

Kelvin Shuangjian ZHANG

CONTACT INFORMATION

ADDRESS: Département de Mathématiques et Applications, École Normale Supérieure,
45 Rue d'Ulm, 75005 Paris, FRANCE
EMAIL: szhang@ens.fr
HOMEPAGE: shuangjian.info

RESEARCH INTERESTS

Optimal Transport and its applications in *Economics, Statistics* and *Machine Learning*;
Convex Analysis; **Duality**; **Optimization**.

RESEARCH AND EDUCATION

Jun 2019 - present	Postdoctoral Fellow at ENS Paris
Sep 2018 - May 2019	Postdoctoral Fellow at CREST, ENSAE ParisTech
Jun - Aug 2018	visiting student at MOKAPLAN, INRIA, Paris
Sep 2013 - Aug 2018	Ph.D. in Mathematics, University of Toronto; Adviser: Robert J. McCANN
Jul - Dec 2014	visiting student at Fields Institute, Toronto
Jul - Dec 2013	visiting student at MSRI, Berkeley
Sep 2012 - Aug 2013	M.S. in Mathematics, University of Toronto; Adviser: Robert J. McCANN
Feb - Jun 2012	visiting student at Beijing International Center for Mathematical Research
Sep 2008 - Jun 2012	B.S. in Mathematics, Nankai University; S.S. Chern Class of Pure Math

PUBLICATIONS

1. K.S. Zhang, J. Du, L. Zhang, C. Zeng, Q. Liu, T. Zhang, G. Hu. Circular cone: a novel approach for protein ligand shape matching using modified PCA. *Computer Methods and Programs in Biomedicine* **108**(1) (2012) 168-175.
2. K.Y.-C. Lui, Y. Cao, M. Gazeau, K.S. Zhang. Implicit manifold learning on generative adversarial networks. *ICML2017 Workshop on Implicit Generative Models*, Sydney, 2017.
3. R.J. McCann, K.S. Zhang. On concavity of the monopolist's problem facing consumers with nonlinear price preferences. *Comm. Pure Appl. Math.* **72**(7) (2019) 1386-1423.
4. K.S. Zhang. Existence in multidimensional screening with general nonlinear preferences. *Econ. Theory* **67**(2) (2019) 463-485.
5. K.S. Zhang. Existence, Uniqueness, Concavity and Geometry of the Monopolist's Problem Facing Consumers with Nonlinear Price Preferences. PhD Thesis, University of Toronto, 2018.
6. G. Carlier, K.S. Zhang. Existence of solutions to principal-agent problems with adverse selection under minimal assumptions. *J. Math. Econ.* **88** (2020) 64-71.
7. K.S. Zhang, G. Peyré, J. Fadili, M. Pereyra. Wasserstein Control of Mirror Langevin Monte Carlo. *In Proc. COLT'20, 2020*.

TEACHING EXPERIENCE

- Course Instructor:

- Calculus II for Biological Sciences (**Course Coordinator**), University of Toronto, 2016
- Calculus I (B), University of Toronto, 2016

Duties Include: Created course syllabus and marking schemes; Planned lectures and tutorials; Executed lectures and office hours; Provided email contact time; Designed assignments, quizzes, problem sets, term tests, makeup tests and final tests.

- Mentor:

- Mentorship Program, University of Toronto, 2013-2018

Taught talented high-school students undergraduate level math courses and guided them in math research on topics in Optimal Transportation. Duties Include: Planned and Executed lectures; Offered advice on final presentations.

- Math Contest Instructor:

- Math Circles, Fields Institute, Spring 2013
- Berkeley Math Circle, University of California, Berkeley, Fall 2013

- Teaching Assistant:

- Multiple courses, University of Toronto, 2012-2018

Courses Include: Calculus, Linear Algebra, Linear Programming, ODEs, Intro to Real Analysis, PDEs, Nonlinear Optimization, Machine Learning.

Duties Include: Planned and Executed tutorials; Provided office hours and email contact time; test invigilation.

CONFERENCE AND SEMINAR PRESENTATIONS

- Invited conference presentations:

- August 3-7, 2020, Mathematics of Machine Learning LMS-Bath Symposium, University of Bath (online)
- July 9-12, 2020, The 33rd Annual Conference on Learning Theory (**COLT 2020**), Graz (online)
- April 10-12, 2019, Economics Meets the Mathematical Sciences Workshop, The Fields Institute
- June 7-9, 2018, Variational Problems in Optical Engineering and Free Material Design, Institute of Mathematics, Polish Academy of Sciences
- June 3, 2018, 2018 Canadian Mathematical Society Summer Meeting, Special Session on Geometric Potential Theory, University of New Brunswick
- April 21, 2018, 2018 SIAM Great Lakes Section Annual Meeting, Special Session on Nonlinear PDEs, Optimal Control Theory, and Relevant Topics, Wayne State University
- August 20-25, 2017, The IV Applied Mathematics, Modeling and Computational Science (AMMCS) International Conference, University of Waterloo
- August 10, 2017, Workshop on Implicit Generative Models, 34th International Conference on Machine Learning, Sydney
- April 9-14, 2017, Generated Jacobian Equations: from Geometric Optics to Economics, Banff International Research Station
- June 17-19, 2016, The Ninth Annual Ottawa Mathematics Conference, University of Ottawa
- June 13-14, 2016, Southern Ontario Graduate Mathematics and Statistics Conference, University of Guelph
- April 29-30, 2016, NYU Workshop on Optimal Transportation, Equilibrium, and Applications to Economics, New York University
- September 25-26, 2015, Prairie Analysis Seminar 2015, Kansas State University

- October 7-11, 2013, Optimal Transport and Applications, University of California, Los Angeles

- Invited seminar presentations:

- January 20, 2020, Meeting on Nesterov Langevin, Institut National de Recherche en Informatique et en Automatique Paris
- May 2, 2019, Analysis and Partial Differential Equations seminar, National University of Singapore
- July 10, 2018, MokaMeeting, Institut National de Recherche en Informatique et en Automatique Paris
- April 17, 2018, Partial Differential Equations Seminar, Ohio State University
- February 1, 2018, Stochastic Analysis and Stochastics of Financial Markets Seminar, Humboldt-Universität zu Berlin
- January 25, 2018, Graduate Student Seminar, University of Toronto
- August 11, 2017, Partial Differential Equations and Analysis Seminar, Australian National University
- March 17, 2017, Analysis and Applied Math Seminar, University of Toronto