

Kelvin Shuangjian Zhang

CONTACT INFORMATION

Department of Mathematics
University of Toronto
40 St. George Street, Room 6290
Toronto, ON, Canada M5S 2E4

Email: szhang@math.toronto.edu
Cell Phone: (+1) 647-740-2517
Homepage: math.toronto.edu/szhang/

RESEARCH EXPERIENCE

April 2013 - present: **Optimal Transportation and its Applications in Economics**

- Discovered necessary and sufficient conditions on concavity of bi-level optimization;
- Proved an existence result in multidimensional screening with general nonlinear preferences;
- Explored min-max duality in optimal auction mechanism

EDUCATION

2013 - present Ph.D. candidate in Mathematics, University of Toronto,
Adviser: Robert J. McCann | Expected Defense: Spring 2018

2012 - 2013 M.S. in Mathematics, University of Toronto, Adviser: Robert J. McCann

2008 - 2012 B.S. in Mathematics, Nankai University, S.S. Chern Class of Pure Math

PUBLICATIONS AND PREPRINTS

1. R.J. McCann, K.S. Zhang. On concavity of the monopolist's problem facing consumers with nonlinear price preferences. To appear in *Comm. Pure Appl. Math.*
2. K.S. Zhang. Existence in multidimensional screening with general nonlinear preferences. *submitted.*
3. 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.*
4. 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.

SEMINAR AND CONFERENCE PRESENTATIONS

Invited seminar presentations:

- August 11, 2017, Partial Differential Equations and Analysis Seminar, Australian National University
- March 17, 2017, Analysis and Applied Math Seminar, University of Toronto

Invited conference presentations:

- 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

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.

Teaching Assistant at University of Toronto, September 2012 - present:

- Graduate-level courses: PDEs I, II; Kernel Methods and SVM
- Undergrad-level courses: Calculus I, II, III; Linear Algebra I, II; ODEs; Intro Real Analysis; Nonlinear Optimization; MATLAB

Duties include: Executed tutorials and office hours; Created assignments and quizzes; Marked quizzes, assignments and tests.

Course Coordinator Teaching Assistant:

- Introduction to Machine Learning, University of Toronto, 2017

FELLOWSHIPS AND AWARDS AT UNIVERSITY OF TORONTO

- Queen Elizabeth II Graduate Scholarship, 2017
- Ontario Graduate Scholarship, 2016
- Margaret Isobel Elliott Graduate Scholarship, 2016
- Kwok Sau Po Scholarship, 2015
- Kwok Sau Po Scholarship, 2014
- McCuaig-Throop Bursary, 2013

EXTRACURRICULAR ACTIVITIES

- January, 2013 - present: Taught high-school students undergraduate level math courses and guided them in math research on Optimal Transportation as a Mentor at Department of Mathematics, University of Toronto
- September, 2014 - September, 2015: Organized various activities as an External Executive at CGAUT (Chinese Graduate Association at the University of Toronto)
- January - December, 2013: Guided students in math contest training at The Fields Institute for Research in Mathematical Sciences and University of California, Berkeley