- Developed source code for use in machine learning research and projects that is made freely available to all for possible modification and redistribution (**accessed by over 200 GitHub users since release**).
- Published Python package for 3-dimensional convolutional layers using Kolmogorov-Arnold Networks (KANs)
- Published Python package with 4-dimensional implementations of MaxPool, DropBlock, and SpatialDropout.

INDUSTRY EXPERIENCE

e& (Etisalat)

AI and Data Intern

Abu Dhabi, UAE

May 2024 – Aug 2024

- Lead on the **design of 2 AI use cases with UNDP** for sustainable development in the Arab World (climate resilience, service delivery) and identifying data, privacy, and security challenges.
- Defined methodology for monitoring AI impact and **instituted AI governance for 40,000 employees**.
- Developed a GenAI recommendation system on Smiles mobile app, **serving 1.6 million households in the UAE**.

WhiteBox HR

Machine Learning Intern

Abu Dhabi, UAE

May 2023 – Aug 2023

- Designed a fully automated unsupervised ML algorithm to parameterize worker well-being and performance using dimensionality reduction and clustering techniques.
- Fine-tuned an in-house generative AI chat bot as a **Natural Language Interface to DataBase (NLIDB)** used for automatically generating statistics and visualizations from tabular data.
- Deployed solutions are utilized by **30+ companies and over 2,000 employees** across the UAE and MENA region.
- Developed a human-centered framework for data and ML development aligned with government partner needs.

SELECT PROJECTS

Autonomous Vision-Based Line-Following Robot | *Embedded Systems Project*

- Built a **real-time OpenCV pipeline** with weighted centroid detection to robustly track lines under gaps, variable lighting, and textured surfaces.
- Designed **autonomous decision logic** using HSV-based marker detection for dynamic turns, U-turns, and stop signals.
- Implemented obstacle detection, stall recovery, and bang-bang control on **NVIDIA JetBot** for resilient, real-time navigation on obstacle course.

GoogleMeets Transcription Agent | *ML Agents Project*

- Developed an agent that automatically joins GoogleMeets calls, tracks the meeting discussion, summarizes crucial points, and answers questions directly in the chat.
- Built using **Python (Flask, Pipenv, PyTest)**, **Selenium** for web scraping, **Tkinter** for application development, and powered by **Gemini**.

Fall Detecting Watch | *Software Engineering Project*

- Wrote C++ scripts and deployed on M5 using accelerometer and gyroscope data to perceive when device suffers a fall and alert an emergency number via API call.
- Trained ML model to translate wearer's voice to commands to control watch.

Autonomous Water Debris Collection Robot | *Mubadala Competition*

- Designed an object detection and tracking algorithm for a water waste collection robot by training object detection networks (YOLO) and monocular depth estimation networks trained on simulated scenes.

COMPETITIONS

- **1st Place, eBrain Lab Generative AI Competition** - Fine-tuned foundation model to reduce model size and maximize performance on medical question-answer task.
- **2nd Place, Mubadala Water Debris Robot Competition** — awarded **\$8,200** for autonomous vehicle design.
- **3rd place in UAE, IEEEExtreme 17.0 Competition** - 24-hour global competitive programming challenge.
- **Audience Award, NYUAD Hackathon 2023** - Designed FuQdan, a quantum computing algorithm that acts as a binary dementia classifier for MRI scan images.

AWARDS AND HONORS

- **Rhodes Scholarship**, A Partnership between the Rhodes Trust and the Salama Bint Hamdan Al Nahyan Foundation - selected as 2025 UAE Rhodes Scholar and provided full-ride graduate scholarship to Oxford University.
- **Summa Cum Laude**, NYU Abu Dhabi — awarded to **top 5%** of graduating students in Engineering.
- **Outstanding Reviewer**, DATA-FM @ ICLR 2026 — awarded to **2 reviewers** who provided exceptional reviews.
- **NYUAD Post-Graduation Practical Training Funding** — awarded **\$3,200** to work on AI for Clinical Decision-Making.
- **NYUAD Research Funding** — awarded **\$4,000** to work on faculty-supervised research (Summer 2023 & Summer 2024).
- **Founders Day Honors Scholar**, NYU — awarded to top-ranking baccalaureate candidates for academic excellence and scholarly distinction.
- **UAE Golden Visa for Outstanding Students** — granted for ranking among UAE's national academic toppers.