Diogo Amaro

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Education

NOVA School of Science and Technology *Sept 2020 – Present*
Integrated Master's in Biomedical Engineering

- **Coursework:** Mathematical Analysis, Quantum Mechanics, Linear Algebra, Physics, Image Processing, Stochastic Calculus, Signal Analysis, Statistics, Probability Theory and Programming.

University of Glasgow, School of Mathematics and Statistics *Jan 2025 - July 2025*
Master's Thesis

- **Title:** "Statistical Emulation of Complex Cardiac Models using Gaussian Processes"

Publications

Modelling Passive Diastolic Filling of the Left Ventricle *Preprint*
Applied Mathematical Modelling, Elsevier *Oct 2025 (under review)*

Experience

Research Intern *Glasgow, Scotland*
School of Mathematics and Statistics, University of Glasgow *Jan 2025 – July 2025*

- Applied the constitutive law for a hyperelastic, near incompressible solid to the left ventricle;
- Developed a statistical emulator to produce a digital-twin of the heart;
- Conducted sensitivity analysis and uncertainty quantification in model parameters to improve accuracy.

Research Assistant *Lisbon, Portugal*
Biomedical Neuroscience Lab *Sept 2023 – June 2024*

- Applied statistical methods to analyze fMRI images and behavioral data;
- Implemented routines to process eye-tracking data and model decision-making under varying cognitive loads;
- Quantified neural responses under different experimental conditions.

Research Intern *Lisbon, Portugal*
PLUX Biosignals *Jan 2023 – April 2023*

- Developed analysis procedures for electrodermal activity data under stress conditions;
- Optimized signal extraction methods to improve the accuracy of biomedical sensors.

Projects

FEM Solver [Python, Git, ParaView, JAX] *Code*

- Derived the weak form of the PDEs governing passive diastolic filling of the left ventricle;
- Developed a FEniCS implementation to solve the weak form using finite element discretization.

Statistical Emulator [Python, C, Git, JAX] *Code*

- Developed a Gaussian Process-based framework for the passive diastolic filling of the left ventricle;
- Integrated a Bayesian inference pipeline for cardiac tissue parameter estimation;
- Validated the results through the built-in uncertainty quantification measure provided by the GP.

Skills

Programming Languages: Python, C, Matlab, SQL, R, Fortran

Domains: Numerical Analysis, PDEs, FEM, Mathematical Modelling, Optimization, Scientific Computing

Libraries/Frameworks: NumPy, SciPy, Sklearn, Matplotlib, FEniCS, Pytorch, Tensorflow, SymPy, Cython

Tools & Environments: Git, Linux, Jupyter Notebooks, LaTeX