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 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 – **Associate Professor** – Statistics Program, KAUST, Saudi Arabia
- Fall 2018 to end of 2023 – *Professeur Classe 2* – Department of Data Science, EURECOM, Biot, France
- Fall 2015 to Fall 2018 – *Maître de Conférence Classe 1* – EURECOM, Biot, France
- Fall 2011 to Fall 2015 – *Lecturer* – School of Computing Science – University of Glasgow, UK
- Fall 2010 to Fall 2011 – *Research Associate* (PI: Prof. M. Girolami) – University College London (2011) and University of Glasgow (2010), UK
- Spring 2008 to Fall 2009 – *Research Associate* (PI: Prof. G. Sanguinetti) – University of Sheffield, UK
- 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 twelve years, I have focused on 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 cast 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 May 2024, I've received 4500+ citations and my h-index is 32 (source Google Scholar).

Selected Research Grants

- PI: *MUSE-COM^2: AI-enabled MUltimodal SEmantic COMmunications and COMputing* (300K€), 2023–2026, ANR and EU (Chist-ERA call)
- PI: AXA Chair of Computational Statistics: *New Computational Approaches to Risk Modeling* (600K€), 2016–2023, AXA Research Fund
- PI: *ECO-ML: Rethinking Modern Machine Learning Tools for a New Generation of Low-Power Large-Scale Modeling Systems* (300K€), 2018–2021, National French funding agency, JCJC research grant
- PI: 3IA Chair: *Deep Probabilistic Modeling on Novel Hardware* (∼200K€), 2020–2023, AI center funded by the National French funding agency ANR
- Partner: European Training Network: *WindMill: Machine Learning for Wireless Communications* (∼200K€), 2018–2022, EU Horizon 2020.
- 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 have recently completed the supervision of three **Ph.D. students** at EURECOM, **Bogdan Kozyrskiy** (ended in Spring 2023), and **Ba-Hien Tran** (ended in Fall 2023) who were partially funded by two ongoing grants on fundamentals of Bayesian Statistics; the third Ph.D. student **Davit**

Gogolashvili was funded by European training network on Machine Learning for Wireless Communication Networks (EU grant WindMILL). In the previous 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. 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 undergraduate 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**. At KAUST I am teaching a new course on **Bayesian Deep Learning** and one on **Bayesian Statistics**. 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 international conferences. 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 as a **Senior Area Chair** for AISTATS since 2023, 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 2023, I was invited to present my work at the symposium on Advances in Approximate Bayesian Inference (AABI) at ICML and at the Generative Modeling and Uncertainty Quantification (GenU) workshop in Copenhagen. 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: NTNU (2023), Aalto University (2023), Stanford University (2022), University California Irvine (2022), University of Wollongong (2022), Data61, Sydney (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 addition, 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 **Stephan Mandt** and **Babak Shahbaba** (Computer Science and Statistics departments at University California Irvine), **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

- Best Ph.D. Thesis Award obtained by former student Ba-Hien Tran, Doctoral School of Sorbonne University, France, December 2023
- 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.

Selected Publications

- A. Zammit-Mangion, M. D. Kaminski, B.-H. Tran, M. Filippone, and N. Cressie. Spatial Bayesian neural networks. *Spatial Statistics*, 60:100825, 2024.
- B.-H. Tran, G. Franzese, P. Michiardi, M. Filippone. One-line-of-code data mollification improves optimization of likelihood-based generative models. *NeurIPS 2023*.
- 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*, 117(540):1787-1808, 2022.
- G. Franzese, D. Milios, M. Filippone, P. Michiardi. Revisiting the effects of stochasticity for Hamiltonian samplers. *ICML 2022*.
- B.-H. Tran, S. Rossi, D. Milios, and M. Filippone. Model Selection for Bayesian Autoencoders. *NeurIPS 2021*.
- G.-L. Tran, D. Milios, P. Michiardi, and M. Filippone. Sparse within sparse Gaussian processes using neighbor information. *ICML 2021*.
- S. Rossi, S. Marmin, and M. Filippone. Walsh-Hadamard Variational Inference for Bayesian Deep Learning. *NeurIPS 2020*.
- C. Nemeth, F. Lindsten, M. Filippone, and J. Hensman. Pseudo-extended Markov chain Monte Carlo. *NeurIPS 2019*.
- S. Rossi, P. Michiardi, and M. Filippone. Good Initializations of Variational Bayes for Deep Models. *ICML 2019*.
- G.-L. Tran, E. V. Bonilla, J. P. Cunningham, P. Michiardi, and M. Filippone. Calibrating Deep Convolutional Gaussian Processes. *AISTATS 2019*.
- D. Milios, R. Camoriano, P. Michiardi, L. Rosasco, and M. Filippone. Dirichlet-based Gaussian Processes for Large-scale Calibrated Classification. *NeurIPS 2018*.
- M. Lorenzi and M. Filippone. Constraining the Dynamics of Deep Probabilistic Models. *ICML 2018*.
- K. Cutajar, E. V. Bonilla, P. Michiardi, and M. Filippone. Random feature expansions for deep Gaussian processes. *ICML 2017*.
- K. Cutajar, M. A. Osborne, J. P. Cunningham, and M. Filippone. Preconditioning kernel matrices. *ICML 2016*.
- J. Hensman, A. G. de G. Matthews, M. Filippone, and Z. Ghahramani. MCMC for variationally sparse Gaussian processes. *NeurIPS 2015*.
- M. Filippone and R. Engler. Enabling scalable stochastic gradient-based inference for Gaussian processes by employing the Unbiased LInear System SolvEr (ULISSE). *ICML 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.