# 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 Feb 2025, I've received about 5000 citations and my $h$-index is 34 (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.

At KAUST, I'm currently supervising two Ph.D. students (**Mattia Rosso** and **Madi Matymov**) and one Ms/Ph.D. student (**Yiting Lu**), and co-supervising one post-doc (**Emmanuel Ambriz**).

## 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 2024, I gave an invited talk at the Approximate Inference in Theory and Practice workshop in Paris, and at two sessions on Advances in Inference and Theory for Bayesian Neural Networks and Recent Advances on High Dimensional Models at the JSM conference and at the ICSDS conference, respectively. 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.

## Full list of publications

**Journals**

- J. Wacker, M. Kanagawa, and M. Filippone. Improved random features for dot product kernels. *Journal of Machine Learning Research*, 25(235):1-75, 2024.
- A. Zammit-Mangion, M. D. Kaminski, B.-H. Tran, M. Filippone, and N. Cressie. Spatial Bayesian neural networks. *Spatial Statistics*, 60:100825, 2024.
- G. Franzese, S. Rossi, L. Yang, A. Finamore, D. Rossi, M. Filippone, and P. Michiardi. How much is enough? a study on diffusion times in score-based generative models. *Entropy*, 25(4), 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.
- C. Carota, M. Filippone, and S. Polettini. Assessing Bayesian semi-parametric log-linear models: An application to disclosure risk estimation. *International Statistical Review*, 90(1):165-183, 2022.
- Q. V. Andrew Zammit-Mangion, Tin Lok James Ng and M. Filippone. Deep compositional spatial models. *Journal of the American Statistical Association*, 117(540):1787-1808, 2022.
- R. Domingues, P. Michiardi, J. Barlet, and M. Filippone. A comparative evaluation of novelty detection algorithms for discrete sequences. *Artificial Intelligence Review*, 53:3787-3812, 2020.
- M. Lorenzi, M. Filippone, G. B. Frisoni, D. C. Alexander, and S. Ourselin. Probabilistic disease progression modeling to characterize diagnostic uncertainty: Application to staging and prediction in alzheimer's disease. *NeuroImage*, 190:56-68, 2019.
- R. Domingues, P. Michiardi, J. Zouaoui, and M. Filippone. Deep Gaussian Process autoencoders for novelty detection. *Machine Learning*, 107(8-10):1363-1383, 2018.
- R. Domingues, M. Filippone, P. Michiardi, and J. Zouaoui. A comparative evaluation of outlier detection algorithms: Experiments and analyses. *Pattern Recognition*, 74:406-421, 2018.
- M. Niu, B. Macdonald, S. Rogers, M. Filippone, and D. Husmeier. Statistical inference in mechanistic models: time warping for improved gradient matching. *Computational Statistics*, pages 1-33, 8 2017.
- X. Xiong, V. Šmídl, and M. Filippone. Adaptive multiple importance sampling for Gaussian processes. *Journal of Statistical Computation and Simulation*, 87(8):1644-1665, 2017.
- B. Macdonald, M. Niu, S. Rogers, M. Filippone, and D. Husmeier. Approximate parameter inference in systems biology using gradient matching: a comparative evaluation. *BioMedical Engineering OnLine*, 15(Suppl 1):80, 7 2016.
- J. M. Rondina, M. Filippone, M. Girolami, and N. S. Ward. Decoding post-stroke motor function from structural brain imaging. *NeuroImage: Clinical*, 12:372-380, 2016.
- C. Carota, M. Filippone, R. Leombruni, and S. Polettini. Bayesian nonparametric disclosure risk estimation via mixed effects log-linear models. *Annals of Applied Statistics*, 9(1):525-546, 2015.
- M. Dell'Amico, M. Filippone, P. Michiardi, and Y. Roudier. On user availability prediction and network applications. *IEEE/ACM Transactions on Networking*, 23(4):1300-1313, Aug 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.
- S. Kim, F. Valente, M. Filippone, and A. Vinciarelli. Predicting continuous conflict perception with Bayesian Gaussian processes. *IEEE Transactions on Affective Computing*, 5(2):187-200, 2014.
- A. F. Marquand, M. Filippone, J. Ashburner, M. Girolami, J. Mourão-Miranda, G. J. Barker, S. C. R. Williams, P. N. Leigh, and C. R. V. Blain. Automated, High Accuracy Classification of Parkinsonian

Disorders: A Pattern Recognition Approach. *PLoS ONE*, 8(7):e69237+, 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.
- Y. Zhao, J. Kim, and M. Filippone. Aggregation algorithm towards large-scale boolean network analysis. *IEEE Transactions on Automatic Control*, 58(8):1976-1985, 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.
- L. Mohamed, B. Calderhead, M. Filippone, M. Christie, and M. Girolami. Population MCMC methods for history matching and uncertainty quantification. *Computational Geosciences*, 16(2):423-436, 2012.
- M. Filippone and G. Sanguinetti. Approximate inference of the bandwidth in multivariate kernel density estimation. *Computational Statistics & Data Analysis*, 55(12):3104-3122, 2011.
- M. Filippone and G. Sanguinetti. A perturbative approach to novelty detection in autoregressive models. *IEEE Transactions on Signal Processing*, 59(3):1027-1036, 2011.
- M. Filippone, F. Masulli, and S. Rovetta. Simulated annealing for supervised gene selection. *Soft Computing - A Fusion of Foundations, Methodologies and Applications*, 15:1471-1482, 2011.
- M. Filippone, F. Masulli, and S. Rovetta. Applying the possibilistic c-means algorithm in kernel-induced spaces. *IEEE Transactions on Fuzzy Systems*, 18(3):572-584, June 2010.
- M. Filippone and G. Sanguinetti. Information theoretic novelty detection. *Pattern Recognition*, 43(3):805-814, March 2010.
- M. Filippone. Dealing with non-metric dissimilarities in fuzzy central clustering algorithms. *International Journal of Approximate Reasoning*, 50(2):363-384, February 2009.
- F. Camastra and M. Filippone. A comparative evaluation of nonlinear dynamics methods for time series prediction. *Neural Computing and Applications*, 18(8):1021-1029, November 2009.
- M. Filippone, F. Masulli, and S. Rovetta. Clustering in the membership embedding space. *International Journal of Knowledge Engineering and Soft Data Paradigms*, 4(1):363-375, 2009.
- S. Rovetta, F. Masulli, and M. Filippone. Soft ranking in clustering. *Neurocomputing*, 72(7-9):2028-2031, March 2009.
- M. Filippone, F. Camastra, F. Masulli, and S. Rovetta. A survey of kernel and spectral methods for clustering. *Pattern Recognition*, 41(1):176-190, January 2008.

**Conferences**
- M. Heinonen, B.-H. Tran, M. Kampffmeyer, and M. Filippone. Robust classification by coupling data mollification with label smoothing. In *The 28th International Conference on Artificial Intelligence and Statistics*, 2025.
- A. Lhéritier and M. Filippone. Unconditionally calibrated priors for beta mixture density networks. In *The 28th International Conference on Artificial Intelligence and Statistics*, 2025.
- A. Benechehab, Y. A. E. Hili, A. Odonnat, O. Zekri, A. Thomas, G. Paolo, M. Filippone, I. Redko, and B. Kégl. Zero-shot model-based reinforcement learning using large language models. In *The Thirteenth International Conference on Learning Representations*, 2025.
- T. Papamarkou, M. Skoularidou, K. Palla, L. Aitchison, J. Arbel, D. Dunson, M. Filippone, V. Fortuin, P. Hennig, J. M. Hernández-Lobato, A. Hubin, A. Immer, T. Karaletsos, M. E. Khan, A. Kristiadi, Y. Li, S. Mandt, C. Nemeth, M. A. Osborne, T. G. J. Rudner, D. Rügamer, Y. W. Teh, M. Welling, A. G. Wilson, and R. Zhang. Position: Bayesian deep learning is needed in the age of large-scale AI. In R. Salakhutdinov, Z. Kolter, K. Heller, A. Weller, N. Oliver, J. Scarlett, and F. Berkenkamp, editors, *Proceedings of the 41st International Conference on Machine Learning*, volume 235 of *Proceedings of Machine Learning Research*, pages 39556-39586. PMLR, 21-27 Jul 2024.
- B.-H. Tran, G. Franzese, P. Michiardi, and M. Filippone. One-line-of-code data mollification improves optimization of likelihood-based generative models. In A. Oh, T. Neumann, A. Globerson, K. Saenko, M. Hardt, and S. Levine, editors, *Advances in Neural Information Processing Systems*, volume 36, pages 6545-6567. Curran Associates, Inc., 2023.
- G. Franzese, G. Corallo, S. Rossi, M. Heinonen, M. Filippone, and P. Michiardi. Continuous-time functional diffusion processes. In A. Oh, T. Neumann, A. Globerson, K. Saenko, M. Hardt, and S. Levine, editors, *Advances in Neural Information Processing Systems*, volume 36, pages 37370-37400. Curran Associates, Inc., 2023.
- J. Wacker, R. Ohana, and M. Filippone. Complex-to-real sketches for tensor products with applications to the polynomial kernel. In F. Ruiz, J. Dy, and J.-W. van de Meent, editors, *Proceedings of The 26th International Conference on Artificial Intelligence and Statistics*, volume 206 of *Proceedings of Machine Learning Research*, pages 5181-5212. PMLR, 25-27 Apr 2023.
- G. Franzese, D. Milios, M. Filippone, and P. Michiardi. Revisiting the effects of stochasticity for Hamiltonian samplers. In K. Chaudhuri, S. Jegelka, L. Song, C. Szepesvari, G. Niu, and S. Sabato, editors, *Proceedings of the 39th International Conference on Machine Learning*, volume 162 of *Proceedings of Machine Learning Research*, pages 6744-6778. PMLR, 17-23 Jul 2022.
- B.-H. Tran, S. Rossi, D. Milios, P. Michiardi, E. V. Bonilla, and M. Filippone. Model selection for Bayesian autoencoders. In A. Beygelzimer, Y. Dauphin, P. Liang, and J. W. Vaughan, editors, *Advances*

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- G. Mita, M. Filippone, and P. Michiardi. An Identifiable Double VAE For Disentangled Representations. In M. Meila and T. Zhang, editors, *Proceedings of the 38th International Conference on Machine Learning*, volume 139 of *Proceedings of Machine Learning Research*, pages 7769-7779. PMLR, 18-24 Jul 2021.
- S. Rossi, M. Heinonen, E. Bonilla, Z. Shen, and M. Filippone. Sparse Gaussian Processes Revisited: Bayesian Approaches to Inducing-Variable Approximations. In A. Banerjee and K. Fukumizu, editors, *Proceedings of The 24th International Conference on Artificial Intelligence and Statistics*, volume 130 of *Proceedings of Machine Learning Research*, pages 1837-1845. PMLR, 13-15 Apr 2021.
- S. Rossi, S. Marmin, and M. Filippone. Walsh-Hadamard variational inference for Bayesian deep learning. In H. Larochelle, M. Ranzato, R. Hadsell, M. Balcan, and H. Lin, editors, *Advances in Neural Information Processing Systems*, volume 33, pages 9674-9686. Curran Associates, Inc., 2020.
- G. Mita, P. Papotti, M. Filippone, and P. Michiardi. LIBRE: Learning Interpretable Boolean Rule Ensembles. In *AISTATS 2020, Palermo, Italy*, 2020.
- S. Rossi, S. Marmin, and M. Filippone. Efficient approximate inference with walsh-hadamard variational inference. In *Bayesian Deep Learning Workshop, NeurIPS*, 2019.
- 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.
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- D. Nguyen, M. Filippone, and P. Michiardi. Exact Gaussian process regression with distributed computations. In C. Hung and G. A. Papadopoulos, editors, *Proceedings of the 34th ACM/SIGAPP Symposium on Applied Computing, SAC 2019, Limassol, Cyprus, April 8-12, 2019*, pages 1286-1295. ACM, 2019.
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