George Papamakarios

Contact Info

Email: g.papamakarios@ed.ac.uk
Personal Website: http://homepages.inf.ed.ac.uk/s1459647/

Research Interests

I'm interested in probabilistic approaches to machine learning, especially generative modelling and Bayesian methods. My current research is on deep-learning methods for density estimation and approximate Bayesian inference.

Professional Experience

Summer 2018 | **Research intern**, DeepMind London
I worked on deep reinforcement learning for partially observed environments.

Summer 2016 | **Research intern**, Microsoft Research Cambridge
I worked as part of the *Infer.NET* project. My role was to develop and evaluate inference methods for deep generative models, mainly for computer-vision tasks.

2015–2019 | **Teaching assistant**, School of Informatics, University of Edinburgh
I tutored (and occasionally marked) the following courses:

- Machine Learning & Pattern Recognition
- Introductory Applied Machine Learning
- Probabilistic Modelling & Reasoning
- Informatics 2B - Algorithms, Data Structures & Learning
- Introduction to Theoretical Computer Science

2012–2013 | **Research assistant**, Information Technologies Institute, Centre for Research & Technology Hellas
I participated in the EU-funded project *Adapt4EE* and the Greek-funded project *EnNoisis*. My main role was to develop machine-learning systems for automatically recognizing everyday activities in smart homes, based on ambient sensors and Kinect cameras.

2010–2011 | **Research assistant**, Department of Electrical and Computer Engineering, Aristotle University of Thessaloniki
I participated in the EU-funded project *AutoGPU*. My main role was to develop fast and parallel software for low-level image processing on GPUs.

Studies

2019 | **PhD in Data Science**, University of Edinburgh
Thesis: "Neural density estimation and likelihood-free inference"
Supervisor: Iain Murray

2015 | **MSc by Research in Data Science**, University of Edinburgh
Grade: 92%, *Distinction*
Thesis: "Distilling Model Knowledge" — Supervisor: Iain Murray

2014 | **MSc in Advanced Computing**, Imperial College London
Grade: 90%, *Distinction*

Thesis: "Robust Low-Rank Modelling on Matrices and Tensors" — Supervisor: Stefanos Zafeiriou

2012 | **MEng in Electrical and Computer Engineering**, Aristotle University of Thessaloniki
Grade: 89.6%, *Distinction*
Thesis: "FLCC: A Library for Fast Computation of Convolution and Local Correlation Coefficients" — Supervisor: Nikos Pitsianis

Scholarships and Awards

2015 MSc by Research in Data Science Class Prize
2014 Microsoft Research PhD Scholarship
2014 Corporate Partnership Programme Award for Academic Excellence
2014 Winton Capital Applied Computing MSc Project Prize
2013 Lilian Voudouri Scholarship for Postgraduate Studies
2009 Erasmus Scholarship for International Studies

Academic Service

Reviewer	Advances in Neural Information Processing Systems (2016, 2018, 2019) International Conference on Machine Learning (2019) International Conference on Learning Representations (2019) International Conference on Artificial Intelligence and Statistics (2018, 2019) Journal of Machine Learning Research IEEE Transactions on Cybernetics
Organizer	ICML Workshop on Invertible Neural Networks and Normalizing Flows (2019)

Languages

English	Fluent
Greek	Native speaker

Computer Skills

Expert in	C, C++, C#, Python, Matlab, LaTeX
Familiar with	Java, Haskell, Prolog, SQL, XML
Machine Learning	TensorFlow, PyTorch, Theano
Parallel	Hadoop/MapReduce, CUDA, Pthreads
Web	HTML, CSS, JavaScript, Bootstrap
Other	Git, Bash, Qt

Publications

Preprints

[1] C. Durkan, A. Bekasov, I. Murray, G. Papamakarios, *Neural Spline Flows*, arXiv:1906.04032, 2019.

Conferences

[2] K. Gregor, G. Papamakarios, F. Besse, L. Buesing, T. Weber, *Temporal Difference Variational Auto-Encoder*, International Conference on Learning Representations, 2019. **(oral)**

[3] G. Papamakarios, D. C. Sterratt, I. Murray, *Sequential Neural Likelihood: Fast Likelihood-free Inference with Autoregressive Flows*, International Conference on Artificial Intelligence and Statistics, 2019.

[4] G. Papamakarios, T. Pavlakou, I. Murray, *Masked Autoregressive Flow for Density Estimation*, Advances in Neural Information Processing Systems, 2017. **(oral)**

[5] N. Xue, G. Papamakarios, M. Bahri, Y. Panagakis, S. Zafeiriou, *Robust low-rank tensor modelling using Tucker and CP decomposition*, European Signal Processing Conference, 2017.

[6] G. Papamakarios, I. Murray, *Fast ϵ-free Inference of Simulation Models with Bayesian Conditional Density Estimation*, Advances in Neural Information Processing Systems, 2016.

[7] G. Papamakarios, Y. Panagakis, S. Zafeiriou, *Generalised Scalable Robust Principal Component Analysis*, British Machine Vision Conference, 2014.

[8] G. Papamakarios, D. Giakoumis, K. Votis, S. Segouli, D. Tzovaras, C. Karagiannidis, *Synthetic Ground Truth Data Generation for Automatic Trajectory-based ADL Detection*, IEEE-EMBS International Conference on Biomedical and Health Informatics, 2014.

[9] G. Papamakarios, G. Rizos, N. P. Pitsianis, X. Sun, *Fast Computation of Local Correlation Coefficients on Graphics Processing Units*, Proceedings of SPIE, 2009.

Workshops

[10] C. Durkan, A. Bekasov, I. Murray, G. Papamakarios, *Cubic-Spline Flows*, Workshop on Invertible Neural Networks and Normalizing Flows at International Conference on Machne Learning, 2019. **(oral)**

[11] P. Moreno, J. Humplik, G. Papamakarios, B. . Pires, L. Buesing, N. Heess, T. Weber, *Neural belief states for partially observed domains*, Reinforcement Learning under Partial Observability Workshop at Neural Information Processing Systems, 2018.

[12] C. Durkan, G. Papamakarios, I. Murray, *Sequential Neural Methods for Likelihood-free Inference*, Bayesian Deep Learning Workshop at Neural Information Processing Systems, 2018.

[13] G. Papamakarios, I. Murray, *Distilling Intractable Generative Models*, Probabilistic Integration Workshop at Neural Information Processing Systems, 2015.

[14] G. Papamakarios, D. Giakoumis, M. Vasileiadis, K. Votis, D. Tzovaras, S. Segkouli, C. Karagiannidis, *A Tool to Monitor and Support Physical Exercise Interventions for MCI and AD Patients*, Patient Rehabilitation Techniques Workshop at International Conference on Pervasive Computing Technologies for Healthcare, 2014.

Book Chapters

[15] G. Papamakarios, D. Giakoumis, M. Vasileiadis, A. Drosou, D. Tzovaras, *Human Computer Confluence in the Smart Home Paradigm: Detecting Human States and Behaviours for 24/7 Support of Mild-Cognitive Impairments*, Human Computer Confluence: Transforming Human Experience Through Symbiotic Technologies, De Gruyter Open, 2016.

Theses

[16] G. Papamakarios, *Distilling Model Knowledge*, MSc by Research thesis, University of Edinburgh, 2015.

[17] G. Papamakarios, *Robust Low-Rank Modelling on Matrices and Tensors*, MSc thesis, Imperial College London, 2014.

[18] G. Papamakarios, G. Rizos, *FLCC: A Library for Fast Computation of Convolution and Local Correlation Coefficients*, MEng thesis, Aristotle University of Thessaloniki, 2011.