Sattar Vakili

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Education

2017 **Ph.D.** in Electrical and Computer Engineering with a Minor Degree in Applied Mathematics, **Cornell University**, Ithaca, NY.

Thesis: Sequential Methods for Learning and Inference Under Unknown Models.

Advisor: Professor Qing Zhao

2013 **M.S.** in Electrical and Computer Engineering, University of California, Davis, CA.

2011 **B.Sc.** in Electrical Engineering, Sharif University of Technology, Tehran, Iran.

Employment

2020 - Senior AI Researcher, **MediaTek Research**, Cambridge, UK.

MediaTek Research is the AI research department of MediaTek—a globally renowned semiconductor company. As a senior researcher, I lead AI research and development with applications in automated decision making systems. I mentor Ph.D. students, junior researchers and research interns. Our team consistently presents research outcomes at leading AI and ML venues.

2018 - 2020 Senior ML Researcher, **Secondmind Labs**, Cambridge, UK.

I led AI research with a focus on probabilistic non-parametric models, multi-agent systems and reinforcement learning. I mentored junior researchers, ML engineers and research interns.

Director: Professor Carl Rasmussen, Cambridge University

2017 - 2018 Postdoctoral Research Associate, Electrical Engineering Department, **Princeton University**, Princeton, NJ.

During my postdoctoral research, I worked on distributed learning and optimization for embedded systems in communication networks, in collaboration with BAE Systems.

Advisor: Professor Mung Chiang

Publications

Preprints:

2023 G. Neu, J. Olkhovskaya, **S. Vakili**, "Adversarial Contextual Bandits Go Kernelized," available on arXiv.

2023 S. Salgia, **S. Vakili**, Q. Zhao, "Random Exploration in Bayesian Optimization: Order-Optimal Regret and Computational Efficiency," available on arXiv.

2023 W. Wang, **S. Vakili**, I. Bogunovic, "Robust Best-arm Identification in Linear Bandits," available on arXiv.

Published:

2023 **S. Vakili**, J. Olkhovskaya, "Kernelized Reinforcement Learning with Order Optimal Regret Bounds," Conference on Neural Information Processing Systems (**NeurIPS 2023**); Part of this work was presented at European Workshop on Reinforcement Learning (**EWRL 2023**).

2023 S. Salgia, **S. Vakili**, Q. Zhao, "Collaborative Learning in Kernel-based Bandits for Distributed Users," IEEE Transactions on Signal Processing.

2023 **S. Vakili**, D. Ahmed, A. Bernacchia, C. Pike-Burke, "Delayed Feedback in Kernel Bandits," International Conference on Machine Learning (**ICML 2023, Oral presentation**).

2023 A. Das, S. Fotiadis, A. Batra, F. Nabiei, F. Liao, **S. Vakili**, D. Shiu, A. Bernacchia, "Image generation with shortest path diffusion," International Conference on Machine Learning (**ICML 2023**).

2023 S. Salgia, **S. Vakili**, Q. Zhao, "Provably and Practically Efficient Neural Contextual Bandits," International Conference on Machine Learning (**ICML 2023**).

2023 J. Garcia, F. Freddi, S. Fotiadis, M. Li, **S. Vakili**, A. Bernacchia, G. Hennequin, "Fisher-Legendre (FishLeg) optimization of deep neural networks," International Conference on Learning Representations (**ICLR 2023**).

2022 S. Yeh, F. Chang, C. Yueh, P. Wu, A. Bernacchia, **S. Vakili**, "Sample Complexity of Kernel-Based Q-Learning," International Conference on Artificial Intelligence and Statistics (**AISTATS 2023**).

2023 **S. Vakili**, M. Bromberg, J. Garcia, D. Shiu, A. Bernacchia, "Uniform Generalization Bounds for Overparameterized Neural Networks," IEEE International Symposium on Information Theory (**ISIT 2023**).

2023 U. Sengupta, C. Jao, A. Bernacchia, **S. Vakili**, D. Shiu, "Generative Diffusion Models for Radio Wireless Channel Modelling and Sampling," IEEE Global Communications Conference (**GLOBECOM 2023**).

2022 F. Chang, F. Nabiei, P. Wu, A. Cioba, **S. Vakili**, A. Bernacchia, "Gradient Descent: Robustness to Adversarial Corruption," International OPT Workshop on Optimization for Machine Learning at **NeurIPS 2022**.

2022 C. Réda, **S. Vakili**, E. Kaufmann, "Near-Optimal Collaborative Learning in Bandits," Conference on Neural Information Processing Systems (**NeurIPS 2022, Oral presentation**).

2022 **S. Vakili**, J. Scarlett, D. Shiu, A. Bernacchia, "Improved Convergence Rates for Sparse Approximation Methods in Kernel-Based Learning," International Conference on Machine Learning (**ICML 2022, Spotlight presentation**).

2022 **S. Vakili**, "Open Problem: Regret Bounds for Noise-Free Kernel-Based Bandits," Conference on Learning Theory (**COLT 2022**); Open Problems track.

2021 **S. Vakili**, H. Moss, A. Artemev, V. Dutordoir, V. Picheny, "Scalable Thompson Sampling using Sparse Gaussian Process Models," Conference on Neural Information Processing Systems (**NeurIPS 2021**).

2021 **S. Vakili**, N. Bouziani, S. Jalali, A. Bernacchia, DS Shiu, "Optimal Order Simple Regret for Gaussian Process Bandits," Conference on Neural Information Processing Systems (**NeurIPS 2021**).

2021 S. Salgia, **S. Vakili**, Qing Zhao, "A Domain-Shrinking based Bayesian Optimization Algorithm with Order-Optimal Regret Performance," Conference on Neural Information Processing Systems (**NeurIPS 2021**).

2021 **S. Vakili**, J. Scarlett, T. Javidi, "Open Problem: Tight Online Confidence Intervals for RKHS Elements," Conference on Learning Theory (**COLT 2021**); Open Problems track.

2021 **S. Vakili**, K. Khezeli, V. Picheny, "On Information Gain and Regret Bounds in Gaussian Process Bandits," International Conference on Artificial Intelligence and Statistics (**AISTATS 2021**).

2021 F. Perotto, **S. Vakili**, Y. Kord, P. Gajane and M. Bourgais, "Gambler Bandits and the Regret of Being Ruined," International Conference on Autonomous Agents and Multiagent Systems (**AAMAS 2021**).

2020 S. Salgia, Q. Zhao, **S. Vakili**, "Stochastic Coordinate Minimization with Progressive Precision for Stochastic Convex Optimization," International Conference on Machine Learning (**ICML 2020**).

2020 A. Boustati, **S. Vakili**, J. Hensman, ST John, "Amortized Variance Reduction for Doubly Stochastic Objectives", Conference on Uncertainty in Artificial Intelligence (**UAI 2020**).

2019 **S. Vakili**, A. Boukouvalas, Q. Zhao, "Decision Variance in Online Learning", Conference on Decision and Control (**CDC 2019**).

2019 X. Xu, **S. Vakili**, Q. Zhao, A. Swami, "Multi-Armed Bandits on Unit Interval Graphs", **IEEE Transactions** on Network Science and Engineering.

2019 G. Grant, A. Boukouvalas, D. Leslie, **S. Vakili**, E. Munoz, "Adaptive Sensor Placement for Continuous Spaces", International Conference on Machine Learning (**ICML 2019, Oral presentation**).

2019 S. Vakili, Q. Zhao, "A Random Walk Approach to First-Order Stochastic Convex Optimization", International Symposium on Information Theory (**ISIT 2019**).

2019 S. Vakili, S. Salgia, Q. Zhao, "Stochastic Gradient Descent on a Tree: An Adaptive and Robust Approach to Stochastic Convex Optimization", Annual Allerton Conference on Communication,

Control, and Computing (**Allerton 2019**).

2018 **S. Vakili**, Q. Zhao, "Acive Learning on a Tree," Annual Allerton Conference on Communication, Control, and Computing (**Allerton 2018**).

2018 **S. Vakili**, Q. Zhao, C. Liu, C.-N. Chuah, "Hierarchical Heavy Hitter Detection under Unknown Models", IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP 2018**).

2017 X. Xu, **S. Vakili**, Q. Zhao, A. Swami, "Online Learning with Side Information," IEEE Military Communication Conference (**MILCOM 2017**).

2016 **S. Vakili**, Q. Zhao, "Risk-Averse Multi-Armed Bandit Problems under Mean-Variance Measure", IEEE Journal of Selected Topics in Signal Processing: *Special Issue on Financial Signal Processing and Machine Learning for Electronic Trading*.

2015 **S. Vakili**, Q. Zhao, "Mean Variance and Value at Risk in Multi-Armed Bandit Problems," Annual Allerton Conference on Communication, Control, and Computing (**Allerton 2015**).

2015 **S. Vakili**, Q. Zhao, L. Tong, "Bayesian Quickest Short-term Voltage Instability Detection in Power Systems," IEEE Conference on Decision and Control (**CDC 2015**).

2015 **S. Vakili**, Q. Zhao, "Risk-Averse Online Learning under Mean-Variance Measures," IEEE International Conference on Acoustics, Speech, and Signal Processing (**ICASSP 2015**).

2015 **S. Vakili**, Q. Zhao, L. Tong, "Quickest Detection of Short-Term Voltage Instability with PMU Measurements," IEEE International Conference on Acoustics, Speech, and Signal Processing (**ICASSP 2015**).

2014 **S. Vakili**, Q. Zhao, Y. Zhou, "Time-Varying Stochastic Multi-Armed Bandit," IEEE Asilomar Conference on Signals, Systems, and Computers, (**Asilomar 2014**).

2013 **S. Vakili**, Q. Zhao, "Distributed Node-Weighted Connected Dominating Set Problems," IEEE Asilomar Conference on Signals, Systems, and Computers (**Asilomar 2013**).

2013 **S. Vakili**, K. Liu, Q. Zhao, "Deterministic Sequencing of Exploration and Exploitation for Multi-Armed Bandit Problems", IEEE Journal of Selected Topics in Signal Processing.

2013 **S. Vakili**, Q. Zhao, "Achieving Complete Learning in Multi-Armed Bandit Problems," IEEE Asilomar Conference on Signals, Systems, and Computers (**Asilomar 2013**).

Software

2022 V. Picheny, J. Berkeley, H. B. Moss, H. Stojic, U. Granta, S. W. Ober, A. Artemev, K. Ghani, A. Goodall, A. Paleyes, **S. Vakili**, S. Pascual-Diaz, S.. Markou, J. Qing, Nasrulloh R. B. S Loka, I. Couckuyt , "Trieste: Efficiently Exploring The Depths of Black-box Functions with TensorFlow," available at https://github.com/secondmind-labs/trieste.

Mentoring and Teaching Experience

2019- 2023 Sudeep Salgia, Ph.D. student at Cornell University, leading to publications at Allerton 2019, ICML 2020, NeurIPS 2021, ICML 2023, and IEEE transactions on signal processing.

2022 Clémence Réda, Ph.D. student at Paris 19, leading to a publication at NeurIPS 2022, designated as an Oral prsentation.

2022 Sing-Yuan Yeh, Fu-Chieh Chang, Chang-Wei Yueh, M.S. students at National Taiwan University, leading to a publication at AISTATS 2023.

2022 Danyal Ahmed, Cambridge University, research intern at MediaTek Research, leading to a publication at ICML 2022, designated as an Oral presentation.

2021 Nacime Bouziani, Imperial College London, research intern at MediaTek Research, leading to a publication at NeurIPS 2021.

2020 Ayman Boustati, University of Warwick, research intern at Secondmind.ai, leading to a publication at UAI 2020.

2020-2022 Organised Trends in AI Theory seminar series in collaboration with National Taiwan University. Some recordings are available at YouTube.com/channel/UCJFJOK8mn27Iq8n3ECGfQXA.

2019 Xiao Xu, Ph.D. student at Cornell Universty, leading to a publication at IEEE Transactions on Network Science and Engineering.

2016 Teaching assistant for Signals and Information, ECE2200 at Cornell University, Instructor: Professor Peter Doerschuk.

2012 Teaching assistant for Introduction to Signals and Systems I, EEC150A at UC Davis, Instructor: Professor Qing Zhao.

Patent Applications

2020 A. Boustati, S. John, **S. Vakili**, J. Hensman, "Computational Inference System", US Patent Application 16/984,824, European Patent Application EP19192404.2A.

2019 J. Grant, A. Boukouvalas, D. Leslie, E. Munoz, S. John, **S. Vakili**, "Method and system for adaptive sensor arrangement", European Patent Application EP19160156.6A.

Professional Involvement

2023 Invited talk at Inria Scool seminar series at University of Lille, France.

2023 Invited seminar at Deepmind/Ellis CSML seminar series.

2023 Invited talk at the London Symposium on Information Theory.

2023 Invited online lecture at FeDucation seminar series (Florida International University).

2021 Invited talk at Machine Learning Research group, Cambridge University Engineering Department.

2021 Chaired the RL, Bandit and Control session at conference on learning theory (COLT), 2021.

2018-2022 Invited papers at:

◇ 2022 IEEE Information Theory Workshop (ITW), Mumbai, India;
◇ 56th and 57th Annual Allerton Conferences on Communication, Control, and Computing, IL;
◇ 2019 INFORMS Annual Meeting, Phoenix, AZ;
◇ 43rd IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Calgary, Alberta, Canada.

2014-2022 Peer reviewed papers submitted to:

◇ Several IEEE transactions, journals and conferences,
◇ Artificial Intelligence and Statistics Conference (AISTATS),
◇ International Conference on Learning Representations (ICLR),
◇ Conference on Artificial Intelligence (AAAI),
◇ International Conference on Machine Learning (ICML),
◇ Conference on Neural Information Processing Systems (NeurIPS),
◇ Conference on Learning Theory (COLT),
◇ Conference on Information Science and Systems (CISS),
◇ American Control Conference (ACC),
◇ European Journal of Operational Research,
◇ Institute of Industrial and Systems Engineers (IISE) transaction.

2020-2021 Received top reviewer grant from NeurIPS 2020 and NeurIPS 2021.

2018 Member of the technical program committee of the 52nd Annual Conference on Information Sciences and Systems (CISS), Princeton University, Princeton, NJ.

Other Achievements

2018 Endorsed as an *exceptional talent* in *machine learning and data science* by Tech Nation (formerly known as Tech City UK).

2015 2015-16 academic year graduate student fellowship, Cornell University, Ithaca, NY.

2011 Fall 2011 graduate student fellowship, University of California, Davis.