Francisco Bernardo PhD • AFHEA • MA • MSc • ENG

✉ franxico@gmail.com   ☎ +44 (0) 75 182 134 21   ⌂ Flat 3, 46 Buckley Rd, NW6 7LU London, UK

PROFILE

• Experienced software engineer, designer and researcher, with 8 years of industry experience and +10 years in publicly funded R&D projects • Specialised in user-centred design, complex UI architecture design and development • Well-rounded experience in programming paradigms, languages, CS fundamentals, and working across large software stacks building SaaS products • Experienced in the design and development of machine learning toolkits and workflows for sensor, audio, and physics-based simulation data • Experienced in agile and greenfield project management, technical leadership, documentation and writing, and start-up and scale-up environments.

EDUCATION

PhD Computer Science – Goldsmiths, University of London	2020
MA Management in Creative Industries – Universidade Católica Portuguesa	2013
MSc Mobile Systems – University of Minho	2009
BSc Computer Science and Systems Engineering (5-year degree–300 ECTS) – University of Minho	2006

INDUSTRY EXPERIENCE

Frontend Software Engineer – Cegid Primavera, Portugal   Jan 2011 – April 2013

- Developed a modular software architecture and components for business analytics dashboards for OLAP and data warehousing in the Primavera Elevation SaaS (**Silverlight**, **C#.NET**, **SQL Server**, **Analysis Services**, **WCF**).
- Designed and developed the UI architecture, UX and content for Business Intelligence dashboards.
- Designed, developed and managed the project for a mobile iOS app for ERP global sales indicators (**Objective-C**).

Senior Software Engineer and Project Manager – Ubisign, Digital Signage, Portugal   May 2007 – Jan 2011

- Advocated and accelerated the transition of a desktop software product to a cloud-based software-as-a-service, contributing to the company's acquisition by a larger market player.
- Led architecture and development of single-page and progressive Web applications for network, channel, and content management of digital signage and corporate TV networks (**Silverlight**, **XAML**, **Prism, C#.NET**, **WCF, SQLServer**).
- Developed a high-performance desktop multimedia system and video plugins (**C#.NET**, **WPF** and **DirectShow**).
- Created new products including a gesture-based interactive catalogue for multimedia kiosks with audience analytics for intelligent content segmentation (**WPF**, **C#.NET**, **Kinect, Intel AIM**, **C++, DirectShow**, **OpenCV**).
- Instituted best practices for architecture and engineering of complex Web user interfaces.

RESEARCH EXPERIENCE

Postdoctoral Fellow in Computational Design – University College London, UK   Sept 2021 – now

- Led prototyping and evaluation projects with industry partners (Meta Reality Labs, Sony R&D, Ultraleap).
- Prototyped ultrasonic phased arrays, acoustic waveguides and metamaterials for wearable mid-air haptics (**CAD, COMSOL Acoustics simulation, acoustic field measurement, Python, electronics, embedded C++, Verilog**).
- Authored a computational framework for AI-driven optimisation with geometric modelling, finite elements method and wave scattering simulation for metamaterials (**Python**, **Fortran90**, **SALOME**, **ElmerFEM**, **HPC**).
- Generated synthetic datasets and applied deep learning for generative design and optimisation of acoustic metamaterials (**Python, scikit-learn**, **Pytorch**).
- Supervised a PhD student in Computer Science (CS) and two MSc students in Data Science and Machine Learning.
- Delivered seminars in Algorithms and Data Structures to CS undergraduates (**Python**).

Postdoctoral Fellow in Music Technology ([AH/R005154/1](AH/R005154/1)) – University of Sussex, UK   Jan 2021 – Aug 2021

- Led system design, full-stack engineering, systems administration, and documentation for https://sema.codes, a Web-based integrated development environment for audio and machine learning (**C++, Emscripten, WebAssembly, Javascript, CSS, HTML, Web Audio API, Svelte, NodeJS, Tensorflow.js, Nginx, AWS**).
- Co-authored a new method and middleware for client-side browser compilation of domain-specific languages for audio signal processing and machine learning (won a Best Paper award, published in Audio Engineering Society).
- Conducted user research with mixed methods to refine user experience, workflows, documentation, instructional

content and video tutorials (ethnography, usability evaluation, 5 workshops, 3 large scale surveys).

- Led community-building actions (2 summer schools, 2 performances, 4 public speaking events).
- Coordinated design work, mentored two interns, contributed to open-source software (https://mimicproject.com, Maximilian C++ DSP library).

Doctoral Researcher – **Computing**, **Goldsmiths, University of London, UK**   Feb 2021 – August 2021

- Doctoral thesis focused on the design and developer experience of machine learning APIs and tooling.
- Co-designed/developed a user-friendly machine learning development toolkit for multimodal experiences (https://rapidmixapi.com) (**C++, Emscripten**, **Javascript**, **HTML, CSS, React**).
- Identified client research needs and strategic research goals for a technology transfer and innovation consortium with 3 leading-edge European research centres and 5 music technology start-ups.
- Structured a developer-centred design research system for a consortium of 3 European research centres and 5 music technology start-ups, carried out research with stakeholders and end users (co-design workshops, large-scale hackathons, surveys, interviews, ethnography, prototyping, cognitive walkthroughs, discount usability, mixed methods data analysis), contributed to the final official EU evaluation rating of "Excellent".
- Led research interventions and data collection with project stakeholders, machine learning researchers and creative developers (2 co-design workshops, 3 hackathons, 40+ interviews, ethnography, prototyping, cognitive walkthroughs, usability evaluation, mixed methods analysis) which informed the development of 6 new products.
- Produced 3 prototypes and middleware for data visualisation, machine learning, and mobile AR for Google ATAP Soli, the millimetre-wave radar-on-a-chip sensor (featured at Google I/O 2016, published research paper).

May 2013 – Dec 2014   **Portuguese Catholic University, Portugal** – **Sound & Image Department**
                      Research Assistant in project *VisualYzARt* (ERDF–COMPETE, ID 23201)

- Developed experimental prototypes for augmented reality and 3D natural user interfaces with motion capture (**Unity3D**, **C#, LibPd, Vicon**, **Kinect**, **LeapMotion**), published papers, wrote documentation and reports.
- Teaching assistant in the Interactive Sound Design module of the Digital Design Post-Graduation (**PureData**/**P5**).
- Led workshops on Research Strategy and Methodology Design to Masters' degree cohorts.

TECHNICAL SKILLS

- **Software Engineering and Architecture:** desktop, web, mobile, embedded, and augmented reality applications.
- **Programming Languages**: Python, C#, C/C++, Obj-C, Java, Javascript, HTML, CSS, Haskell, SQL, Fortran.
- **Mobile Development:** iOS, WP7, Windows Mobile 6.5, J2ME, Bluetooth protocol development.
- **Software Design Methodologies**: Agile, eXtreme Programming, SCRUM, design patterns and TDD.
- **Machine Learning**: Foundational algorithms, Tensorflow.js, Pytorch.
- **Front-end Frameworks**: Svelte, React, WPF, Silverlight, DirectShow, Prism, Tensorflow.js, Fiddler, Graphedit, SourceSafe, Openframeworks, OpenCV.
- **Backend**: Node.js, Webpack, Rollup, MySQL, MongoDB, MS SQL Server, MS Analysis Server, Apache Web Server, Nginx, Express, AWS, RIA Services, WCF, ADO.NET.
- **Development Environments**: VSCode, Visual Studio, XCode, Unity3D, PureData, Git, CI/CD, Travis, Github Actions, NUnit, FxCop, CruiseControl, Team Foundation Server.
- **Modelling and Simulation:** COMSOL Multiphysics, Salome, Elmer FEM.
- **Prototyping**: Storyboards, Sitemaps, OmniGraffle, Balsamic Mockups.
- **Other:** NVivo, RStudio, LaTex, Mendeley, MS Office Suite, Project and Visio, Adobe Premier, After Effects.

AWARDS AND HONOURS (selected)

European Commission Seal of Excellence on 2x H2020 Marie Skłodowska-Curie grant proposals.	2021/2024
Best Paper award at Web Audio Conference, Trondheim, Norway.	2019
Prototypes for Google ATAP Soli Alpha Developer featured at the Google I/O 2016.	2016
Best Paper award at Vienna Music Business Research Days, Vienna, Austria.	2013

ADDITIONAL INFO

Languages: Portuguese (native), English (proficient), Spanish (intermediate), French (basic).
Canadian-Portuguese (dual) citizenship, UK-settled status. Multi-instrumentalist (guitar 20+ years, piano 6 years)