AARUNI ARORA

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EDUCATION

Imperial College London *(Ongoing) Oct 2020 - Jun 2025*
MEng in Biomedical Engineering with a Year in Industry Grade: Expected First Class

- Specialisation in Electrical and Computational Engineering pathway of Bioengineering.
- Relevant Modules: Brain-Computer Interfaces, Reinforcement Learning (RL), Image and Signal Processing, Bioinspired Robotics, Optimisation, Linear Algebra, Probability and Statistics, Modelling in Biology.

Scottish High International School *Apr 2012 – Jul 2020*
International Baccalaureate Diploma Programme Grade: 42/45

RESEARCH EXPERIENCE

Brain and Behaviour Lab at ICL London, UK
Master's Thesis - Final Year Individual Project (full-time) *(Ongoing) Oct 2024 - Jun 2025*

- Facilitated data collection for VR-simulated EEG trials, comparing reward vs sensory error-based learning.
- Conducted comprehensive analyses of event-related potential markers across a minimum of 24 participants.

Ferrari Lab at LSE London, UK
Research Technician (part-time) *(Ongoing) Aug 2024 - Present*

- Supported the management of an interdisciplinary health economics project on 'Violence against Women'.
- Identified and coordinated with potential funders and wrote a grant proposal following their specified criteria.

The Lab for Translational Engineering at MIT and BWH Boston, MA, USA
Research Trainee (full-time) *Jan 2024 - Jul 2024*

- Labelled videos on Boris for machine learning models, attaining >80% inter-rater reliability amongst the team.
- Fabricated and 3D printed a custom lightweight (~100g) EEG headset using SolidWorks (pending publication).
- Adapted the SolidWorks CAD model for a smart pill casing and optimised the PCB design in Altium, integrating a hall effect switch for improved functionality.
- Customised a Python SciPy-based pipeline for the acquisition of heart and respiratory rate signals, denoising, filtering, feature extracting, and visualising them to present to funders.

Vaccine and Immunotherapy Center at Harvard Medical School and MGH Boston, MA, USA
Visiting Research Scholar (full-time) *Jul 2023 - Dec 2023*

- Optimised and standardised protocols for JDRF-funded research on Type 1 Diabetes, increasing reliability.
- Performed confocal imaging of over 100 cell and tissue samples, evaluating them on ImageJ and CellProfiler.
- Executed statistical and graphical analyses with Python, GraphPad, and FlowJo for Flow Cytometry (BD LRSFortessa and Cytek Aurora), contributing to cytokine profiling and transfection assessments.
- Enhanced islet transplantation outcomes in murine models, increasing graft survival from 10 to 30 days through interdisciplinary collaboration.

Interventional Systems Neuroscience Lab at ICL London, UK
UROP at the Dept. of Brain Sciences with UK Dementia Research Institute (part-time) *Nov 2022 - Mar 2023*

- Participated in research on temporal interference in brain stimulations, focusing on murine neuromodulation.
- Trained students on essential lab techniques, including microtome sectioning and confocal imaging.

AWARDS AND HONOURS

First Place at ICL Bioengineering BMI Competition *Mar 2025*
Judge's Choice Award (2nd Position) for ICL Neurotech Hackathon *Jan 2025*
Turing Scheme Grant for Year in Industry *Aug 2023 - Jul 2024*

PUBLICATIONS

Fatma Dogan, Esin Ozkan, Aaruni Arora, et al. "345.3: Immunoisolation and Islet Survival in the Absence of Systemic Immune Suppression Enabled by Co-Delivery of CXCL12 and FasL Containing Microgels in Allo-Islet Transplanted Diabetic Mice." *Transplantation*, vol. 108, no. 9S, Sept. 2024, doi:10.1097/01.tp.0001065724.81662.c2.

ENGINEERING PROJECT EXPERIENCE

Bioinformatics Courseworks *Oct 2022 - Mar 2025*

- Coded a neural decoder in MATLAB implementing EMA, PCA, LDA, soft kNN, and PCR.
- Adapted and edited Dr Finn's Model-Agnostic Meta-Learning (MAML) RL algorithm for a Medium tutorial.
- Applied Dynamic Programming, Monte Carlo and Q-learning (ε-greedy) RL algorithms in Python (VS Code) to maximise drug efficacy while minimising side effects.
- Automated a simulated gene editing and cancer progression application, achieving 100% accuracy in Python.

HeartReach: A Low-Cost Imperial Bioengineering Outreach Kit *Oct 2022 - Jun 2023*

- Innovated an interactive outreach tool utilising Unity Game Engine, Augmented Reality (AR), and Arduino.
- Organised a pilot study in a team of 5, with inputs from outreach experts, demonstrating a ~70% increase in engagement rates for bioengineering-based solutions among GCSE students' post-interaction with HeartReach.

DinoMaze: AR Educational App Development for Cerebral Palsy (CP) Students *Nov 2022 - Jan 2023*

- Collaborated on developing a 3D AR educational app tailored for children (ages 5+) with CP using Unity (C#).
- Programmed an engaging quiz-based maze that aims to improve critical thinking, problem-solving and collaboration skills by at least 5% among children for our client, The Pace Centre UK.

Hydrotherapy Device for Kids with Cerebral Palsy (Co-Project Lead/Manager) *Oct 2021 - Jun 2022*

- Designed an adjustable floatation device for adolescents (≤75kg), aiding sports therapy and social interaction.
- Successfully promoted the mechanical device to 3 potential clients at the National CP Swimming Competition in Nottingham and received positive feedback.
- Coordinated regular meetings, maintained detailed documentation and delegated tasks to ensure effective teamwork among a group of ten.

Electrical Lab Work *Jan 2021 - Mar 2023*

- Created a prototype impedometric pneumometer on a stripboard within five weeks, bolstering debugging skills.
- Partnered to design a stethoscope on OrCAD and built a physical prototype with 80% working efficiency.

LEADERSHIP AND VOLUNTEERING EXPERIENCE

Imperial College London London, UK

Undergraduate Teaching Assistant (part-time) *Oct 2022 - Mar 2025*

- Mentored and addressed queries of ~50 students on topics like PCB assembly in Embedded Systems Labs.
- Led introductory training sessions on Quartus Prime v16, Python and Simulink on MATLAB for ~70 students.

Stint UK London, UK

Hospitality Team Member (part-time) *Nov 2022 - Mar 2023*

- Improved interpersonal and time-management skills in dynamic environments (restaurants, cafes, events).

Poetry Society at Imperial College London London, UK

Vice President (part-time) *Oct 2021 - Jun 2022*

- Boosted society engagement at the college's welcome fair, increasing membership by 7 individuals.
- Organised thematic poetry reading/writing sessions, cultivating a safe and creative space for idea-sharing.

Imperial Bioscience Review London, UK

Student Member (part-time) *Oct 2020 - Oct 2021*

- Authored two articles related to DNA and cancer and collaborated on the report 'Reforestation in Brazil'.

SKILLS

Languages:	Arduino, C#, HTML, LaTeX, MATLAB (EEGLab, Simulink), OpenMV, Python (Jupyter, Matplotlib, NumPy, Pandas, SciPy)
Software:	Altium, Bambu Studio, Canva, FlowJo, FormLabs, GraphPad, GitHub, ImageJ, LAS X, LTSpice, Microsoft Office (Excel, PowerPoint, Word), OrCAD, SolidWorks, Unity, VS Code
Lab:	3D Printing (PLA, Resin), Circuitry, Confocal and Tissue Microscopy, ELISA, Flow Cytometry, Microtome, Silicone Moulding, Oscilloscope, Soldering, Western Blot
Certifications:	Digital Signal Processing and Analysis (*April 2024*); PyTorch for Deep Learning (*Ongoing*)
Interests:	Badminton, Cycling, Dance (Indian Classical – Bharatnatyam), Investing, Taekwondo (Green Belt)