

TONGSEOK LIM

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EDUCATION & EMPLOYMENT

- **Purdue University, West Lafayette, IN, USA.** Aug 2020 – present.
Assistant Professor in Quantitative Methods, Krannert School of Management
Homepage: <https://tlim0213.github.io>
- **Fields Institute, Toronto, Canada.** Mar – Jul 2019 & Mar – Jul 2020.
Fields Research Fellow
- **ShanghaiTech University, Shanghai, China.** Sep 2018 – Jun 2020.
Assistant Professor of Mathematics
- **University of Oxford, Oxford, UK.** Oct 2016 – Aug 2018.
Postdoctoral Research Assistant
- **Technische Universität Wien, Vienna, Austria.** May – Sep 2016.
Postdoctoral Research Assistant
- **University of British Columbia, Vancouver, Canada.** Sep 2011 – May 2016.
PhD in Mathematics

RESEARCH INTERESTS

(1) (Martingale–) Optimal Transport in multi-dimensions and its applications to Economics, Finance and Statistics. (2) Analysis of Variational problems arising in Physics, Geometry and Data Science.

PUBLICATIONS

- **On the structure of optimal martingale transport in higher dimensions.** *PhD thesis*. [Link](#)
- with N. Ghoussoub and Y-H. Kim. **Structure of optimal martingale transport in general dimensions.** *Annals of Probability*, 2019. [Journal](#)
- with M. Beiglböck and J. Oblój. **Dual attainment for the martingale transport problem.** *Bernoulli*, 2019. [Journal](#)
- **Optimal martingale transport between radially symmetric marginals in general dimensions.** *Stochastic Processes and their Applications*, 2020. [Journal](#)
- with N. Ghoussoub and Y-H. Kim. **Optimal Brownian stopping when the source and target are radially symmetric distributions.** *SIAM Journal on Control and Optimization*, 2020. [Journal](#)
- with S. Eckstein, G. Guo and J. Oblój. **Robust pricing and hedging of options on multiple assets and its numerics.** *SIAM Journal on Financial Mathematics*, 2021. [Journal](#) [arXiv](#)
- with K. Kang, H. Kim and G. Seo. **Uniqueness and characterization of local minimizers for the interaction energy with mildly repulsive potentials.** *Calculus of Variations and Partial Differential Equations*, 2021. [Journal](#) [arXiv](#)
- with R.J. McCann. **Geometrical bounds for the variance and recentered moments.** *Mathematics of Operations Research*, 2021. [Journal](#) [arXiv](#)
- with R.J. McCann. **Isodiametry, variance, and regular simplices from particle interactions.** *Archive for Rational Mechanics and Analysis*, 2021. [Journal](#) [arXiv](#)
- with R.J. McCann. **On Fejes Tóth's conjectured maximizer for the sum of angles between lines.** *Applied Mathematics and Optimization*, 2021. [Journal](#) [arXiv](#)

- with R.J. McCann. **Maximizing powers of the angle between pairs of points in projective space.** arXiv
- with R.J. McCann. **On the cardinality of sets in \mathbb{R}^d obeying a slightly obtuse angle bound.** arXiv
- **Geometry of multi-marginal martingale optimal transportations and duality.** arXiv
- **A Hodge theoretic extension of Shapley axioms.** arXiv
- **Hodge theoretic reward allocation for generalized cooperative games on graphs.** arXiv
- with C. Davis and R.J. McCann. **Classifying minimum energy states for interacting particles (I) – Spherical shells.** arXiv
- with C. Davis and R.J. McCann. **Classifying minimum energy states for interacting particles (II) – Regular simplices.** forthcoming

WORK IN PROGRESS

- with R.J. McCann. **Geometry of optimizers on the sphere for intrinsic interaction energy.**
- with J. Zoen-Git Hiew, B. Pass and M. Souza. **Modularity, Legendre transform, and multi-marginal martingale optimal transportations.**

INVITED TALKS & LECTURES

- Dec 2020. *Canadian Mathematical Society Winter Meeting.* online. [Link](#) [Video](#)
- Oct-Nov 2020. *Four lecture series.* online. [Link](#)
- Feb 2020. *Colloquium.* Krannert School of Management, Purdue University, USA.
- Oct 2019. *Korean Mathematical Society (KMS) Annual Meeting.* Hong-Ik University, Seoul, Korea.
- Oct 2019. *Analysis & PDE Seminar.* Georgia Institute of Technology, USA. [Link](#)
- Apr 2019. *Analysis & Applied Math Seminar.* University of Toronto, Canada.
- Mar 2019. *Colloquium Seminar.* Pusan National University, Korea.
- Aug 2018. *Mathematics Seminar.* Seoul National University, Korea.
- Jun 2018. *Mathematical Finance Internal Seminar.* University of Oxford, UK.
- May 2018. *CMO Workshop 18w5080: Stochastic Analysis and its Applications.* Mexico. [Link](#) [Video](#)
- May 2018. *Mathematics Seminar.* University of Bath, UK.
- Apr 2018. *Mathematics Seminar.* University of Central Florida, USA.
- Dec 2017. *Vienna Seminar in Mathematical Finance and Probability.* University of Vienna, Austria.
- Dec 2017. *Mathematics Seminar.* Dublin City University, Ireland.
- Sep 2017. *Martingale Optimal Transport (and Friends).* University of Oxford, UK. [Link](#)
- Jul 2017. *Stochastic Processes and their Applications (SPA) 2017.* Moscow, Russia. [Link](#)
- May 2017. *Oxford-Princeton Workshop on Financial Mathematics & Stochastic Analysis.* UK. [Link](#)
- Jan 2017. *Mathematics Seminar.* Strasbourg University, France.
- Jan 2017. *Advances in Financial Mathematics.* Paris, France. [Link](#)
- Jan 2017. *Mathematics Seminar.* Ecole Polytechnique, Palaiseau, France.
- Jan 2017. *Paris Bachelier Seminar.* Paris, France. [Link](#)
- Nov 2016. *Mathematical Finance Internal Seminar.* University of Oxford, UK. [Link](#)

- Nov 2016. *Model Uncertainty & Robust Finance*. University of Milan, Italy.
- Jul 2016. *Mathematics Seminar*. Scuola Normale Superiore, Pisa, Italy.
- Jun 2016. *Mathematics Seminar*. Yonsei University, Seoul, Korea.
- Apr 2016. *Optimal Transportation, Equilibrium, and Applications to Economics*. NYU, USA. [Link](#)
- Mar 2016. *Skorokhod embeddings, Martingale Optimal Transport and their applications*. UK. [Link](#)
- Feb 2016. *Vienna Seminar in Mathematical Finance and Probability*. TU Wien, Austria. [Link](#)
- Sep 2015. *Mathematics Seminar*. Ecole Polytechnique, Palaiseau, France.
- Sep 2015. *European Summer School In Financial Mathematics*. Le Mans, France. [Link](#)
- Aug 2015. *KIAS CMC minischool on Analysis, Geometry, and Optimal Transport*. KIAS, Korea. [Link](#)

ACADEMIC SERVICE & CONFERENCE ORGANIZATION

- Organizer for *ShanghaiTech-Yonsei Mathematics Conference*, 15-16 Nov 2019. [Link](#)

TEACHING EXPERIENCE

Krannert School of Management, Purdue University

Assistant Professor in Quantitative Methods

2020 – present

West Lafayette, IN, USA

- MGMT 47400–001,002 : Predictive Analytics. Spring 2021.
- MGMT 47400–001,002,003 : Predictive Analytics. Fall 2021. (scheduled)
- MGMT 69000 : Advanced Problems in Management – Optimal Transport Problems. Spring 2022. (scheduled)

ShanghaiTech University

Assistant Professor of Mathematics

2018 – 2020

Shanghai, China

- Stochastic Processes (for 3rd & 4th grades). 2019.
- Linear Algebra (for 2nd grades). 2018.

University of Oxford

Class Tutor

2018

Oxford, UK

- Class Tutor for B8.3 Mathematical Models of Financial Derivatives. 2018.

University of British Columbia

Teaching Assistant and Instructor

2011 – 2016

Vancouver, BC, Canada

- Instructor for MATH 101 (Integral Calculus with Applications to Physics and Engineering). 2016.
- Instructor for Workshops (Direct student groups towards solving math problems). 2015.
- TA for MATH 121 (Honours Integral Calculus). 2015.
- TA for MATH 441 (Mathematical Modeling: Discrete Optimization Problems). 2014.
- TA for MATH 424 (Classical Differential Geometry). 2012 – 2013.

HONOURS & AWARDS

- Fields Research Fellowship. Jul – Dec 2020. University of Toronto, Canada. [Link](#)
- Fields Research Fellowship. June 2019. University of Toronto, Canada. [Link](#)
- Four Year Doctoral Fellowship (4YF) recipient. 2011 – 2015. University of British Columbia, Canada.
- Kwanjeong Scholarship recipient. 2011 – 2016. Kwanjeong Educational Foundation, Seoul, Korea. [Link](#)

- Seoul Scholarship recipient. 2008 – 2010. Seoul Metropolitan Government, Korea.

OTHERS

Military service

- Sergeant. Republic of Korea army. Nov 2000 – Jan 2003.

For the underprivileged

- Supporting four unprivileged children in Tanzania, Nicaragua, Philippines and Mexico for their living and education through CompassionUK.org. 2006 – present.
- Weekly voluntary mathematics teaching for unprivileged children under the guidance of pastor Pyun. 2006 – 2011. Geoyeo-Dong, Seoul, Korea.

Hobbies

- Basketball, Baseball, Snowboarding, Weight training, Playing Piano, Listening Music.