# DR TASOS PAPASTYLIANOU

MBChB, DPhil, MSc, BSc, LRSM, FHEA

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## EDUCATION / QUALIFICATIONS

2021: University of Essex (via the CADENZA D2 descriptor programme).
**Advance HE Fellowship (FHEA)**

2017: University of Oxford — Institute of Biomedical Engineering
**Doctor of Philosophy (DPhil)**

*Funding:* EPSRC (RCUK Digital Economy Programme grant number EP/G036861/1 Oxford Centre for Doctoral Training in Healthcare Innovation)

*Specialist topics:* Biomedical Engineering
Medical Image Analysis

*Thesis Title:* "Fuzzy and probabilistic segmentation, and appropriate validation, applied to cardiac magnetic resonance images"

*Supervisor:* Prof. Vicente Grau

*Clinical Co-supervisor:* Dr Erica Dall' Armellina (Consultant Cardiologist)

*Examiners:* Prof. Jens Rittsche and Prof. Miguel Ángel González Ballester

2009: University of Bristol — Department of Computer Science
**Masters of Science (MSc) in Advanced Computing – Machine Learning and Data Mining**

*Grade:* Distinction

*Dissertation:* "Segmentation of medical images using a waterflow principle"

*Supervisor:* Prof. Majid Mirmehdi

*Awards:* 'Surface Inspection Prize' for the Best MSc Image Processing Project/Dissertation

2006: University of Bristol – Bristol Medical School
**Bachelor of Medicine and Surgery (MBChB)**

*Final year project:* "Peer-Assisted Learning Scheme: A study on educational theory applied to clinical practice"

*Elective project:* "Updating Healthcare: A study on the computerisation of the NHS"

2002: University of Bristol – Department of Anatomy
**Bachelor of Science (BSc Hons) in Neuroscience**

*Grade:* 2.1 (dissertation with distinction)

*Dissertation:* "Forgetting rates in auditory recognition memory"

*Supervisor:* Prof. Malcolm Brown FRS

1997: Associated Board of the Royal Schools of Music (ABRSM)
**Licentiate of the Royal Schools of Music (LRSM) - Music Performance** (teaching diploma)

## EMPLOYMENT

2022-08 .. Present: University of Essex – Institute of Public Health and Wellbeing
**Research Fellow in Health Informatics**

*Duties:* My academic research focuses on clinical and public health applications of Artificial Intelligence and Machine Learning. In particular, I'm interested in: data analysis and information fusion from biological signals (e.g. Brain Computer Interfaces, wearables, hospital-derived, etc) and digitised health data; medical image analysis, explainability, and appropriate validation; AI or tech-oriented public health interventions, and the use and benefits of free and open-source software in medicine. As part of the role I am also acting as a probationary Lecturer for the School of Computer Science and Electronic Engineering.

2020-08 .. 2022-08: University of Essex – Brain Computer Interfaces and Neural Engineering Lab
**Senior Research Officer in Brain-Computer Interfaces**

*Project:* BARI: *US/UK Bilateral Academic Research Initiative*

A large, international project led by Prof. Riccardo Poli, involving partners from the University of Essex, University of Oxford, Harvard Medical School, University of Massachusetts Medical School, University of Southern California, and University of California (Berkeley).

The aim of the project is investigate optimal collaboration in teams consisting of both human and artificial agents, in order to optimise human-AI collaborative decision-making. I implemented, conducted, and analysed EEG-based experiments, and investigated the role of behavioural and neuro-physiological biomarkers relating to confidence and trust when performing group decisions in non-trivial scenarios.

*Funding:* Defense Science and Technology Laboratory (Ministry of Defense)

2018-02 .. 2020-08: University of Essex – Brain Computer Interfaces and Neural Engineering Lab
**Senior Research Officer in Machine Learning and Biomedical Signal Processing**

*Project:* NEVERMIND: *Neurobehavioural predictive and personalised modelling of depressIve symptoms during primary somatic Diseases with ICT-enabled self-management procedures*

A large international project involving University of Essex, University of Pisa, Madrid Polytechnic University, University of Turin, University of Lisbon, Karolinska Institute, and a number of private companies).

The project involved the use of intelligent tools and systems enabling depression self management in patients with secondary depression. Under the supervision of Dr Luca Citi and Prof. Riccardo Poli, I was responsible for researching appropriate computational models on the basis of a sophisticated Decision Support System, for providing suitable, real-time inference of patients' mental state, enabling optimal interventions through personalised models and real-time feedback.

*Funding:* Horizon 2020 – European Comission (Grant: 689691)

2018-10 .. 2018-12 & 2019-10 .. 2019-12: University of Essex
**Fixed Term Teacher** (CE320: Large Scale Systems / Extreme Programming)

2015-02 .. 2015-03 & 2015-06 .. 2015-07: University of Oxford – IT Learning Centre
**Associate Teacher** ('Introduction to Matlab' evening course)

2013-12 .. 2015-05: Sentimoto Ltd – Wearables for health monitoring in older adults

**Co-founder & Director**

2010-02 .. 2010-08: University Hospitals Bristol NHS Foundation Trust
**Clinical Fellow in Accident & Emergency Medicine**

2007-08 .. 2008-08: University Hospitals Bristol NHS Foundation Trust
**Foundation doctor (FY2)**

2007-08 .. 2007-12: University of Bristol
**Recognised Teacher in Anatomy**
(employed as part of Foundation FY2 House Officer training scheme)

2006-08 .. 2007-08: North Devon Healthcare NHS Trust
**Foundation doctor (FY1)**

## TEACHING EXPERIENCE

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|---|---|---|
| 2023-24 | **Module Supervisor** (University of Essex) | **CE310 – Evolutionary Computation and Genetic Programming.** This 3rd year undergrad module introduces students to the field of evolutionary computation, with a particular focus on genetic programming, how this can be used to solve interesting problems, and best practices in the field. |
| 2022-23 | **Module Supervisor** (University of Essex) | **CE303 – Advanced Programming.** This 3rd year undergrad module introduces students to advanced programming constructs and techniques, such as threads and synchronisation, sockets, web services, and functional programming techniques. Primarily involves Java, but also includes a short introduction to Haskell. |
| 2021 | **Teaching qualification** (University of Essex) | I successfully obtained an **Advance HE Fellowship (FHEA)** through the CADENZA D2 programme at the University of Essex |
| 2021-09 | **Course co-organiser** (University of Oxford) | I co-organised, designed and delivered a 3-day full-day introductory **'bridging' course** to prospective maths, engineering, chemistry and economics undergraduate students, for the **Mathematical, Physical and Life Sciences Division** at the University of Oxford. The specific modules I taught were Introduction to Linear Algebra, and Introduction to Statistics. |
| 2020 | **Online voluntary course** (University of Essex) | I created the "**Colchester Scientific Programming Meetup Group**" on the meetup.com platform, which I used as a platform to deliver a course entitled "**Introduction to Scientific Programming**". This consisted of fifteen 2-hourly sessions, and was aimed primarily at MSc students undertaking a conversion MSc at the University of Essex, who felt they needed supplemental instruction with aspects of scientific programming. The course was very successful; I received good feedback for the course from the students involved, both in terms of presentation/preparation as well as choice of content. |
| 2018/19: | **Fixed Term Teacher** (University of Essex) | Assisted in the assessment and delivery of practical sessions for module CE320 '**Large Scale Systems and Extreme Programming**', led by Prof. Riccardo Poli. |
| 2015: | **Associate Teacher** (University of Oxford) | Designed and delivered (twice) an introductory course (consisting of four 3-hourly sessions) teaching **Matlab** to a broad academic audience as part of the **IT Learning Programme** at the University of Oxford. This included the design of a detailed lesson plan, a course handbook, practical exercises and assessments. |
| 2007: | **Recognised Teacher in Anatomy** (University of Bristol) | Co-designed and taught a hands-on course on **human anatomy** to medical students during an academic placement at the University of Bristol, as part of my **F1 Junior Doctor** work for the **NHS**. |

## SUPERVISION EXPERIENCE

Since the start of my probation period in Aug 2022, I have supervised 8 3rd-year undergraduate students, 4 MSc students, co-supervised 1 PhD student, and supervised 1 Innovate-UK funded KTP associate.

## GRANT APPLICATIONS / FUNDING / AWARDS / SPONSORSHIPS

**Successful bids** *(Total funding: £275,157)*

2023: **Innovate UK – Yulife KTP** (£236,157)

The project involves investigating the impact of gamification in reducing health-risk through positive behaviour modification, in collaboration with Yulife Ltd (a business-to-business health-insurance company). As a Co-Investigator, I nevertheless have a central role in this grant as the main academic supervisor to the KTP associate hired for the role.

2014: **UnLtd 'Fast Growth Award'.** *(£20,000)*

I was awarded a personal ***£20,000*** award by 'UnLtd: The Foundation for Social Entrepreneurs', to support my entrepreneurial activities in relation to my role as co-founder and co-director of Sentimoto Ltd.

2014: **Wolfson Innovation Competition.** *(£4,000)*

My team at Sentimoto Ltd was awarded the Wolfson Innovation Award for our pitch at the annual Wolfson College Innovation Competition at the University of Oxford. (£4,000).

2013 **Bethnal Green Ventures.** *(£15,000)*

I co-founded Sentimoto Ltd, a company dealing with smart wearables for older adults, together with three DPhil colleagues from the CDT in Healthcare Innovation programme at the University of Oxford. Our team won a bid for a £15,000 investment from Bethnal Green Ventures (a Nesta/NominetTrust-backed social tech start-up accelerator).

**Studentships** *(Total amount: £78,760)*

2011: **CDT Studentship in Healthcare Innovation.** *(£78760)*

I was awarded an EPSRC-funded studentship to study for a DPhil at the University of Oxford, as part of the CDT in Healthcare Innovation programme at the University of Oxford, valued at ***£78,760***.

**Other Awards**

2023 **Data Impact Fellow** (£2000)

I was awarded the DIF award following a competitive process, for ongoing work investigating the prediction of a first homelessness episode following a hospital admission, based on hospital discharge summaries.

2016: **MICCAI Travel Award.** *(£500)*

I was awarded a Travel Award (valued at ***£500***) for my paper "Orientation-Sensitive Overlap Measures for the Validation of Medical Image Segmentations", presented at the prestigious 2016 MICCAI conference (the International Conference on Medical Image Computing and Computer Assisted Intervention).

2009: **'Surface Inspection Prize'**

I was awarded the above prize for Best Image Processing Project during my MSc in Advanced Computer Science (Machine Learning and Data Mining).

1998: **Young Musician of the year 1998** (Cyprus)

I won first place in a national competition for my piano performance. As the winner of the national leg, I also competed in the international leg of the competition, held in Vienna, where I ranked 9$^{th}$.

## PUBLICATIONS

### Journal articles

*Published:*

- Evdokimov I, Kampouridis M, Papastylianou T. *Application Of Machine Learning Algorithms to Free Cash Flows Growth Rate Estimation*. **Procedia Computer Science.** 2023 Jan 1;222:529-38.
- Christinaki E and Papastylianou T (joint), Carletto S, Gonzalez-Martinez S, Ostacoli L, Ottaviano M, Poli R, Citi L. *Well-being Forecasting using a Parametric Transfer-Learning method based on the Fisher Divergence and Hamiltonian Monte Carlo*. **EAI Endorsed Transactions on Bioengineering and Bioinformatics**. 2021;1(1):e6.
- Qian G, Toizumi M, Clifford S, Le LT, Papastylianou T, Quilty BJ, Iwasaki C, Kitamura N, Takegata M, Nguyen TM, Nguyen HA. Association of p*neumococcal carriage in infants with the risk of carriage among their contacts in Nha Trang, Vietnam: A nested cross-sectional survey.* **PLoS Medicine**. 2022. 19(5):e1004016. **h5-Index: 105**
- Carli V, Gebrewold Petros N, HadlaczkyG, Vitcheva T, Berchialla P, Bianchi S, Carletto S, Christinaki E, Citi L, Dinis S, Gentili C, Geraldes V, Giovinazzo L, Gonzalez-Martinez S, Meyer B, Ostacoli L, Ottaviano M, Ouakinin S, Papastylianou T, Paradiso R, Poli R, Rocha I, Scilingo EP, Settanta C, Valenza G. *The NEVERMIND e-health system in the treatment of depressive symptoms among patients with severe somatic conditions: a multicentre, pragmatic randomised controlled trial*. **EclinicalMedicine.** 2022;48:101423. **h5-index: 44**

### Preprints

*medRxiv:*

- Qian G, Toizumi M, Clifford S, Le LT, Papastylianou T, Quilty BJ, Iwasaki C, Kitamura N, Takegata M, Nguyen TM, Nguyen HA. *Pneumococcal exposure routes for infants: a nested cross-sectional survey in Nha Trang, Vietnam*. *Pneumococcal exposure routes for infants: a nested cross-sectional survey in Nha Trang, Vietnam*. medRxiv. 2021 Jan 1. https://www.medrxiv.org/content/10.1101/2021.07.04.21259950v1

### Conference papers

*Published*:

- Habbab FZ, Kampouridis M, Papastylianou T. Improving REITs Time Series Prediction Using ML and Technical Analysis Indicators. In2023 International Joint Conference on Neural Networks (IJCNN) 2023 Jun 18 (pp. 1-8). IEEE.
- Christinaki E, Papastylianou T, Poli R, Citi L. *Parametric transfer learning based on the fisher divergence for well-being prediction*. In **2019 IEEE 19th International Conference on Bioinformatics and Bioengineering** (BIBE) 2019 Oct 28 (pp. 288-295). IEEE. **h5-index:15**
- Papastylianou T, Dall'Armellina E, Grau V. *Orientation-sensitive overlap measures for the validation of medical image segmentations*. In **International Conference on Medical Image Computing and Computer-Assisted Intervention** 2016 Oct 17 (pp. 361-369). Springer, Cham. **h5-index: 10**
- Papastylianou T, Kelly C, Villard B, Dall'Armellina E, Grau V. *Fuzzy Segmentation of the Left Ventricle in Cardiac MRI Using Physiological Constraints*. In **International Conference on Functional Imaging and Modeling of the Heart** 2015 Jun 25 (pp. 231-239). Springer, Cham.
- Zhu T, Behar J, Papastylianou T, Clifford GD. *CrowdLabel: A crowdsourcing platform for electrophysiology*. In **Computing in Cardiology** 2014 2014 Sep 7 (pp. 789-792). IEEE. **h5-index: 30**
- Zhu T, Osipov M, Papastylianou T, Oster J, Clifton DA, Clifford GD. *An intelligent cardiac health monitoring and review system*. In **Appropriate Healthcare Technologies for Low Resource Settings** (AHT 2014) 2014 Sep 17 (pp. 1-4). IET.
- Papastylianou T, Behar J, Guazzi A, Jorge J, Laranjeira S, Maraci MA, Clifford GD, Hope RA,

Thomson P. *Smart handpumps: technical aspects of a one-year field trial in rural kenya*. In **Appropriate Healthcare Technologies for Low Resource Settings** (AHT 2014). IET.

- Behar J, Guazzi A, Jorge J, Laranjeira S, Maraci MA, Papastylianou T, Thomson P, Clifford GD, Hope RA. *Software architecture to monitor handpump performance in rural Kenya.* In **Proceedings of the 12th International Conference on Social Implications of Computers in Developing Countries**, Ochos Rios, Jamaica. pp. 978 2013 (Vol. 991). IFIP. **h5-index: 12**

*In preparation:*

- Papastylianou, T, Ramele R, Cinel C, Citi L, Poli R. *Optimal human-AI group decision making via a fuzzy aggregation method using behavioural and neurophysiological markers of confidence*. (in preparation)

**Thesis** Papastylianou, T. *Fuzzy and probabilistic segmentation, and appropriate validation, applied to cardiac magnetic resonance images. 2017.* **Doctoral dissertation, University of Oxford**.

## CLINICAL AUDIT

2010: **Bristol Royal Infirmary:** 'CT Head in suspected stroke patients'
2008: **Bristol Royal Infirmary:** 'Use of C-Reactive Protein in the Emergency Department'
2007: **North Devon District Hospital:** 'Discharge summaries: Quality of inter-professional communication'
2006: **North Devon District Hospital:** 'Use of insulin sliding scales in medical wards'

## OTHER PROFESSIONAL ACTIVITIES AND CONTRIBUTIONS

*Peer Review:* **For Journals:** (Transactions Artificial Intelligence, PLoS ONE, Nature Scientific Data, Frontiers in Neuroscience, etc)

**For Conferences:** (ICJNN/GEC/FUZZ, CBMS, SMC, etc)

**For funding bodies / grant applications:** (MRC)

*Seminars organiser:*

- Computer Vision seminar series, University of Essex (2021-09 .. 2021-12)

*Outreach:*

- Royal Society Summer Science Exhibition (2023)
- Stempoint Nuffield Research Placements (2023)
- Owner of Colchester Scientific Programming Meetup Group

*Academic and Pastoral support:*

- Personal Tutor to 3rd y. BSc and MSc students (2022 onwards)
- Hall tutor, Churchill Hall, University of Bristol (2008-2010)

*Formal contribution to open source projects:* • Gnu octave • Python • Gnu nano

*Other Administrative:*

- Online content coordinator – School of Computer Science and Electronic Engineering, University of Essex

## PROFESSIONAL MEMBERSHIPS / ROLES:

- Advance HE Fellow (**FHEA**): No. PR225638 (2021-Present)
- British Computer Society (**BCS**): No. 995102112 (2022-Present)
- Institute of Electrical and Electronics Engineers (**IEEE**): No. 97627118 (2020-Present)
- IEEE Engineering in Medicine and Biology Society (**EMBS**): No. 97627118 (2020-Present)
- General Medical Council (**GMC**): No. 6120246 (2006-Present)

- Frontiers in Bionics and Biomimetics – Review Editor (since 2020)
- Frontiers in Medtech Data Analytics – Review Editor (since 2020)

## SKILLS AND EXPERTISE

*Special interests / expertise:* Health Informatics and Clinical Machine Learning, Biomedical signal processing, Medical Image Analysis, Explainability and Fuzzy evaluation methods, Bayesian Methods, Information fusion, Artificial Intelligence, Reinforcement Learning, Unsupervised methods, Distributed/open-source/federated learning, BioEthics.

*Research areas / project topics:*

**Clinical Machine Learning, Biological Signals, and Data Analysis**

- Linear Dynamical Systems and fusion of health data and biological signals, for the prediction and management of clinical conditions (e.g. depression, heart conditions).
- Brain-Computer Interfaces for extraction of neurophysiological markers (e.g. decision confidence).

**Medical Image Analysis and Explainability**

- Probability and Uncertainty in the Analysis and Validation of Medical Images.
- Explainability and analysis of modes of failure in medical image segmentation.

**Population/Public Health and Wellbeing**

- Wearable technologies for 'quantitative self' analysis and health monitoring (e.g. in older adults).
- Low-cost monitoring using low-cost devices (e.g. SMS for predicting handpump health in rural Africa).

*Programming Languages:*
**Scientific:** Python, R, Julia, Matlab/Octave
**Functional:** Haskell
**Declarative:** Prolog
**General-purpose:** C, C++, Java
**Shell Scripting:** Perl, Bash
**Web:** html/css/javascript/typescript/PHP
**Query languages:** SQL, Cypher

*Software tools:*
**Databases:** MySQL, Sqlite, neo4j (graph database)
**Versioning systems:** git, subversion, mercurial
**Project management:** trac, jira, gitlab
**Learning platforms:** Moodle
**Typesetting:** LaTeX, Libreoffice, MS Word
**OS:** Windows / Mac / Gnu-Linux

*Domain-specific:*
**Machine Learning:** MC-Stan, Tensorflow, Google colab / Azure Databricks
**Clinical:** DICOM, PACS, SNOMED, PhysioNet (credentialled).

*Spoken languages:*
**Native or near-native:** English (UK resident 25+ years), Greek (mother tongue).
**Other:** French, German, Italian, Russian, Japanese