Marta Campi

| [Google Scholar](#) | [GitHub](#) | [SSRN](#) |

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Postdoctoral Researcher at Institut Pasteur
Specialty in Statistical Signal Processing, Statistical Machine Learning & Time Series

SUMMARY

Machine learning researcher specializing in statistical signal processing, time-series modelling, and statistical machine learning. My work focuses on developing AI-driven methods for complex structured data, combining statistical modelling and machine learning to create interpretable solutions for challenges in speech processing, cybersecurity, and financial modelling.

My PhD at University College London focused on multi-kernel Gaussian processes for speaker recognition in neurological disorders, improving diagnostic accuracy in Parkinson's disease. I also applied multi-kernel learning with Support Vector Machines (SVM) to detect differences between acoustic voice properties in speaker verification for cybersecurity applications. Additionally, I introduced a kPCA-CCA framework to model spatial–temporal dependencies in financial and environmental data, refining impact assessment for green bonds. My postdoctoral research at Institut Pasteur develops state-space models to integrate audiogram and speech test data for comprehensive hearing loss diagnostics, while also implementing causal Artificial Neural Networks for real-time speech enhancement in hearing aids, optimizing computational strategies for auditory neuropathies.

With a multidisciplinary approach and experience in international collaborations, I focus on translating advanced machine learning methodologies into impactful solutions. Drawing from my background as a professional athlete, I bring a strategic, results-driven mindset to research, emphasizing adaptability and problem-solving in complex domains.

EDUCATION

University College London London, UK
PhD in Statistical Science and Signal Processing, Department of Statistical Science. *Sep 2017 – Dec 2021*
Thesis title: A Statistical Perspective of the Empirical Mode Decomposition, available at this [link](#)
Supervisors: [Chair Prof. Gareth W. Peters (UCSB)](#), Prof. Matina Rassias (UCL).

University College London London, UK
MPhil (Master of Philosophy) in Statistics, Department of Statistical Science *Sep 2016 – Sep 2017*

University College London London, UK
MRes (Master of Research) in Financial Computing, Computer Science Department *Sep 2015 – Sep 2016*

University of Essex Colchester, UK
MSc (Master of Science) in Financial Econometrics, Economics Department and Essex Business School *Sep 2014 – Sep 2015*

Università degli studi di Genova Genova, Italy
BSc (Bachelor of Science) in Mathematical Statistics and Data Management, Mathematics Department *Sep 2009 – Dec 2013*

TEACHING AND ACADEMIC POSITION

Postdoctoral Researcher Oct 2022 – Present
Institut Pasteur, Hearing Institute, [Center for Research and Innovation in Human Audiology](#) *Paris, France*
My project aims to develop speech enhancement signal processing techniques that are computationally optimal to be applied in real-time within hearing aids. The target participants require ad hoc methodologies for neuropathies affecting the auditory system. Personalised cues (tactile or visual) must be integrated into the calibration of the constructed models. I also have experience in: performing psychoacoustic and electrophysiology tests study with human participants, design novel tests for such a specific hearing loss.
Reference details: [Prof. Paul Avan](#), email: paul.avan@pasteur.fr

Visiting Research Fellow August 2024
Institute of Statistical Mathematics, Department of Statistical Modeling *Tokyo, Japan*
Working on a project aimed to perform estimation of green bond yield using Signature Graph Signal Reconstruction with Green Bond Yields Analysis with particular attention to missing data path estimation and improve investment strategies.
Reference details: [Prof. Tomoko Matsui](#), mobile: +81 50 5533 8537, email: tmatsui@ism.ac.jp

Research Engineer Feb 2022 – Jul 2022

Institut Polytechnique de Paris, Telecom Paris, Signal, Statistics, and Learning Team *Paris, France*

Implemented ML-based geolocation methods for wireless device networks in collaboration with the French Army.

Teaching Assistant Sep 2016 – Sep 2021

University College London, Statistical Science Department & Computer Science Department *London, UK*

Tutor for different courses in Probability, Statistics and Programming methods in the Statistical Science Department and Computer Science Department. Maximum class size: 250.

Reference details: Prof. Matina Rassias, mobile: +44(0)20 7679 1624, email: m.rassias@ucl.ac.uk

Research Assistant Feb 2020 – Feb 2021

Heriot-Watt University, Business School *Edinburgh, UK*

Supporting Prof. Dimitris Christopolous in preparing different grant applications in Green Finance

Reference details: Prof. Dimitris Christopoulos, mobile: +44 (0)20 7040 5106, email: D.Christopoulos@hw.ac.uk

Research Assistant July 2019 – Dec 2019

City University of London, Cass Business School *London, UK*

A project with Prof. Rosalba Radice aimed to investigate Copula Functions within insurance applications

Reference details: mobile: Prof. Rosalba Radice, email: rosalba.radice@city.ac.uk

Visiting Research Fellow Feb 2018 – Mar 2018

Institute of Statistical Mathematics, Department of Statistical Modeling *Tokyo, Japan*

I have been invited at the ISM as research fellow by Prof. Tomoko Matsui as part of my Phd project

Reference details: Reference details: Prof. Tomoko Matsui, mobile: +81 50 5533 8537, email: tmatsui@ism.ac.jp

Visiting Research Student Jul 2017 – Jul 2017

Université Clermont Auvergegne, Laboratoire de Mathématiques Blaise Pascal *Clermont-Ferrand, France*

I have been invited as research student by Prof. Nourddine Azzaoui as part of my Phd project

Reference details: Prof. Nourddine Azzaoui mobile: +33 4 73 40 70 81 , email: nourddine.azzaoui@math.univ-bpclermont.fr

PUBLICATIONS LIST

Machine Learning Mitigants for Speech Based Cyber Risk.

Authors: Marta Campi, Gareth W. Peters, Nourddine Azzaoui, Tomoko Matsui

Journal: IEEE Access, Volume 9, Pages 136831 - 136860, Publisher IEEE , Publication date 2021/10/1, available at this page, supplement page.

Ataxic Speech Disorders and Parkinson's Disease Diagnostics via Stochastic Embedding of Empirical Mode Decomposition.

Authors: Marta Campi, Gareth W. Peters, Dorota Toczydlowska.

Journal: PlosOne, page, supplement available at page.

Cervical vestibular evoked myogenic potentials (c-VEMPs) in healthy children: normative values for bone and air conduction.

Authors: Sylvette Roselyne Wiener Vacher, Marta Campi, Priscilla Boizea, Hung THAI-VAN.

Accepted and to appear in "Frontiers in Neurology", section Neuro-Otology, available at this page.

Shades of Green: Unveiling the Impact of Municipal Green Bonds on the Environment.

Authors: Marta Campi, Gareth W. Peters, Kylie-Anne Richards.

Journal:"Open Franklin", 100113, available at this page.

Vestibular Impairment and Postural Development in Children 2 With Profound Bilateral Hearing Loss.

Authors: Sylvette Roselyne Wiener Vacher, Marta Campi, Simona Caldani, Hung Thai-Van.

Journal: JAMA Network Open 7 (5), e2412846-e2412846, available at this page.

Signature Isolation Forest.

Authors: Marta Campi, Guillaume Staerman, Gareth W. Peters, Tomoko Matsui

Accepted and to appear at AISTAT2025, available at this page.

Standardised Hearing Loss Risk Profiles with State-Space Models.

Authors: Marta Campi, Gareth W. Peters, Perrine Morvan, Mareike Buhl, Hung Thai-Van.

Under Review Plos Computational Biology, available at this page.

Anatomy of Municipal Green Bond Yield Spreads

Authors: Mohammad Hadi Sehatpour, Marta Campi, Christina Sklibosios Nikitopoulos, Gareth W. Peters, Kylie-Anne

Richards.
Under Review at Journal of Banking of Finance, available at this page.

Discrimination loss vs. SRT: A model-based approach towards harmonizing speech test interpretations.
Authors: Mareike Buhl, Eugen Kludt, Paul Avan, Marta Campi.
Under Review Journal of International Audiology, available at this page.

Hearing Loss Characterisation Using NLP Modeling on large-scale PROMs.
Authors: Perrine Morvan, Marta Campi, Gareth W. Peters, Hung Thai-Van.
Under Review at Lancet Public Health.

Optimizing Snowball Referrals in Expert Surveys
Authors: Dimitris Christopoulos, Alex Jose, Marta Campi.
Under Review at PNAS.

Cross-Curve Interest Rate Stress Testing
Authors: Isaiah T. Katz, Gareth W. Peters, Marta Campi.
In Preparation.

Pediatric Protocol for Bithermal Caloric Testing with Video-nystagmoscopy and quickphase frequency recording: normative data.
Authors: J. Housset, M. Campi, A.Maudoux, E. Chebib, S.R. Wiener-Vacher, H Thai-Van.
Under Review at JAMA Network Open.

Underlying Speech Mechanisms of Auditory Nerve Spectrum Disorder.
Authors: Marta Campi, Clement Gaultier, Gregory Gerenton, Paul Avan.
In Preparation.

Spectral Representation Learning for Real-Valued Signals by Complex Gaussian Process.
Authors: Marta Campi, Dorota Toczydlowska, Gareth W. Peters.
In Preparation.

Relationships of Vestibular Function and Usher Genomic Mutations.
Authors: Sylvette Roselyne Wiener Vacher, Marta Campi, Crystel Bonnet, Christine Petit.
In Preparation.

Time Series Methods, *Book*
Authors: Gareth W. Peters, Marta Campi.
In Preparation.

SELECTED PRESENTATIONS & CONFERENCES

Ataxic Speech Disorders and Parkinson's Disease Diagnostic via Stochastic EMD   Dec. 2024
University California Santa Barbara   *California, US*
Invited speaker for the seminar at the Department of Statistics and Applied Probability, University California Santa Barbara.

Big Data in Audiology   Sep. 2024
WCA, World Congress of Audiology 2024   *Paris, France*
Invited speaker and chair at WCA.

Big Data in Audiology   May. 2024
EFAS, internal workshop for the Congress of European Federation of Audiology Societies 2024   *Zagreb, Croatia*
Invited speaker at internal workshop for audiologists.

From monogenic age-related hearing loss to a battery of objective audiovestibular diagnostic tests   May. 2023
EFAS, 16th Congress of European Federation of Audiology Societies 2023   *Sibenik, Croatia*
Poster presentation

Statistical Perspective of the Empirical Mode Decomposition   Apr. 2022
Télécom Paris, Institut Polytechnique de Paris   *Palaiseau, France*
Internal Seminar at Télécom Paris

Green Bond Risk Performance and Risk Indicators

Heriot-Watt Business School

International Workshop on Green Finance and UK Decarbonization Processes at the Business School of Heriot-Watt University

Jan. 2020

Edinburgh, UK

Empirical Mode Decomposition for Speaker Verification Applications

Institut of Statistical Mathematics

International Workshop on spatio-temporal statistics methods at ISM in Tokyo

Feb. 2018

Tokyo, Japan

Properties of Empirical Mode Decomposition

CMStatistics 2017.

The 10th International Conference of the ERCIM WG on Computational and Methodological Statistics

Dec. 2017

London, UK

AWARDS AND SCHOLARSHIP

Winner of the Thematic Programmes - 3 weeks duration

Institut Henri Poincaré

Nov 2025

Paris, France

The Institut Henri Poincaré in Paris organises yearly calls for research programmes of 3 weeks for researchers to select a thematic and hold a workshop. I won this grant in collaboration with Dr. Ioannis Chalkiadakis and Prof. Gareth W. Peters. The workshop will be held in November 2025 and will last three weeks. The thematic will cover advanced statistical and mathematical methods for speech and natural language processing applications in health and political science. € 50 000. The award was not taken due to personal reasons.

PhD Teaching Assistantship

University College London

Funding for my Phd at University College London (UCL) corresponding to 12 months, £1450 pcm

Sep 2019 – Sep 2021

London, UK

Engineering and Physical Sciences Research Council (EPSRC)

University College London

Funding for my Master of Research (MRes), Mphil and Phd corresponding to 4.5 years, £17000 per year

Sep 2015 – Sep 2019

London, UK

Best tutor Computer Science Department

University College London

Best tutor within the Computer Science Department of UCL corresponding to £500 (Students' feedback available)

April 2019

London, UK

UCL Faculty Education Award and shortlisted for the UCL Provost's Education Awards

University College London

Best tutor within the Faculty of Mathematical and Physical Science of UCL corresponding to £250 (Students' feedback available); shortlisted for the UCL Provost's Education Award competing against more experienced staff members

April 2019

London, UK

Winner of the PhD Students Competition "Departmental Away Days"

University College London

Best presentation amongst PhD students of the Statistical Science Department of UCL corresponding to £50

April 2018

London, UK

Athlete Performance Scholarship Program

Essex University

Sep 2014 - Sep 2015

Colchester, UK

Award for volleyball performances covering tuition fees and living costs at Essex University corresponding to £20000 for the academic year. Obligations: double daily training, Championship's match on Wednesday, Weekly Performance meeting (Nutrition, Sport's Psychology, etc.), Weekly Performance Testing (Jumping, Running, body composition, etc.), individual and team goals to be achieved.
Reference: Dr. Coach Alex Porter, email: alex@porter.eu.com, aporter@essex.ac.uk

STUDENT SUPERVISION

- Isaiah T. Katz, **PhD student** at University California Santa Barbara, Department of Statistics and Applied Probability. *My role*: Second supervisor with Chair Prof. Gareth W. Peters UCSB).

- Mohammadhadi Sehatpour, **PhD student** at University Technology Sydney, Finance Department. *My role*: Supervisor with Prof. Christina (University Technology Sydney), Dr. Kylie-Anne Richards (University Technology Sydney) and Chair Prof. Gareth W. Peters UCSB).

- Eva Thurot, **Master 1 student** at ECE Paris, Internship at CERIAH in 2023, Hearing Institute. *My role*: Second supervisor with Dr. Gregory Gerenton (CERIAH).

- Manon Martinez, **Master 2 student** at AIX-MARSEILLE UNIVERSITÉ in Acoustic, Internship at CERIAH in 2024, Hearing Institute. *My role*: First supervisor with Dr. Gregory Gerenton (CERIAH).

- Yasemin Arslan, **Master 1 student** at University of Sorbonne in Machine Learning, Internship at CERIAH in 2024, Hearing Institute. *My role*: First supervisor with Dr. Mareike Buhl (CERIAH).

- Perrine Morvan, **PhD student** at CERIAH in 2022-2025, Hearing Institute. *My role*: Third supervisor with Prof. Hung Thai-Van (CERIAH) and Dr. Johanna Savin (Amplifon).

WORK EXPERIENCE

Research Scientist   July 2024 – Present
Amplifon France   *Part time – Paris, France*
Collaborating on research strategies and budget forecasting to optimize resource distribution, supporting long-term business development and strategic planning for sustained growth.

- Developed and implemented advanced AI-driven clinical practices for hearing aid users by leveraging Large Language Models (LLMs) and Natural Language Processing (NLP) techniques to analyze and extract insights from open-text surveys in French, enabling a deeper understanding of patient needs.

- Applied State Space Models (SSMs) to estimate dynamic trends in hearing loss across various demographic groups, facilitating the definition of risk incidences and enhancing the effectiveness of clinical decision support systems (CDSS).

- Utilized XGBoost algorithms to predict speech intelligibility scores based on hearing aid parameters within hearing-impaired clusters, optimizing device performance and improving patient care outcomes.

- Supervised and mentored 2-3 PhD students employed by the company, guiding them in AI-related projects and contributing to their professional development.

Reference details: *Reference details*: <u>Prof. Hung Thai-Van</u>, email: hthaivan@gmail.com,
Perrine Morvan, email: perrine.morvan@amplifon.com

Senior Analyst   Dec 2021 – July 2024
Fortlake Asset Management   *Remote – Sydney, Australia*
Reporting to the Deputy Chief Investment Officer (CIO) to run several aspects within the business.

- Collaborated closely with the Deputy Chief Investment Officer (CIO) to develop models integral to the investment process.

- Played a significant role in developing Responsible Investment Principles across all funds within Fortlake's scope.

- Extensive investment knowledge of complex OTC and exchange-traded financial instruments across North America, Europe, Asia Pacific, and Japan, including: Bonds, interest rate swaps, swaptions, Equity and bond futures, Credit default swaps, CDS swaptions, Equity index options, currency derivatives, Carbon futures and other forward-thinking instruments

- Represented Fortlake at key investor meetings, effectively communicating investment strategies to stakeholders.

- Utilized computational languages (R, Python) for quantitative analysis and modeling, incorporating data from Bloomberg, MSCI, IHS Markit, S&P, JP Morgan, and specialized vendors.

- Integrated AI and machine learning techniques into model development, enhancing predictive capabilities and optimizing investment strategies.

- Contributed to the establishment of critical infrastructure and led quantitative product development initiatives, showcasing expertise in financial modeling and strategic development.

- Worked with the Deputy CIO to facilitate strategic academic partnerships with prestigious institutions (University of California, University of Technology Sydney), contributing to high-impact research in fixed income and equities.

Reference details: <u>Dr. Kylie-Anne Richards</u>, email: kylieanne.richards@futurefund.gov.au

Consultant   May 2019 – Dec 2019
InRobin   *Remote – Part time – Edinburgh, UK*
Building predictive models able to monitor the maintenance of industrial assets.
I provided consultancy for several statistical methodologies for reliable predictions.
Reference details: Martin Kreer, email: m.kreer77@gmail.com

Junior Analyst   Apr 2013 – Dec 2013
COSTA CROCIERE S.P.A, Revenue Management Department   *Genova, Italy*
I participated to the development of the demand forecast and price optimisation and my tasks were:
(1) Analysis of periodical software output,
(2) Tools development to validate price recommendations,
(3) Reporting on software behaviour after changes of booking trend.
Reference details: Emilio Zunino, email: emiliozunino1@gmail.com

Languages

- **Italian**   Mothertongue
- **English**   Full Working Proficiency
- **French**   Full Working Proficiency

Software Skills

Solid experience in manipulating large datasets, as financial, environmental or speech dataset, with respect to several aspects as data cleaning, data preparation, data filtering, data integration and data exploration. Advanced skills in Python, R, Matlab, Tensorflow, Pytorch, C++, LATEX, bash script, matrix supercomputing, AWS, Microsoft Office, SAS, STATA, SQL, Minitab, Spss, Eviews. Basic skills in Java, Linux.

Professional Volleyball Player – 2006 - 2017

Professional volleyball player since 2006. Junior, Senior and Italian National Championships (Serie B2, B1 - Italy). UK National Championship (Super League). Double day training, 4/5 days per week in-season. Strong capability to organise my time, great sense of teamwork, self-confidence, ambition and result-driven approach. Captain of under 15, under 17, under 21, Serie B2. Vice-Captain Serie B1, Super-League (UK).

Awards:

- **2016-2017**: Best Hitter UK Super-League
- **2013-2014**: Captain of the Year - B2 Championship
- **2011-2012**: Most valuable player B2 Championship
- **2007-2008**: Best Blocker Under 18s Italian Championship

Reviewer

I served as a reviewer in several journal and proceeding conferences, such as Journal of Applied Statistics, IEEE Access, Journal of the Acoustical Society of America, Journal of Selected Topics in Signal Processing and the International Conference on Artificial Intelligence and Statistics (AISTATS).

REFERENCES

Chair Prof. Gareth W. Peters
Chair Professor, Department of Statistics and Applied Probability, University of California Santa Barbara, California, US, Leader of the Quantitative Risk Solutions (QRS) Lab, email: garethpeters@ucsb.edu, phone: 0131 451 8211

Assoc. Prof. Nourddine Azzaoui
Maitre de Conferences, Laboratoire de Mathématiques Blaise Pascal, Université Clermont Auvergne, Clermont-Ferrand, France, email:nourddine.azzaoui@math.univ-bpclermont.fr, phone: +33 4 73 40 70 81

Dr. Kylie-Anne Richards
Senior Lecturer, Business School, University of Technology Sydney (UTS), Sydney, Australia
Director, Investment Research team at Future Fund of Australia (Melbourne)
email:kylie-anne.richards@uts.edu.au, kylieanne.richards@futurefund.gov.au
webpage: `https://profiles.uts.edu.au/Kylie-Anne.Richards`

Assoc. Prof. Paul Northrop (Teaching)
Associate Professor, Department of Statistical Science, University College London, London, UK
email: p.northrop@ucl.ac.uk

Prof. Tomoko Matsui
Professor, Department of Statistical Modeling, Institute of Statistical Mathematics, Tokyo, Japan
email: tmatsui@ism.ac.jp, phone: +81 50 5533 8537

Prof. Paul Avan
Professor and leader of the CERIAH team at Hearing Institute, Institut Pasteur, Honorary Professor at Université Clermont Auvergne, Faculty of medicine, email: paul.avan@pasteur.fr

Prof. Hung Thai-Van
Professor of physiology at University of Lyon, co-leader of the CERIAH team at Hearing Institute, Institut Pasteur, email: hthaivan@gmail.com

Dr. Dorota Toczydłowska
Senior Software Engineer - AI in Drug Discovery, NVIDIA, Warsaw, Poland
email:dtoczydlowska@gmail.com