

Curriculum Vitae

Maurizio Filippone

- *AXA Chair of Computational Statistics & Associate Professor* at EURECOM, Sophia Antipolis, France
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Education

I received a Master's degree in Physics and a Ph.D. in Computer Science from the University of Genoa, Italy, in 2004 and 2008, respectively. The reason to pursue a Ph.D. in Computer Science was to deepen my interest in machine learning, which sparked towards the end of my studies in Physics. I also hold the French habilitation "Habilitation à diriger des recherches", which is the highest degree in French academic system to allow someone to become a professor.

Academic Positions

- Current position – **Associate Professor** – EURECOM, Sophia Antipolis, France
- From Fall 2015 to Spring 2018 – *Assistant Professor* – EURECOM, Sophia Antipolis, France
- From Fall 2011 to Fall 2015 – *Lecturer* – School of Computing Science – University of Glasgow, UK
- From Fall 2010 to Fall 2011 – *Research Associate* (PI: Prof. Mark Girolami) – Department of Statistical Science – University College London (2011), UK and School of Computing Science – University of Glasgow (2010), UK
- From Spring 2008 to Fall 2009 – *Research Associate* (PI: Dr Guido Sanguinetti) – Department of Computer Science – University of Sheffield, UK
- From Spring 2007 to Fall 2007 – *Research Scholar* (PIs: Profs. D. Barbarà, C. Domeniconi) – Department of Information and Software Engineering – George Mason University, VA, USA

Research contributions and impact

My research interest is in the field of Bayesian ML. In the last ten years, I've been focusing on nonparametric Bayesian models based on Gaussian processes, proposing a number of fundamental contributions to their applicability to large-scale problems. Due to the advancements in the field, myself and other groups working in the domain have established ways to approximate Gaussian processes and Deep Gaussian processes as Bayesian Deep Neural Networks. As a result, my research is currently focusing on Bayesian Deep Learning, and techniques at the interface between Gaussian processes and Deep Neural Networks.

After my Ph.D., I've published 50+ papers almost equally split between journals and conference, and I have been the leading author (either first or last) in most of these. As of Jan 2020, I've received 2000+ citations and my *h*-index is 23 (source Google Scholar).

Research Grants

- PI: *ECO-ML: Rethinking Modern Machine Learning Tools for a New Generation of Low-Power Large-Scale Modeling Systems* (300K€), 2018–2021, ANR-JCJC (French) research grant
- PI: AXA Chair of Computational Statistics: *New Computational Approaches to Risk Modeling* (600K€), 2016–2023, AXA Research Fund
- Co-PI: *Computational inference of biopathway dynamics and structures* (£340K), 2014–2017, (PI) D. Husmeier and (Co-PI) S. Rogers - EPSRC (UK) research grant

Supervision of Postdoctoral Fellows and Graduate Students

I'm currently supervising two **post-docs** at EURECOM for the duration of three years, **Sebasties Marmin** and **Dimitrios Milios**, both finishing at the end of 2020, who are partially funded by two ongoing grants on fundamentals of Bayesian ML. Before joining EURECOM, I co-supervised **Mu Niu** as a post-doc for three years at the University of Glasgow, funded by a grant from the UK research council EPSRC.

I'm currently supervising three **Ph.D. students** at EURECOM, **Jonas Wacker** (ends in Spring 2022), **Simone Rossi** (ends in Spring 2021), and **Gia-Lac Tran** (ends in Fall 2020) who are partially funded by two ongoing

grants on fundamentals of Bayesian ML. Recently, two Ph.D. students under my supervision at EURECOM, **Kurt Cutajar** and **Remi Domingues**, successfully defended their theses, one on fundamentals of Bayesian ML and another on machine learning for fraud detection in collaboration with the company Amadeus in Sophia Antipolis, France. Together with my colleague **Pietro Michiardi**, I'm co-supervising Ph.D. students funded by industry with Amadeus on time series (**Rosa Candela**), with SAP on interpretable ML (**Graziano Mita**), and with Renault Software Labs on ML for vehicular technologies (**Ugo Lecerf** and **Matthieu Da Silva Filarder**). Prior to joining EURECOM, I supervised a self-funded Ph.D. student **Xiaoyu Xiong** at the University of Glasgow.

Teaching Activities

I have started teaching when I joined the University of Glasgow as a lecturer in 2011, where I taught under-graduate and post-graduate courses in **Algorithmic Foundations** and **Machine Learning**. In Glasgow, I also designed and created the material of a new course on **Artificial Intelligence**. After joining EURECOM, I have given lectures on Bayesian ML in a course named **Advanced Statistical Inference**. Between 2018 and 2019, I have delivered lectures at the MLCC **summer school** in Genoa, Italy, and I designed and created the material for a **tutorial** on Gaussian processes at the IJCNN 2019 conference in collaboration with E. V. Bonilla.

Service to the Scientific Community

I've served as a **Program committee** member for several conference. Here is a selection including the most prestigious ones: NeurIPS (2014–2019), ICML (2015–2020), ECML (2016–2017), AISTATS (2012–2013, 2016–2019), IJCAI (2016), IJCNN (2006–2010, 2015). I'm currently covering more senior roles, such as **Area Chair** for AISTATS, and **Guest Editor** for the ECML/PKDD Machine Learning Journal track. Between 2013 and 2016 I've served as an **Associate Editor** for the journals Pattern Recognition and the IEEE Transactions on Neural Networks and Learning Systems.

Selected Presentations

I receive regular invitations to deliver **keynote** presentations at international events. Recently, I presented at the Northern Lights Deep Learning Workshop in Tromsø, Norway, and at the Workshop on Surrogate models for UQ in complex systems, Cambridge, UK.

I've also been actively promoting my research through **invited talks**. Here is a selected list over the past five years: University of Oxford (2019, 2015), Imperial College (2018), Google Research NYC (2017), Yandex Moscow (2017), University of Sheffield (2015), Columbia University (2014), Bristol University (2014), University of Edinburgh (2014), UTIA Prague (2014), University of Turin (2014, 2012).

In complement to these, I gave a talk at the Deep Bayes summer school in Moscow, Russia (2018, 2019), at the MLCC summer school in Genoa, Italy (2019), and I delivered a tutorial on Gaussian processes at the IJCNN 2019 conference.

Media Coverage

- *The Conversation* - 26 July 2019 - "Light, a possible solution for a sustainable AI"
- *MIT Technology Review website* - 20 October 2015 based on "Monte Carlo strength evaluation: Fast and reliable password checking"
- *New Scientist website* - 03 March 2012 based on "Predicting the conflict level in television political debates: an approach based on crowdsourcing, nonverbal communication and Gaussian processes"

Major Collaborations

I have a number of international collaborations, which developed out of shared scientific interests with **John P. Cunningham** (Department of Statistics, Columbia University), **Lorenzo A. Rosasco**, (University of Genoa and MIT), **Edwin V. Bonilla** (Data61, Sydney, Australia), **Michael A. Osborne** (University of Oxford, UK), and **James Hensman** (Prowler.io, Cambridge, UK). I'm also named collaborator in two grants to develop the application of Bayesian ML to neuroscience and spatial statistics. In particular, the Wellcome trust grant "BRAINCHART: Normative brain charting for predicting and stratifying psychosis" with PI **Andre Marquand** (Donders Institute, Nijmegen, The Netherlands), and on the Australian Research Council Discovery Early Career Researcher Award (DECRA) grant with PI **Andrew Zammit-Mangion** (University of Wollongong, Australia).

Awards

International Association of Pattern Recognition best paper award: M. Filippone, et al. **A survey of kernel and spectral methods for clustering**. *Pattern Recognition*, 41(1):176-190, January 2008. I also received a "Special Mention" award for a poster at the Autumn meeting on Latent Gaussian Models in Trondheim, Norway in 2015.

Selected Publications

- C. Nemeth, F. Lindsten, M. Filippone, and J. Hensman. Pseudo-extended Markov chain Monte Carlo. In *Advances in Neural Information Processing Systems 32: Annual Conference on Neural Information Processing Systems 2019, 9-12 December 2019, Vancouver, British Columbia, Canada, 2019*.
- S. Rossi, P. Michiardi, and M. Filippone. Good Initializations of Variational Bayes for Deep Models. In *Proceedings of the 36th International Conference on Machine Learning, ICML 2019, Long Beach, USA, 2019, 2019*.
- G.-L. Tran, E. V. Bonilla, J. P. Cunningham, P. Michiardi, and M. Filippone. Calibrating Deep Convolutional Gaussian Processes. In *AISTATS 2019, Naha, Japan, 2019, 2019*.
- D. Miliotis, R. Camoriano, P. Michiardi, L. Rosasco, and M. Filippone. Dirichlet-based Gaussian Processes for Large-scale Calibrated Classification. In *Advances in Neural Information Processing Systems 31: Annual Conference on Neural Information Processing Systems 2018, December 3-7 2018, Montreal, Quebec, Canada, 2018*.
- M. Lorenzi and M. Filippone. Constraining the Dynamics of Deep Probabilistic Models. In *Proceedings of the 35th International Conference on Machine Learning, ICML 2018, Stockholm, Sweden, 2018, 2018*.
- K. Cutajar, E. V. Bonilla, P. Michiardi, and M. Filippone. Random feature expansions for deep Gaussian processes. In *Proceedings of the 34th International Conference on Machine Learning, ICML 2017, Sydney, Australia, August 6-11, 2017, 2017*.
- K. Cutajar, M. A. Osborne, J. P. Cunningham, and M. Filippone. Preconditioning kernel matrices. In *Proceedings of the 33rd International Conference on Machine Learning, ICML 2016, New York City, USA, June 19-24, 2016, 2016*.
- J. Hensman, A. G. de G. Matthews, M. Filippone, and Z. Ghahramani. MCMC for variationally sparse Gaussian processes. In *Advances in Neural Information Processing Systems 28: Annual Conference on Neural Information Processing Systems 2015, December 7-12 2015, Montreal, Quebec, Canada, 2015*.
- M. Filippone and R. Engler. Enabling scalable stochastic gradient-based inference for Gaussian processes by employing the Unbiased Linear System SolvEr (ULISSE). In *Proceedings of the 32nd International Conference on Machine Learning, ICML 2015, Lille, France, July 6-11, 2015, 2015*.
- M. Filippone and M. Girolami. Pseudo-marginal Bayesian inference for Gaussian processes. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 36(11):2214-2226, 2014.
- F. Dondelinger, M. Filippone, S. Rogers, and D. Husmeier. ODE parameter inference using adaptive gradient matching with Gaussian processes. In *AISTATS*, 2013.
- M. Filippone, M. Zhong, and M. Girolami. A comparative evaluation of stochastic-based inference methods for Gaussian process models. *Machine Learning*, 93(1):93-114, 2013.
- M. Filippone, A. F. Marquand, C. R. V. Blain, S. C. R. Williams, J. Mourão-Miranda, and M. Girolami. Probabilistic prediction of neurological disorders with a statistical assessment of neuroimaging data modalities. *Annals of Applied Statistics*, 6(4):1883-1905, 2012.
- M. Filippone and G. Sanguinetti. Information theoretic novelty detection. *Pattern Recognition*, 43(3):805-814, March 2010.