

# Patrick Rebeschini — CV

Associate Professor at the University of Oxford

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

[www.stats.ox.ac.uk/~rebeschini/](http://www.stats.ox.ac.uk/~rebeschini/)

[patrick.rebeschini@stats.ox.ac.uk](mailto:patrick.rebeschini@stats.ox.ac.uk)

October 11, 2019

## 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.
- **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

## Research Grants

- Title: “**Locality in Network Optimization**” [[Link to webpage](#)] 2016 – 2019  
Award Number: 1609484. Awarded Amount to Date: \$450,000.00.  
Electrical, Communications and Cyber Systems (ECCS) – National Science Foundation (NSF).

## Awards, Fellowships and Funding

- University of Oxford MPLS Divisional **Teaching Award** 2019
- The Alan Turing Institute, **Turing Fellowship** 2017 – present
- SIAM Early Career **Travel Award** 2015
- Princeton University **Graduate Research Assistantship** 2014
- Princeton University McGraw Teagle's **Graduate Teaching Fellowship** 2014
- Princeton Engineering Council's **Excellence in Teaching Award** 2013
- Princeton University Applied Sciences **Graduate Fellowship** 2010
- Imperial College **International Diploma** 2006

## Preprints

- Dominic Richards and *Patrick Rebeschini*, “**Graph-dependent implicit regularisation for distributed stochastic subgradient descent**,” (2018). [[Link to arXiv](#)]

## Conference Publications

- Tomas Vaškevičius, Varun Kanade, *Patrick Rebeschini*, “**Implicit regularization for optimal sparse recovery**,” Accepted to NeurIPS (2019). [[Link to arXiv](#)]
- Dominic Richards and *Patrick Rebeschini*, “**Optimal statistical rates for decentralised non-parametric regression with linear speed-up**,” Accepted to NeurIPS (2019). [[Link to arXiv](#)]
- David Martínez-Rubio, Varun Kanade, *Patrick Rebeschini*, “**Decentralized cooperative stochastic multi-armed bandits**,” Accepted to NeurIPS (2019). [[Link to arXiv](#)]
- *Patrick Rebeschini* and Sekhar Tatikonda, “**Accelerated consensus via Min-Sum Splitting**,” NIPS (2017). [[Link to Proceedings](#)]
- *Patrick Rebeschini* and Sekhar Tatikonda, “**Decay of correlation in network flow problems**,” *50th Annual Conference on Information Sciences and Systems*, CISS (2016). [[Link to Proceedings](#)]
- *Patrick Rebeschini* and Amin Karbasi, “**Fast mixing for discrete point processes**,” *28th Annual Conference on Learning Theory*, COLT (2015). [[Link to Proceedings](#)]

## Journal Publications

- *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*, 20(36):1-37 (2019). [[Link to Journal](#)]
- *Patrick Rebeschini* and Ramon van Handel, “**Can local particle filters beat the curse of dimensionality?**” *Ann. Appl. Probab.* **25**, No. 5, 2809-2866 (2015). [[Link to Journal](#)]
- *Patrick Rebeschini* and Ramon van Handel, “**Phase transitions in nonlinear filtering,**” *Electron. J. Probab.* **20**, No. 7, 1-46 (2015). [[Link to Journal](#)]
- *Patrick Rebeschini* and Ramon van Handel, “**Comparison theorems for Gibbs measures,**” *J. Stat. Phys.* **157**, 234-281 (2014). [[Link to Journal](#)]

## Talks

- “**On the Interplay between Statistics, Computation and Communication in Decentralised Learning,**” Decision and Control Systems, KTH, October 2019. Invited talk.
- “**Implicit Regularization for Optimal Sparse Recovery,**” Probability and Mathematical Statistics seminar, Department of Mathematics, KTH, October 2019. Invited talk.
- “**Implicit Regularization for Optimal Sparse Recovery,**” London Machine Learning Meetup, September 2019. Invited talk.
- “**Implicit Regularization for Optimal Sparse Recovery,**” Theory, Algorithms and Computations of Modern Learning Systems workshop, DALI/ELLIS, September 2019. Invited talk.
- “**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. Invited talk.
- “**On the Interplay between Statistics, Computation and Communication in Decentralised Learning,**” School of Mathematics, University of Bristol, March 2019. Invited talk.
- “**On the Interplay between Statistics, Computation and Communication in Decentralised Learning,**” Algorithms & Computationally Intensive Inference Seminar, University of Warwick, February 2019. Invited talk.
- “**Multi-Agent Learning: Implicit Regularization and Order-Optimal Gossip,**” Theory and Algorithms in Data Science, The Alan Turing Institute, August 2018. Invited talk.
- “**Multi-Agent Learning: Implicit Regularization and Order-Optimal Gossip,**” Statistical Scalability Programme, Isaac Newton Institute, June 2018. Invited talk.
- “**Multi-Agent Learning: Implicit Regularization and Order-Optimal Gossip,**” Statistics Seminar Series, Department of Decision Sciences, Bocconi University, May 2018. Invited talk.
- “**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. Invited talk.

- **“Accelerated Consensus via Min-Sum Splitting,”** Statistics Seminar, University of Cambridge, November 2017. Invited talk.
- **“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. Invited talk.
- **“Message-passing in convex optimization,”** WINRS conference, Brown University, March 2017. Invited talk.
- **“Min-Sum and network flows,”** Workshop on Optimization and Inference for Physical Flows on Networks, Banff International Research Station, March 2017. Invited talk.
- **“Locality and message-passing in network optimization,”** DISMA, Politecnico di Torino, January 2017. Invited talk.
- **“Locality and message-passing in network optimization,”** LIDS Seminar Series, MIT, November 2016. Invited talk.
- **“Locality and message-passing in network optimization,”** Probability Seminar, Division of Applied Mathematics, Brown University, November 2016. Invited talk.
- **“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. Invited talk.
- **“From sampling to learning submodular functions,”** 2016 New England Statistics Symposium (NESS), Yale University, April 2016. Invited talk.
- **“Scale-free sequential Monte Carlo,”** Seminar on particle methods in Statistics, Statistics Department, Harvard University, April 2016. Invited talk.
- **“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. Invited talk.
- “**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. Invited talk.
- “**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

- SC10/SM13 Algorithmic Foundations of Learning 2019  
Statistics Department, University of Oxford. **Course Instructor.** [[Link to webpage](#)]
- SC10/SM13 Algorithmic Foundations of Learning 2018  
Statistics Department, University of Oxford. **Course Instructor.** [[Link to webpage](#)]
- SC5/SM12 Advanced Simulation Methods 2018  
Statistics Department, University of Oxford. **Course Instructor.** [[Link to webpage](#)]
- Probability, Statistics, Graph Theory 2017 – present  
University College Oxford. **Tutorial Fellow.**
- CPSC 100 (CS 50) Introduction to Computing and Programming 2016  
Computer Science Department, Yale University. **Head Instructor.**
- Machine Learning Group 2015  
Yale Institute for Network Science, Yale University. **Senior Thesis Advisor.**
- McGraw Center for Teaching and Learning at Princeton University 2011 – 2014  
**Assistant Instructor Leader. McGraw Graduate Teaching Transcript Fellow.**

- ORF 309 Probability and Stochastic Systems, Prof. Erhan Çinlar 2010 – 2013  
ORFE Department, Princeton University. **Head Teaching Assistant.**
- ORF 401 Electronic Commerce, Prof. Alain L. Kornhauser 2012  
ORFE Department, Princeton University. **Teaching Assistant.**
- COS 126 General Computer Science, Kevin Wayne 2011  
CS Department, Princeton University. **Teaching Assistant.**

## Graduate Students

- David Martinez, PhD, 50% (co-supervised with Varun Kanade) 2018 – present  
Department of Computer Science, University of Oxford
- Fan Wu, PhD, 100% 2018 – present  
Department of Statistics, University of Oxford
- Tomas Vaškevičius, PhD, 50% (co-supervised with Varun Kanade) 2018 – present  
Department of Statistics, University of Oxford
- Dominic Richards, PhD, 100% 2017 – present  
Department of Statistics, University of Oxford

## Reviewing Activities

- Association for the Advancement of Artificial Intelligence (AAAI)
- Annals of Statistics
- Conference on Learning Theory (COLT)
- Conference on Neural Information Processing Systems (NeurIPS)
- IEEE Conference on Decision and Control (CDC)
- 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 Machine Learning (ICML)
- Israel Science Foundation (ISF)
- Journal of Applied Probability/Advances in Applied Probability
- Mathematics of Operations Research

## Organization of Scientific Meetings

- Statistics and Computation in Machine Learning 2020  
The Alan Turing Institute, London. **Organizer.** [[Link to webpage](#)]
- The Interplay between Statistics and Optimization in Learning 2018  
The Alan Turing Institute, London. **Organizer.** [[Link to webpage](#)]
- Reading group on optimisation for machine learning 2017 – 2018  
Department of Statistics, University of Oxford. **Organizer.** [[Link to webpage](#)]

## Institutional Responsibilities

- EPSRC StatML Center for Doctoral Training (CDT). **Industry Liaison.** 2019 – present
- EPSRC Peer Review Associate College. **Member.** 2019 – present
- Graduate Research Committee, Statistics Department, Oxford. **Member.** 2019 – present
- Academic Committee, University College Oxford. **Member.** 2018 – present
- Teaching Committee, Statistics Department, University of Oxford. **Member.** 2017 – 2019
- Governing Body, University College Oxford. **Member.** 2017 – present

## Outreach Activities

- Maths Departmental Open Days. University of Oxford. **Speaker.** 2018 – 2019
- Julia Robinson Mathematics Festival 2015 – 2017  
Yale Science Outreach, Yale University. **Organizer and Coordinator.**

## References

- **Sekhar Tatikonda** (Postdoc host)  
Associate Professor at Yale University  
Department of Electrical Engineering and Yale Institute for Network Science  
Address: 17 Hillhouse Avenue, Room 338, New Haven, CT 06511, USA  
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  
Address: Sherrerd Hall, Room 227, Princeton University, Princeton, NJ 08544, USA  
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  
Address: 182 George Street, Room 317, Brown University, Providence, RI 02912, USA  
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  
Address: 77 Massachusetts Avenue, Room 32-D562, Cambridge, MA 02139, USA  
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  
Address: Microsoft Campus, Building 99, Office 2955, Redmond, WA 98052, USA  
Tel: +1 609 937 9638  
Email: [sebubeck@microsoft.com](mailto:sebubeck@microsoft.com)