CURRICULUM VITAE

Maurizio Filippone

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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 Computational Statistics and Machine Learning, which sparked towards the end of my studies in Physics. I hold a "Post-graduate certificate in academic practice", which I obtained during my Lectureship at the University of Glasgow. I also hold the French abilitation "Habilitation á diriger des recherches", which is the highest degree in the French academic system to allow someone to become a Professor.

Academic Positions

- Current position – **Professeur Classe 2** – Department of Data Science, EURECOM, Biot, France
- From Fall 2015 to 2018 – *Maître de Conférence Classe 1* – EURECOM, Biot, 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) 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) – George Mason University, Fairfax VA, USA

Research contributions and impact

My research interests are in the field of Bayesian Statistics. Over the last ten years, I have focused 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 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 100+ 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 December 2022, I've received 3600+ citations and my h-index is 28 (source Google Scholar).

Selected 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've recently completed the supervision of two **post-docs** at EURECOM, **Simone Rossi** and **Dimitrios Milios**, who were partially funded by two ongoing grants on fundamentals of Bayesian Statistics. Shortly after joining EURECOM, I supervised another post-doc **Sebastien Marmin** on the same grants, and 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 am currently supervising three **Ph.D. students** at EURECOM, **Bogdan Kozyrskiy** (ends in Spring 2023), and **Ba-Hien Tran** (ends in Fall 2023) who are partially funded by two ongoing grants on fundamentals of Bayesian Statistics; the third Ph.D. student **Davit Gogolashvili** is funded by European training network on Machine Learning for Wireless Communication Networks (EU grant WindMILL). In the past couple of years, five Ph.D. students under my supervision at EURECOM, **Jonas Wacker**, **Kurt Cutajar**, **Gia-Lac Tran**, **Simone Rossi**, and **Remi Domingues**, successfully defended their

theses, the first four on fundamentals of Bayesian Statistics, and the last one on statistical methods for fraud detection in collaboration with the company Amadeus in Sophia Antipolis, France. I am helping my colleague **Pietro Michiardi** to co-supervise one post-doc **Giulio Franzese** on representation learning for networking data. I've also co-supervised Ph.D. students funded by industry with Amadeus on time series (**Rosa Candela**) and with SAP on interpretability (**Graziano Mita**). Prior to joining EURECOM, I supervised a self-funded Ph.D. student **Xiaoyu Xiong** at the University of Glasgow.

Teaching Activities

I 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 in **Artificial Intelligence**. Since joining EURECOM, I have been giving lectures on Bayesian Statistics in a course named **Advanced Statistical Inference**. Between 2018 and 2019, I 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, and another one on Bayesian Deep Learning at the IJCAI 2021 conference in collaboration with my (at the time) Ph.D. student S. Rossi.

Service to the Scientific Community

I am and I have been 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, 2016–2023), IJCAI (2016), IJCNN (2006–2010, 2015). I'm acting as an **Area Chair** for AISTATS since 2020, and I was **Guest Editor** for the ECML/PKDD Machine Learning Journal track in 2020. Between 2013 and 2016 I 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. In 2022, I opened the workshop on Statistical Deep Learning in Sydney, Australia, in 2019 I presented at the Northern Lights Deep Learning Workshop in Tromsø, Norway, and in 2018 I presented at the Workshop on Surrogate models for Uncertainty Quantification in Complex Systems in Cambridge, UK.

I've also been actively promoting my research through **invited talks**. Here is a selected list over the past few years: Aalto University (2023), Stanford University (2022), University California Irvine (2022), University of Wollongong (2022), Data61 (2022), University of Oxford (2019, 2015), Imperial College (2018), Google Research NYC (2017), Yandex Moscow (2017), University of Sheffield (2015), Columbia University (2017, 2014), Bristol University (2014), University of Edinburgh (2014).

In complement to these, I gave invited lectures 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 and a tutorial on Bayesian Deep Learning at the IJCAI 2021 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 **Markus Heinonen** (Aalto University, Helsinki, Finland). I'm also named collaborator in two grants to develop the application of Bayesian Statistics 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

- J. Wacker, M. Kanagawa, M. Filippone. Improved random features for dot product kernels. *Journal of Machine Learning Research*, to appear.
- B.-H. Tran, S. Rossi, D. Milios, and M. Filippone. All you need is a good functional prior for Bayesian deep learning. *Journal of Machine Learning Research*, 23(74):1–56, 2022.
- S. Marmin and M. Filippone. Deep Gaussian processes for calibration of computer models (with discussion). *Bayesian Analysis*, 17(4): 1301-1350, 2022.
- A. Zammit-Mangion, T.-L. J. Ng, Q. Vu, and M. Filippone. Deep compositional spatial models. *Journal of the American Statistical Association*, in press, 2021.
- G. Franzese, D. Milios, M. Filippone, P. Michiardi. Revisiting the effects of stochasticity for Hamiltonian samplers. *Proceedings of the 39th International Conference on Machine Learning*, PMLR 162:6744-6778, 2022.
- B.-H. Tran, S. Rossi, D. Milios, and M. Filippone. Model Selection for Bayesian Autoencoders. *Advances in Neural Information Processing Systems 34: NeurIPS 2021*.
- G.-L. Tran, D. Milios, P. Michiardi, and M. Filippone. Sparse within sparse Gaussian processes using neighbor information. *Proceedings of the 38th International Conference on Machine Learning*, PMLR 139:10369-10378, 2021.
- S. Rossi, S. Marmin, and M. Filippone. Walsh-Hadamard Variational Inference for Bayesian Deep Learning. *Advances in Neural Information Processing Systems 33: NeurIPS 2020*.
- C. Nemeth, F. Lindsten, M. Filippone, and J. Hensman. Pseudo-extended Markov chain Monte Carlo. *Advances in Neural Information Processing Systems 32: NeurIPS 2019*.
- S. Rossi, P. Michiardi, and M. Filippone. Good Initializations of Variational Bayes for Deep Models. *Proceedings of the 36th International Conference on Machine Learning*, PMLR 97:5487-5497, 2019.
- G.-L. Tran, E. V. Bonilla, J. P. Cunningham, P. Michiardi, and M. Filippone. Calibrating Deep Convolutional Gaussian Processes. *AISTATS 2019, Naha, Japan, 2019*.
- D. Milios, R. Camoriano, P. Michiardi, L. Rosasco, and M. Filippone. Dirichlet-based Gaussian Processes for Large-scale Calibrated Classification. *Advances in Neural Information Processing Systems 31: NeurIPS 2018*.
- M. Lorenzi and M. Filippone. Constraining the Dynamics of Deep Probabilistic Models. *Proceedings of the 35th International Conference on Machine Learning*, PMLR 80:3227-3236, 2018.
- K. Cutajar, E. V. Bonilla, P. Michiardi, and M. Filippone. Random feature expansions for deep Gaussian processes. *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. *Proceedings of the 33rd International Conference on Machine Learning*, PMLR 48:2529-2538, 2016.
- J. Hensman, A. G. de G. Matthews, M. Filippone, and Z. Ghahramani. MCMC for variationally sparse Gaussian processes. *Advances in Neural Information Processing Systems 28: NeurIPS 2015*.
- M. Filippone and R. Engler. Enabling scalable stochastic gradient-based inference for Gaussian processes by employing the Unbiased LInear System SolvEr (ULISSE). *Proceedings of the 32nd International Conference on Machine Learning*, PMLR 37:1015-1024, 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.
- 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.