

# Patrick Rebeschini — Curriculum Vitae

Associate Professor at the University of Oxford

Department of Statistics, 24-29 St Giles', Oxford, OX1 3LB, UK

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## Education

- **Ph.D.** Operations Research and Financial Engineering, Princeton University 2009 – 2014  
Ph.D. awarded in June 2014. Advisor: Ramon van Handel  
Thesis: **Nonlinear Filtering in High Dimension**, Princeton University, 2014 [[Link to pdf](#)]  
Committee: David Blei, René Carmona, Ramon van Handel. Reader: Sébastien Bubeck
- **M.A.** Operations Research and Financial Engineering, Princeton University 2009 – 2011  
GPA: 3.93/4.00
- **M.S.** Theoretical Physics, University of Padova 2006 – 2009  
Final grade: 110/110 *summa cum laude*. GPA: 29.62/30.00
- **Imperial College International Diploma** Physics, Imperial College London (Erasmus) 2006
- **B.S.** Physics, University of Padova 2003 – 2006  
Final grade: 109/110. GPA: 28.37/30.00

## Professional Appointments

- **Associate Professor**, Statistics Department, University of Oxford 2017 – present
- **Tutorial Fellow**, University College, Oxford 2017 – present
- **Associate Research Scientist**, Electrical Engineering Department, Yale University 2017
- **Lecturer**, Computer Science Department, Yale University 2016 – 2017
- **Postdoctoral Associate**, Yale Institute for Network Science, Yale University 2014 – 2016
- **Graduate Research Assistant**, ORFE Department, Princeton University 2014

## Research Grants

- Title: **Locality in Network Optimization** [[Link to webpage](#)] 2016 – 2019  
Award Number: 1609484. Awarded Amount: \$450,000 (call limit \$500,000)  
Electrical, Communications and Cyber Systems (ECCS) – National Science Foundation (NSF)  
(declined due to relocation to the U.K.)

## Awards, Fellowships, and Funding

- **Mathematics of Machine Learning**, Summer School, The Alan Turing Institute 2021
- **TensorFlow Award**, Google 2020
- **Teaching Award**, MPLS Division, University of Oxford 2019
- **Turing Fellowship**, The Alan Turing Institute 2017 – present
- **Travel Award**, SIAM Early Career 2015
- **Graduate Teaching Fellowship**, McGraw Teagle, Princeton University 2014
- **Excellence in Teaching Award**, Engineering Council, Princeton University 2013
- **Graduate Research Fellowship**, Princeton University 2010 – 2013

## Preprints

- Dominic Richards, Edgar Dobriban, *Patrick Rebeschini*, **Comparing classes of estimators: When does gradient descent beat ridge regression in linear models?**, arXiv:2108.11872. [[Link to arXiv](#)]
- Fan Wu, *Patrick Rebeschini*, **Implicit regularization in matrix sensing via mirror descent**, arXiv:2105.13831. [[Link to arXiv](#)]
- Fan Wu, *Patrick Rebeschini*, **Nearly minimax-optimal rates for noisy sparse phase retrieval via early-stopped mirror descent**, arXiv:2105.03678. [[Link to arXiv](#)]
- Dominic Richards, Sahand N. Negahban, *Patrick Rebeschini*, **Decentralised sparse multi-task regression**, arXiv:1912.01417. [[Link to arXiv](#)]

## Conference Proceedings Publications

- Fan Wu, *Patrick Rebeschini*, **Hadamard Wirtinger flow for sparse phase retrieval**, International Conference on Artificial Intelligence and Statistics (AISTATS), Proceedings of Machine Learning Research (PMLR), vol. 130, pp. 982-990, 2021. **Oral presentation**. [[Link to Proceedings](#)]
- Fan Wu, *Patrick Rebeschini*, **A continuous-time mirror descent approach to sparse phase retrieval**, Conference on Neural Information Processing Systems (NeurIPS), vol. 33, pp. 20192-20203, 2020. **Spotlight presentation**. [[Link to Proceedings](#)]
- Tomas Vaškevičius, Varun Kanade, *Patrick Rebeschini*, **The statistical complexity of early-stopped mirror descent**, Conference on Neural Information Processing Systems (NeurIPS), vol. 33, pp. 253-264, 2020. **Spotlight presentation**. [[Link to Proceedings](#)]
- Dominic Richards, *Patrick Rebeschini*, Lorenzo Rosasco, **Decentralised learning with random features and distributed gradient descent**, International Conference on Machine Learning (ICML), Proceedings of Machine Learning Research (PMLR), vol. 119, pp. 8105-8115, 2020. [[Link to Proceedings](#)]

- Tomas Vaškevičius, Varun Kanade, *Patrick Rebeschini*, **Implicit regularization for optimal sparse recovery**, Conference on Neural Information Processing Systems (NeurIPS), vol. 32, pp. 2972-2983, 2019. [[Link to Proceedings](#)]
- Dominic Richards and *Patrick Rebeschini*, **Optimal statistical rates for decentralised non-parametric regression with linear speed-up**, Conference on Neural Information Processing Systems (NeurIPS), vol. 32, pp. 1216-1227, 2019. [[Link to Proceedings](#)]
- David Martínez-Rubio, Varun Kanade, *Patrick Rebeschini*, **Decentralized cooperative stochastic bandits**, Conference on Neural Information Processing Systems (NeurIPS), vol. 32, pp. 4529-4540, 2019. [[Link to Proceedings](#)]
- *Patrick Rebeschini* and Sekhar Tatikonda, **Accelerated consensus via Min-Sum Splitting**, Conference on Neural Information Processing Systems (NIPS), vol. 30, pp. 1374-1384, 2017. [[Link to Proceedings](#)]
- *Patrick Rebeschini* and Sekhar Tatikonda, **Decay of correlation in network flow problems**, Conference on Information Sciences and Systems (CISS), vol. 50, pp. 169-174, 2016. [[Link to Proceedings](#)]
- *Patrick Rebeschini* and Amin Karbasi, **Fast mixing for discrete point processes**, Conference on Learning Theory (COLT), vol. 28, pp. 1480-1500, 2015. [[Link to Proceedings](#)]

## Journal Publications

- Dominic Richards and *Patrick Rebeschini*, **Graph-dependent implicit regularisation for distributed stochastic subgradient descent**, Journal of Machine Learning Research, vol. 21, no. 34, pp. 1-44, 2020. [[Link to Journal](#)]
- *Patrick Rebeschini* and Sekhar Tatikonda, **Locality in network optimization**, IEEE Transactions on Control of Network Systems, vol. 6, no. 2, pp. 487-500, 2019. [[Link to Journal](#)]
- *Patrick Rebeschini* and Sekhar Tatikonda, **A new approach for Laplacian solvers and flow problems**, Journal of Machine Learning Research, vol. 20, no. 36, pp. 1-37, 2019. [[Link to Journal](#)]
- *Patrick Rebeschini* and Ramon van Handel, **Can local particle filters beat the curse of dimensionality?** Annals of Applied Probability, vol. 25, no. 5, pp. 2809-2866, 2015. [[Link to Journal](#)]
- *Patrick Rebeschini* and Ramon van Handel, **Phase transitions in nonlinear filtering**, Electronic Journal of Probability, vol. 20, no. 7, pp. 1-46, 2015. [[Link to Journal](#)]
- *Patrick Rebeschini* and Ramon van Handel, **Comparison theorems for Gibbs measures**, Journal of Statistical Physics, vol. 157, pp. 234-281, 2014. [[Link to Journal](#)]

## Talks

- **The Statistical Complexity of Early-Stopped Mirror Descent**, Statistical Methods in Machine Learning, Bernoulli-IMS One World Symposium 2020, August 2020.

- **The Statistical Complexity of Early-Stopped Mirror Descent**, Probability Seminar (virtual lecture), Division of Applied Mathematics, Brown University, May 2020.
- **Statistically and Computationally Optimal Estimators for Sparse Recovery and Decentralized Regression**, Adobe Research, San Jose, December 2019.
- **Implicit Regularization for Optimal Sparse Recovery**, Information Systems Lab (ISL) Colloquium, Stanford University, December 2019.
- **On the Interplay between Statistics, Computation and Communication in Decentralised Learning**, Decision and Control Systems, KTH, October 2019.
- **Implicit Regularization for Optimal Sparse Recovery**, Probability and Mathematical Statistics seminar, Department of Mathematics, KTH, October 2019.
- **Implicit Regularization for Optimal Sparse Recovery**, London Machine Learning Meetup, September 2019.
- **Implicit Regularization for Optimal Sparse Recovery**, Theory, Algorithms and Computations of Modern Learning Systems workshop, DALI/ELLIS, September 2019.
- **On the Interplay between Statistics, Computation and Communication in Decentralised Learning**, Optimization and Statistical Learning workshop (OSL 2019), Les Houches School of Physics, March 2019.
- **On the Interplay between Statistics, Computation and Communication in Decentralised Learning**, School of Mathematics, University of Bristol, March 2019.
- **On the Interplay between Statistics, Computation and Communication in Decentralised Learning**, Algorithms & Computationally Intensive Inference Seminar, University of Warwick, February 2019.
- **Multi-Agent Learning: Implicit Regularization and Order-Optimal Gossip**, Theory and Algorithms in Data Science, The Alan Turing Institute, August 2018.
- **Multi-Agent Learning: Implicit Regularization and Order-Optimal Gossip**, Statistical Scalability Programme, Isaac Newton Institute, June 2018.
- **Multi-Agent Learning: Implicit Regularization and Order-Optimal Gossip**, Statistics Seminar Series, Department of Decision Sciences, Bocconi University, May 2018.
- **Distributed and Decentralised Learning: Generalisation and Order-Optimal Gossip**, Amazon Berlin, April 2018.
- **Locality and Message Passing in Network Optimization**, Workshop on Optimization vs Sampling, The Alan Turing Institute, February 2018.
- **Accelerated Consensus via Min-Sum Splitting**, Statistics Seminar, University of Cambridge, November 2017.
- **Accelerating message-passing using global information**, OxWaSP Workshop, University of Warwick, October 2017.
- **Accelerating message-passing using global information**, StatMathAppli 2017, Statistics Mathematics and Applications, Fréjus, September 2017.

- **Accelerated Min-Sum for consensus**, Large-Scale and Distributed Optimization, LCCC Workshop, Lund University, June 2017.
- **Message-passing in convex optimization**, WINRS conference, Brown University, March 2017.
- **Min-Sum and network flows**, Workshop on Optimization and Inference for Physical Flows on Networks, Banff International Research Station, March 2017.
- **Locality and message-passing in network optimization**, DISMA, Politecnico di Torino, January 2017.
- **Locality and message-passing in network optimization**, LIDS Seminar Series, MIT, November 2016.
- **Locality and message-passing in network optimization**, Probability Seminar, Division of Applied Mathematics, Brown University, November 2016.
- **Message-passing in network optimization**, YINS Seminar Series, Yale University, November 2016.
- **Tractable Bayesian computation in high-dimensional graphical models**, Mathematical Sciences Department, IBM Thomas J. Watson Research Center, June 2016.
- **From sampling to learning submodular functions**, 2016 New England Statistics Symposium (NESS), Yale University, April 2016.
- **Scale-free sequential Monte Carlo**, Seminar on particle methods in Statistics, Statistics Department, Harvard University, April 2016.
- **Decay of correlation in network flow problems**, 50th Annual Conference on Information Sciences and Systems (CISS 2016), Princeton University, March 2016.
- **Locality in network optimization**, INFORMS, Philadelphia, November 2015.
- **Local algorithms in high-dimensional models**, Statistics Department, University of Oxford, September 2015.
- **Killed random walks and graph Laplacians: local sensitivity in network flow problems**, Yale Probabilistic Networks Group seminar, Statistics Department, Yale University, September 2015.
- **Decay of correlation in graphical models; algorithmic perspectives**, School of Computer and Communication Sciences, École Polytechnique Fédérale de Lausanne, August 2015.
- **Fast mixing for discrete point processes**, 28th Annual Conference on Learning Theory (COLT), Université Pierre et Marie Curie, July 2015.
- **Filtering compressed signal dynamics in high dimension**, 45th Annual John H. Barrett Memorial Lectures, University of Tennessee, May 2015.
- **On the role of the Hessian of submodular functions**, Yale Probabilistic Networks Group seminar, Statistics Department, Yale University, April 2015.
- **Submodular functions, from optimization to probability**, Probability Theory and Combinatorial Optimization, The Fuqua School of Business, Duke University, March 2015.

- **Estimating conditional distributions in high dimension**, Applied Mathematics seminar, Yale University, October 2014.
- **Nonlinear filtering in high dimension**, Yale Probabilistic Networks Group seminar, Statistics Department, Yale University, September 2014.
- **Particle filters and curse of dimensionality**, Monte Carlo Inference for Complex Statistical Models workshop, Isaac Newton Institute for Mathematical Sciences, University of Cambridge, April 2014.
- **Particle filters and curse of dimensionality**, Cambridge Machine Learning Group, University of Cambridge, February 2014.
- **New phenomena in nonlinear filtering**, Yale Probabilistic Networks Group seminar, Statistics Department, Yale University, February 2014.
- **Filtering in high dimension**, 9th Cornell Probability Summer School, Cornell University, July 2013.

## Teaching Activities (\*\*received teaching award)

- **Lecturer**. Simulation and Statistical Programming (A12) 2020  
Statistics Department, University of Oxford
- **\*\*\*Designer, Lecturer**. Algorithmic Foundations of Learning (SC10, SM13) 2018 – present  
Statistics Department, University of Oxford [[Link to webpage](#)]
- **Lecturer**. Advanced Simulation Methods (SC5, SM12) 2018  
Statistics Department, University of Oxford [[Link to webpage](#)]
- **Tutorial Fellow**. Probability (M3, A8), Statistics (M3, A9), Graph Theory 2017 – present  
University College Oxford
- **Head Instructor**. Introduction to Computing and Programming 2016  
Computer Science Department, Yale University (Yale CPSC100, Harvard CS50)  
(Course offered in partnership with Harvard University. Coordinated group of 53 teaching assistants. Lecture delivered online counts 80k+ visualizations on YouTube)
- **Senior Thesis Advisor**. Machine Learning Group 2015  
Yale Institute for Network Science, Yale University
- **Assistant Instructor Lead and McGraw Graduate Teaching Fellow** 2011 – 2014  
McGraw Center for Teaching and Learning, Princeton University
- **\*\*\*Teaching Assistant and Head Teaching Assistant** 2010 – 2013  
Probability and Stochastic Systems (ORF309), Prof. Erhan Çinlar. ORFE, Princeton
- **Teaching Assistant**. Electronic Commerce (ORF401), Prof. Alain L. Kornhauser 2012  
ORFE Department, Princeton University
- **Teaching Assistant**. General Computer Science (COS126), Dr. Kevin Wayne 2011  
Computer Science Department, Princeton University

## Supervision of Graduate Students

- **PhD supervisor.** Carlo Alfano 2020 – present  
Department of Statistics, University of Oxford
- **PhD supervisor.** Tyler Farghly 2020 – present  
Department of Statistics, University of Oxford
- **PhD co-supervisor.** David Martinez (co-supervised with V. Kanade) 2018 – present  
Department of Computer Science, University of Oxford
- **PhD supervisor.** Fan Wu 2018 – present  
Department of Statistics, University of Oxford
- **PhD co-supervisor.** Tomas Vaškevičius (co-supervised with V. Kanade) 2018 – present  
Department of Statistics, University of Oxford
- **PhD supervisor.** Dominic Richards 2017 – 2021  
Department of Statistics, University of Oxford
- **MSc thesis supervisor.** 2017 – present  
Supervised dissertations for 11 Part C/OMMS students, 6 Stats MSc students, and 2 visiting students.

## Reviewing Activities (Books, Conferences, Funding Agencies, Journals)

- Association for the Advancement of Artificial Intelligence (AAAI)
- Annals of Statistics
- Biometrika
- Conference on Learning Theory (COLT)
- Conference on Neural Information Processing Systems (NeurIPS)
- EPSRC Peer Review College (since 2019)
- IEEE Conference on Decision and Control (CDC)
- IEEE/CAA Journal of Automatica Sinica
- IEEE Transactions on Control of Network Systems
- IEEE Transactions on Information Theory
- IEEE Transactions on Signal Processing
- International Conference on Artificial Intelligence and Statistics (AISTATS)
- International Conference on Learning Representations (ICLR)
- International Conference on Machine Learning (ICML)
- Israel Science Foundation (ISF)
- Journal of Applied Probability/Advances in Applied Probability

- Mathematics of Operations Research
- Springer Nature

## Organization of Scientific Meetings

- **Main Organizer and Instructor.** Mathematics of Machine Learning Summer School 2021  
The Alan Turing Institute London [[Link to webpage](#)]
- **Steering Committee Member** 2020  
Bocconi Summer School in Advanced Statistics and Probability [[Link to webpage](#)]
- **Organizer Lead.** Statistics and Computation 2020  
Two-day workshop. The Alan Turing Institute London [[Link to webpage](#)]
- **Organizer Lead.** Maths/Stats Annual Joint Colloquium Series 2018 – present  
University of Oxford
- **Organizer Lead.** The Interplay between Statistics and Optimization in Learning 2018  
One-day workshop. The Alan Turing Institute London [[Link to webpage](#)]
- **Organizer.** Learning Theory and Statistical Optimization, reading groups 2017 – present  
Department of Statistics, University of Oxford
  - 2020-2021 [[Link to webpage](#)]
  - 2018-2019 [[Link to webpage](#)]
  - 2017-2018 [[Link to webpage](#)]

## Institutional Responsibilities

- **Management Team Member and Industry Liaison** 2019 – present  
EPSRC StatML Center for Doctoral Training (CDT)  
Imperial College London and University of Oxford [[Link to webpage](#)]
- **Full College Member.** EPSRC Peer Review College 2020 – present
- **Associate College Member.** EPSRC Peer Review College 2019 – 2020  
Ranked in the top 6% of College members for participating in peer review activities
- **Member.** Graduate Research Committee, Statistics Department, Oxford 2019 – present
- **Member.** Academic Committee, University College Oxford 2018 – present
- **Member.** Teaching Committee, Statistics Department, University of Oxford 2017 – 2019
- **Member.** Governing Body, University College Oxford 2017 – present

## Outreach Activities

- **Speaker.** Mathematical Sciences Study Day. University College Oxford 2020
- **Speaker.** Open Days. University of Oxford [[Link to video](#)] 2018 – present



- **Organizer Lead.** Julia Robinson Mathematics Festival  
Yale Science Outreach, Yale University 2015 – 2017

## Scientific Societies

- **Member.** Institute of Mathematical Statistics (IMS) 2020 – present
- **Member.** Bernoulli Society 2020 – present
- **Member.** European Laboratory for Learning & Intelligent Systems (ELLIS) 2019 – present

## References

- **Sekhar Tatikonda** (Postdoc host)  
Associate Professor at Yale University  
Department of Electrical Engineering and Yale Institute for Network Science  
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Tel: +1 203 432 4714  
Email: [sekhar.tatikonda@yale.edu](mailto:sekhar.tatikonda@yale.edu)
- **Ramon van Handel** (Ph.D. advisor)  
Associate Professor at Princeton University  
Department of Operations Research and Financial Engineering  
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Tel: +1 609 258 0973  
Email: [rvan@princeton.edu](mailto:rvan@princeton.edu)
- **Harrison Huibin Zhou**  
Department Chair and Professor at Yale University  
Department of Statistics  
Address: 24 Hillhouse Avenue, New Haven, CT 06511, USA  
Tel: + 1 203 432 0643  
Email: [huibin.zhou@yale.edu](mailto:huibin.zhou@yale.edu)
- **Kavita Ramanan**  
Professor at Brown University  
Division of Applied Mathematics  
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Tel: +1 401 863 3416  
Email: [kavita\\_ramanan@brown.edu](mailto:kavita_ramanan@brown.edu)
- **Sanjoy K. Mitter**  
Professor at Massachusetts Institute of Technology  
Department of Electrical Engineering and Computer Science  
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Tel: + 1 617 253 2160  
Email: [rcohen@mit.edu](mailto:rcohen@mit.edu) (Rachel Cohen, Administrative Assistant)
- **Sébastien Bubeck**  
Researcher at Microsoft Research

Theory Group

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