TONGSEOK LIM

◇ https://tlim0213.github.io ◇ lim336 at purdue dot edu ◇ March 13, 2023

ACADEMIC CAREER

- **Purdue University, West Lafayette, IN, USA** Aug 2020 – present
  Assistant Professor in Quantitative Methods, Mitchell E. Daniels, Jr. School of Business
  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 (BSc from Yonsei University, Seoul, Republic of Korea)

RESEARCH INTERESTS

(i) (Martingale–) Optimal Transport in multi-dimensions and its applications to Economics, Finance and Statistics, (ii) Analysis of Variational problems arising in Physics, Geometry and Data Science, and (iii) Hodge Theory on graphs and its connection with Stochastic Calculus and Game Theory.

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. Obłój. **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. Obłój. **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. **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. **Geometrical bounds for the variance and recentered moments**. *Mathematics of Operations Research*, 2022. Journal arXiv
- with R.J. McCann. **Maximizing expected powers of the angle between pairs of points in projective space**. *Probability Theory and Related Fields*, 2022. Journal arXiv
- with R.J. McCann. **On the cardinality of sets in Rd obeying a slightly obtuse angle bound**. *SIAM Journal on Discrete Mathematics*, 2022. Journal arXiv
- with C. Davis and R.J. McCann. **Classifying minimum energy states for interacting particles: Spherical shells**. *SIAM Journal on Applied Mathematics*, 2022. Journal arXiv
- with C. Davis and R.J. McCann. **Classifying minimum energy states for interacting particles: Regular simplices**. *Communications in Mathematical Physics*, in press, 2022. Journal Github arXiv
- **Geometry of vectorial martingale optimal transportations and duality**. *Mathematical Programming* (series A), in press, 2023. Github arXiv
- **Maximal monotonicity and cyclic involutivity of multi-conjugate convex functions**. arXiv
- **Hodge allocation for cooperative rewards: a generalization of Shapley's cooperative value allocation theory via Hodge theory on graphs**. Github arXiv
  (This article embodies T. Lim's preceding articles arXiv1, arXiv2.)

INVITED TALKS & LECTURES

- Apr 2023. *Midwest International Trade & Theory Conference.* University of Tennessee, USA. Link
- Mar 2023. *Finance seminar.* College of Business, Stony Brook University, USA.
- Mar 2023. *Eighth annual conference on network science and economics.* Virginia Tech, USA. Link
- Feb 2023. *Quantitative Methods seminar.* School of Business, Purdue University, USA.
- Feb 2023. *Analysis & PDE seminar.* Department of Mathematics, Purdue University, USA.
- Jan 2023. *2023 Joint Mathematics Meetings (JMM 2023).* Boston, USA. Link
- July 2022. *AI seminar.* Center for AI and Natural Sciences, KIAS, Korea. Link
- June 2022. *Colloquium seminar.* Kyungpook National University, Korea.
- May 2022. *Colloquium seminars I & II.* Pusan National University, Korea.
- May 2022. *AI seminar.* Center for AI and Natural Sciences, KIAS, Korea. Link
- Mar 2022. *Stochastic Mass Transports.* Banff International Research Station. Link Video
- Dec 2021. *Analysis & PDE seminar I & II.* Yonsei University, Korea.
- Oct 2021. *Game theory seminar.* College of business, KAIST, Korea.
- Sep 2021. *Mathematics & Economics joint seminar.* Washington University in St. Louis, USA. Link
- Dec 2020. *Canadian Mathematical Society Winter Meeting.* online. Link Video
- Oct 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* Link 15-16 Nov 2019

RESEARCH STUDENTS AND ALUMNI

PhD supervision

· Marcelo Cruz de Souza (ongoing since Apr 2021)

TEACHING EXPERIENCE

Krannert School of Management, Purdue University 2020 – present
Assistant Professor in Quantitative Methods *West Lafayette, IN, USA*

· MGMT 47400–001,002 : Predictive Analytics Fall 2023
· MGMT 47400–001 : Predictive Analytics Spring 2023
· MGMT 47400–001,002 : Predictive Analytics Fall 2022
· MGMT 69000 : Advanced Problems in Management – Optimal Transport Problems Spring 2022
· MGMT 47400–001 : Predictive Analytics Spring 2022
· MGMT 47400–001,002 : Predictive Analytics Fall 2021
· MGMT 47400–001,002 : Predictive Analytics Spring 2021

ShanghaiTech University 2018 – 2020
Assistant Professor of Mathematics *Shanghai, China*

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

University of Oxford 2018
Class Tutor *Oxford, UK*

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

University of British Columbia 2011 – 2016
Teaching Assistant and Instructor *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

Hobbies

· Basketball, Baseball, Snowboarding, Weight training, Playing Piano, Listening Music

For the underprivileged

· Supporting underprivileged children through Compassion.org 2006 – present