Francesca Romana Cavallo

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Research interests

Employment

Optum, London, UK
Senior Data Scientist, 02/2023-Present

- Processed and analysed large clinical datasets, including electronic health records, and successfully performed bias analyses and clinical validation studies
- Delivered 5+ predictive models, and several statistical models by owning the model development process from initial problem definition to deployment. Delivered 2 LLM-based prototypes for NLP projects
- Implemented a python package for the processing of EHR data and for the training and validation of a suite of tabular and sequence-based machine learning models
- Cultivated strategic relationships with 15+ stakeholders across 4 business functions, resulting in streamlined processes and shortened project timelines
- Filed 1 patent to the US Patent and Trademark Office

Entrepreneur First London, UK
Founder-in-Residence, 10/2022-11/2022

- Selected from 1000+ applicants to work with a community of entrepreneurs and leading advisors to find a co-founder, and build a company from scratch
- Tested 2 co-founding partnerships and several ideas in the health-tech space
- Gained skills in customer development, pitching, and business development

Government Office for Science London, UK
UKRI Policy Intern, 04/2022-06/2022

- Part of the Engagement Team within the Covid-19 Inquiry Team
- Delivered support and engagement plans for internal staff and external advisors
- Successfully managed relationships with various stakeholders and senior management
- Implemented a stakeholder management tool that was adopted by the department

DnaNudge, London, UK
Research Consultant, 01/2019-03/2020

Led the planning and execution of a user trial for a proprietary wearable device, managing participant documentation, data collection, and data analysis. Completed a feasibility study and developed a system to extract and analyse accelerometer data.

DnaNudge, London, UK
Electronic Engineering Intern, 04/2017-09/2017

Prototyped a wearable device by designing and testing miniature flexible printed circuit boards, implementing a custom testing platform for performance evaluation, and assessing image processing algorithms in C for device integration

National Heart & Lung Institute, London, UK
Research Intern, 07/2016-08/2016

Developed machine learning-based image recognition algorithms for automating the classification of cardiac magnetic resonance images, authored an abstract accepted at two international conferences, and received a Wellcome Trust Biomedical Vacation scholarship.

Education

Imperial College London, London, UK
PhD, 10/2018-02/2023

UKRI EPSRC-funded research titled "Patient-centred technologies targeting genetics, activity, and metabolism for lifestyle and healthcare personalisation". Supervised by Prof Christofer Toumazou.

Imperial College London, London, UK
MEng in Electrical and Electronic Engineering (First Class Honours), 10/2014-08/2018

Additional relevant courses

- Genetic Epidemiology Foundations, University of Colorado (Online), 2021
- Bayesian Statistics: Concepts and Data Analysis, University of California (Online), 2020
- Bayesian Statistics: Techniques and Models, University of California (Online), 2020

Teaching experience

Malta Icom Education, Malta
Guest Lecturer in Advanced research methods, public health and epidemiology, 2023-present

Electrical and Electronic Engineering Dept, Imperial College, London, UK
Graduate teaching assistant in:

- Mathematics (UG), 2018-2022
- Real time digital signal processing (UG), 2018-2019
- Full Custom Integrated Circuit Design (PG), 2018-2019

Skills

Programming Python | R | SQL | Git
Data science methods Machine learning | Deep learning | Statistics | Causal modelling | Bias assessment and mitigation | Hypothesis testing | Survival analysis
Data science tools Microsoft Azure | Databricks | Spark | GitHub | MLOps | MLFlow
Medical domain knowledge Electronic Health Records | Medical coding | NHS | Biobanks | Population health management | Medicine optimisation | Medical devices
Biology domain knowledge Real-time PCR and ELISA data analysis | Genetic data analysis | Compositional data analysis | Biosensors
Research methods Systematic reviews | Study design | Behavioural interventions design

Funding and awards

- UKRI Policy Fellowship Scheme 2022
- UKRI EPSRC Doctoral Training Partnership 2018-2022
- Wellcome Trust Biomedical Vacation Scholarship 2016
- Imperial College Developing Sports Excellence Scholarship 2016

Evidence of esteem

Membership of professional societies

- Data Science Professional of the Royal Statistical Society, 2024-present
- Fellow of the Royal Statistical Society, 2022–present
- Associate Fellow of the Higher Education Academy UK, 2021–present

Reviewer

Plos Digital Health, Plos One

Publications

Books

- Technologies for Personalised Healthcare: Enabling Patient-Centred Approaches in the Management and Prevention of Lifestyle-Related Conditions, **Cavallo F R**, Toumazou C, CRC Press (in press)

Journals

- **Cavallo FR**, Toumazou C (2023) Personalised lifestyle recommendations for type 2 diabetes: Design and simulation of a recommender system on UK Biobank Data. PLOS Digit Health 2(8): e0000333
- **Cavallo FR**, Toumazou C, Nikolic K. Unsupervised Classification of Human Activity with Hidden Semi-Markov Models. Applied System Innovation. 2022; 5(4):83
- **Cavallo FR**, Mirza KB, de Mateo S, Miglietta L, Rodriguez-Manzano J, Nikolic K, Toumazou C. A Point-of-Care Device for Fully Automated, Fast and Sensitive Protein Quantification via qPCR. Biosensors. 2022; 12(7):537.
- **Cavallo FR**, Golden C, Pearson-Stuttard J, Falconer C, Toumazou C (2022) The association between sedentary behaviour, physical activity and type 2 diabetes markers: A systematic review of mixed analytic approaches. PLOS ONE 17(5): e0268289
- **FR Cavallo**, KB Mirza, S de Mateo, K Nikolic, J Rodriguez-Manzano, and C Toumazou. "Aptasensor for Quantification of Leptin Through PCR Amplification of Short DNA-Aptamers", ACS Sensors 2021 6 (3), 709-715

Conferences

- FR Cavallo, KB Mirza, S. de Mateo, J. R. Manzano, K. Nikolic and C. Toumazou, "A Point-of-Care Device for Sensitive Protein Quantification," *2021 IEEE International Symposium on Circuits and Systems (ISCAS)*, 2021, pp. 1-5
- FR Cavallo, KB Mirza and C Toumazou, "Links Between DNA-Based Diet and Salivary Leptin Hormone Concentration," *2018 IEEE Biomedical Circuits and Systems Conference (BioCAS)*, 2018, pp. 1-4