FRANCISCO BERNARDO • PhD • AFHEA • MA • MSc • ENG

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OBJECTIVE

Passionate research scientist with 7 years of industry experience and 9 years of experience in R&D projects in creative audiovisual technology and multimodal interaction, at the interface between academia and industry.

EDUCATION

2015 – 2020   Ph.D in Computer Science – Goldsmiths, University of London

Interactive Machine Learning for End-User Innovation: An Action Design Research approach

Supervisors: Rebecca Fiebrink, Mick Grierson

2011 – 2013   M.A. Management in Creative Industries – Universidade Católica Portuguesa

The Impact of Disintermediation in Independent Music Business Models (Summa Cum Laude)

Supervisors: Luís Gustavo Martins, Ricardo Morais

2006 – 2009   MSc. Mobile Systems – University of Minho

Bluetooth Naming for Situated Interaction in Ubiquitous Environments

Supervisor: Rui José

2000 – 2006   *Licenciatura* (300 ECTS), Computer Science and Systems Engineering – University of Minho

RESEARCH EXPERIENCE

09.2021 – current   **University College London, UK – Multi-Sensory Devices Lab – UCLIC**

     Postdoctoral Fellow in Computer Science (H2020 ERC-ADG 787413)

- Developed a computational framework for automation of geometric modelling, finite elements analysis and wave simulation for acoustic metamaterials (**Python**, **Fortran90**, **SALOME**, **ElmerFEM**, **Paraview**).
- Generated synthetic datasets and applied machine learning for generative design and optimisation of acoustic metamaterials (**Java**, **COMSOL**, **scikit-learn**, **Pytorch**).
- Supervised a CS PhD student, proposed MSc projects and supervised an MSc student to completion.
- Prototyped haptic sensations using custom phased array ultrasonic transducers and acoustic metamaterials.
- Collaborated on the design and evaluation of prototypes with major industrial partners (e.g., Sony R&D)
- Attended conferences (HAID, UIST), developed research collaborations with other academic institutions

01.2021 – 09.2021   **University of Sussex, UK – Experimental Music Technology Lab**

     Postdoctoral Researcher in project 'Innovating Sema' (AH/V005154/1)

- Authored sema-engine, a middleware for signal processing and domain-specific language design.
- Led full-stack software development, devOps and systems administration for https://sema.codes, a web-based live coding playground for audio and end-to-end machine learning workflows (**Tensorflow.js**, **Web Audio API**, **C++**, **WebAssembly**, **Javascript**, **CSS**, **HTML**, **Svelte**, **Rollup**).
- Conducted user-based research to refine workflows, documentation, and video tutorials.
- Organised community-building actions (4 workshops, 2 performances) and mentored interns.

01.2019 – 07.2020   **University of Sussex, UK – Experimental Music Technology Lab**
Postdoctoral Researcher in project MIMIC (AH/R002657/1)

- Co-authored a new method for client-side browser compilation of domain-specific languages (DSL) for music and audio signal processing (won a Best Paper Award, published in the Audio Engineering Society).
- Co-created a new live coding system for machine learning and user community (https://sema.codes).
- Conducted mixed methods research (ethnography, usability evaluation, 5 workshops, 3 large scale surveys) to inform and improve the design of instructional content, video tutorials and user experience.
- Led frontend software architecture and engineering with high-performance Web technologies (**Javascript**, **CSS**, **HTML**, **Svelte**, **Webpack**, **Web Audio API**, **C++**, **Emscripten**, **WebAssembly**, **Tensorflow.js**).
- Organised community-building interventions (3 performances, 4 public talks and 2 summer schools).
- Core contributor to the MIMIC platform (https://mimicproject.com) and the Maximilian DSP library.
- Core collaborator in the UKRI/AHRC -funded MIMIC project (University of Arts London, Goldsmiths College, Durham University, Sussex University, Google Magenta).
- Lectured the Interactive Music Systems module to a Music Technology degree cohort of 19 students.

02.2015 – 12.2018   **Goldsmiths, University of London, UK – Computing Department**
Doctoral Researcher in RAPID-MIX (EU H2020 ICT ID 644862)

- Structured a user-centred design research system for the RAPID-MIX consortium—3 European research centres and 5 music technology start-ups—MTG/Universitat Pompeu Fabra (ES), IRCAM (FR), Goldsmiths College (UK), ROLI (UK), Reactable Systems (ES), PLUX (PT), ORBE (FR), AudioGaming (FR).
- Co-designed a user-friendly machine learning development toolkit (https://rapidmixapi.com) which accelerated the adoption by creative software developers (**C++**, **Emscripten**, **Javascript**, **HTML**).
- Led research interventions with machine learning researchers and creative developers (2 co-design workshops, 3 hackathons, 40+ interviews, ethnography, concurrent prototyping, cognitive walkthroughs, usability evaluation, mixed methods data analysis) which informed the development of 6 new products.
- Conducted systematic data collection, analysis and reporting for 12 official deliverables to the EU H2020 project officers, on findings, processes, design principles and recommendations for best practices, which contributed to the final official EU evaluation rating of "Excellent".
- Produced 3 prototypes and middleware for visualisation, exploration, and musical interaction with millimetre-wave radar data as an individual contributor to the Google Soli Alpha Developers program.

05.2013 – 12.2014   **Universidade Católica Portuguesa (UCP), Portugal**
Research Assistant in project VisualYzARt (FEDER–COMPETE, ID 23201)

- Digital Arts research lead in the VisualYzARt consortium—YDreams, Universidade de Coimbra, UCP, Instituto Politécnico de Leiria, Instituto Politécnico de Santarém.
- Produced the state-of-the-art and market research and developed experimental prototypes for augmented reality and 3D natural user interfaces (Unity, C#, Vicon, Kinect, LeapMotion, PureData).
- Lectured the Interactive Sound Design module of the Digital Design Post-Graduation.
- Facilitated workshops on Research Strategy and Methodology Design to two master's degree cohorts.

05.2006 – 05.2007   **University of Minho, Portugal**
Research Assistant at ALGORITMI Research Centre (Ubicomp group)
in project SituAction (POS-C/EIA/58832/2004)

- Designed and developed middleware for sensor fusion, computer vision and video processing for context-aware applications for situated interaction with public screens.
- Conducted Human factors study, engaged a commercial partner, and published a paper.
- Contributed to the successful transfer of research products into a start-up product.

TEACHING EXPERIENCE

09.2020 – 02.2021   Information Architecture – Module leader in the MSc in Human-Computer Interaction Design, HCI Design Center, City, University of London.

09.2019 – 01.2020	Interactive Music Systems – Teaching assistant on the Music Technology undergraduate degree, School of Media, Film and Music, University of Sussex.
01.07.2019	Designing with Data and Interactive Machine Learning – Summer course Instructor (5-day intensive course) at the Creative Computing Institute, University of the Arts, London, UK
11.2014 – 12.2014	Interactive Sound Design and Dataflow Programming – module of the Digital Design postgraduation, Universidade Católica Portuguesa, Portugal

Invited Lectures

07.2021	Live coding with Sema – Technical University Berlin (with Thor Magnusson)
12.02.2018	Designing with Data and Interactive Machine Learning – Masters in Product Design, Royal College of Art, London, UK
14.03.2014	Research Strategy and Methodology Design – Master's in Music Teaching, UCP, Porto, Portugal
01.03.2014	Research Strategy and Methodology Design – Master's in Management in the Creative Industries, UCP, Porto, Portugal

INDUSTRY EXPERIENCE

01.2011 – 03.2013	**Primavera Business Software Solutions, Portugal** **Frontend Software Engineer for Business Intelligence products**

- Co-developed the software architecture and components for business analytics dashboards with OLAP and data warehousing connectors (Silverlight, C#.NET, SQL Server, Analysis Services, WCF).
- Developed the UI architecture, user experience and content for Business Intelligence dashboards.
- Lead developer of an iOS app for ERP global sales indicators (Objective-C).

05.2007 – 03.2013	**Ubisign, Corporate TV and Digital Signage, Portugal** **Senior software engineer and project manager**

- Accelerated product evolution from desktop software to a cloud-based software-as-a-service, contributing to the company's acquisition by a larger market player.
- Instituted best practices for software architecture and engineering of complex Web user interfaces.
- Developed single-page and progressive Web applications for network, channel, and content management of digital signage and corporate TV networks (Silverlight, XAML, C#.NET, WCF).
- Developed a high-performance desktop multimedia system and plugins (C#.NET, WPF and DirectShow).
- Created a gestural-based interactive product catalogue for multimedia kiosks with audience analytics for automatic content segmentation (Kinect, WPF, C#.NET, Intel AIM, DirectShow, OpenCV).

WORKSHOP LEADERSHIP AND FACILITATION

09.2021	*Sema: Live Coding Music with Machine Learning in the Browser*, workshop at the *International Conference on Computational Creativity (ICCC'21)*
07.2021	*Sema: Live Coding Music with Machine Learning in the Browser*, workshop at the 2nd Conference on AI Music Creativity (MuMe + CSMC)
05.2021	*Sema: Live Coding Music with Machine Learning in the Browser*, Immensiva Artistic Residences, Barcelona, Spain
07.2020	Sema: Live Coding for Machine Learning (2-week workshop), University of Sussex, UK
2020	*Live Coding Machine Learning with Sema* – workshop organiser and facilitator at the International Conference for Live Coding, University of Limerick, Ireland
2019	*Designing and Performing with Live Coding Languages for Signal Processing and Machine Intelligence on the Web* – workshop organiser and facilitator at Web Audio Conference 2019, Norwegian University of Science and Technology (NTNU), Trondheim, Norway

2019	*MIMIC Artist Summer Workshop* – 2-week workshop organiser and facilitator, Sussex Humanities Lab – University of Sussex, Brighton, UK
2019	*Live Coding Machine Learning* – workshop at the 4th International Conference on Live Coding, MediaLab Prado, Madrid, Spain
2017	*The RAPID-MIX API toolkit* (2-week long summer workshop) – workshop leader eNTERFACE'17 – 13th International Summer Workshop on Multimodal Interfaces, Porto, Portugal
2017	*Sound Design in the Cloud* – Workshop facilitator. AudioMostly 2017: Augmented and Participatory Sound and Music Experiences, Queen Mary University of London, UK
2016	*SoliDSPFeatures2OSC: Feature Selection Tool for Prototyping Creative Audiovisuals* with Soli – Presenter - Soli Alpha Developers Workshop, Google, Mountain View, US
2016	Interactive Applications in Machine Learning – Workshop co-presenter with Atau Tanaka, International Conference on Musical Gesture as a Creative Interface, Portugal
2015	*Design de Tecnologias Wearable para Performance Expressiva e Musical* – (workshop) facilitator with Michael Zbyszyński. MakerFaire Lisbon 2015, Lisbon, Portugal

SERVICE

2022	1st International Conference on Sound and Image in Art & Design (MULTIMODUS 2022)
2021	Transactions of the International Society for Music Information Retrieval (TISMIR)
2021	International Conference on Entertainment Computing (IFIP-ICEC 2021)
2021	ACM Audio Mostly 2021 (AM 2021)
2021	10th Workshop on Ubiquitous Music (UbiMus 2021)
2019	International Conference on Live Interfaces (ICLI).
2019	ACM Human Factors in Computing Systems (CHI).
2018	ACM Human Factors in Computing Systems (CHI).
2016	UbiMus 7th Workshop on Ubiquitous Music (UbiMus 2016)
2016	International Conference on Tangible Embedded and Embodied Interaction (TEI).

INVITED TALKS

16.06.2021	"Art+AI+Activism" Immensiva Artistic Residences, Barcelona, Spain
15.02.2020	"AI in the Creative Industries", AAAS, UKRI Live Arena, Seattle, US
25.02.2020	"Making Music and Art with Machine Intelligence", AI+JS, Meetup London, UK
20.09.2019	Human Data Interaction Music Workshop, Somerset house, London, UK
19.04.2018	"Fostering synergies between Art and Innovation", ACT Utopia, ETSIDI-UPM, Madrid
03.07.2017	"The EU H2020 project RAPID-MIX" eNTERFACE'17 – 13th International Summer Workshop on Multimodal Interfaces, UCP, Porto, Portugal
22.11.2014	"The Smart Stage: Designing interaction for immersive and ubiquitous music systems" – Encontro Nacional de Investigação em Música (ENIM), Lisbon, Portugal
21.06.2013	"Disintermediation effects in the music business" – Vienna Music Business Research Days, University of Music and Performing Arts, Vienna, Austria

ORGANISATION

07.2020	Sema: Live Coding with Machine Learning, 2-week workshop, Sussex University, UK
07.2019	MIMIC Artist Summer Workshop, Sussex University, UK
07.2017	The RAPID-MIX API toolkit – eNTERFACE'17, 13th International Summer Workshop on Multimodal Interfaces, UCP, Porto, Portugal
09.2014	Doctoral Summer School for Developing Media, Culture and Social Innovation for Creative Cities" in partnership with Hanover University, UCP, Porto, Portugal
07.2006	CMUS – Conference on Mobile and Ubiquitous Systems, University of Minho, Portugal

AWARDS AND HONOURS

2021	European Commission Seal of Excellence on H2020 Marie Skłodowska-Curie grant proposal
2017	Best Paper award at Web Audio Conference, Trondheim, Norway
2017	Spotify Award at the Anvil Hack III at Goldsmiths' Hacksmiths Tech society, London, UK
2016	Best-in-Show award at the Sex Tech Hackathon, Goldsmiths, London, UK
2016	Google ATAP Soli Alpha Developer prototypes selected (10/80) and featured at the Google I/O
2015	PhD scholarship funded by the EU H2020 project RAPID-MIX
2013	Best Paper award at Vienna Music Business Research Days, Vienna, Austria
2013	Research grant awarded by *Fundação da Ciência e Tecnologia* (FCT), Portugal
2009	The People's Music Award in the Off-the-Beaten Music Category, London, with Papercutz band
2007	Research grant awarded by *Fundação da Ciência e Tecnologia* (FCT), Portugal
2006	Research grant awarded by *Fundação da Ciência e Tecnologia* (FCT), Portugal

CERTIFICATIONS

2022	UCL Inclusive Leaders Programme
2022	Doctoral research supervision
2022	CybSafe – Cyber security and awareness training
2022	Mathematics for Machine Learning: Linear Algebra – Imperial College of London
2022	UCL Innovation and Entrepreneurship CS I/O Lab
2021	Staff online diversity training
2021	Unconscious bias training
2021	Change possible: Sustainable UCL
2021	Disclosing and Managing Conflict of Interest
2021	Prevent duty training
2021	Data Protection and Freedom of Information
2021	Information Security Training
2021	UCL Safety Induction
2021	UCL Basic Fire Safety
2020	Associate Fellow of the Higher Education Academy, Level 7 on FHEQ UK, 15 credits
2019	GDPR – University of Sussex
2017	Science Communication – SciConnect
2016	Designing, Running and Analysing Experiments – University of California San Diego
2016	Information Design – University of California San Diego
2016	User Experience: Research & Prototyping – University of California San Diego
2016	Social Computing – University of California San Diego
2015	Input and Interaction – University of California San Diego
2015	Design Principles: An Introduction – University of California San Diego
2015	Human-Centred Design: An Introduction – University of California San Diego
2014	Critical Thinking: Processes and tools – Catholic University of Portugal
2013	Introduction to Digital Sound Design – Emory University
2012	Certificate of Proficiency in English – Cambridge ESOL
2011	Microsoft Certified Professional in .NET Application Development Foundation
2005	Leadership Course – Portuguese Military Academy
1997	Certificate in Advanced English – Cambridge ESOL
1995	First Certificate in English – Cambridge ESOL

PERFORMANCES (selected)

2021	MNISTREL – classical guitar and live coding at Sussex Festival of Ideas, ACCA, Brighton
2021	"AIrgots" – live coding with T. Magnusson and C. Kiefer at WAC 2021, Barcelona, Spain
2020	"Three Ravens" – live coding with T. Magnusson and C. Kiefer at 5th ICLC, Limerick, Ireland
2019	"Three Pidgins" – live coding with T. Magnusson and C. Kiefer at WAC 2019, NTNU, Norway
2019	Live coding as MNISTREL at Algo/Mesh, ALGOMECH Festival, Sheffield, UK
2019	Live coding as MNISTREL at MIMIC Artist, Rose Hill, Brighton, UK

2009   Concert tour with Papercutz band, to promote debut album "Lylac", Portugal

OTHER SKILLS & TECHNOLOGIES:

- Front-end engineering and architecture of desktop, web, mobile and AR applications.
- Mobile development in iOS, WP7, Windows Mobile 6.5, J2ME, Bluetooth protocol development.
- Agile, eXtreme Programming, SCRUM methodologies, design patterns and test-driven development.
- Programming Languages: Python, Javascript, C#, C/C++, Obj-C, HTML, CSS, Java, Haskell, SQL.
- Development frameworks: Svelte, React, Webpack, Rollup, WPF, Silverlight, DirectShow, Prism, Tensorflow.js, Fiddler, Graphedit, SourceSafe, Openframeworks, OpenCV.
- Development environments: VSCode, Visual Studio, Expression Suite, XCode, Unity3D, PureData, Git, CI/CD, Travis, Github Actions, NUnit, FxCop, CruiseControl, Team Foundation Server.
- Backend: MySQL, MongoDB, MS SQL Server, MS Analysis Server, Apache Web Server, Nginx, Express AWS, RIA Services, WCF, ADO.NET,
- Modelling and UI Prototyping: OmniGraffle, Balsamic Mockups.
- Other: NVivo, RStudio, LaTex, Mendeley, MS Office Suite, Project and Visio, Adobe Premier, After Effects

ADDITIONAL INFO

Languages: Portuguese (native), English (proficient), Spanish (intermediate), French (basic).

Canadian Portuguese (dual) citizenship, UK settled status.

Multi-instrumentalist experienced in piano (6 years), guitar (20+ years), trombone (1 month), live coding, electronics, and audiovisuals.