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*, 2016.
  `https://open.library.ubc.ca/cIRcle/collections/ubctheses/24/items/1.0228865`
- with N. Ghoussoub and Y-H. Kim. **Structure of optimal martingale transport in general dimensions**. *Annals of Probability*, 2019. `https://projecteuclid.org/euclid.aop/1544691619`
- with M. Beiglböck and J. Obłój. **Dual attainment for the martingale transport problem**. *Bernoulli*, 2019. `https://projecteuclid.org/euclid.bj/1560326422`
- **Optimal martingale transport between radially symmetric marginals in general dimensions**. *Stochastic Processes and their Applications*, 2020. `https://doi.org/10.1016/j.spa.2019.06.005`
- 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. `https://doi.org/10.1137/19M1270513`
- 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.`https://doi.org/10.1137/19M1286256`
- 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. `https://doi.org/10.1007/s00526-020-01882-7`
- with R.J. McCann. **Geometrical bounds for the variance and recentered moments**. *Mathematics of Operations Research*, 2021. `https://doi.org/10.1287/moor.2021.1125`
- with R.J. McCann. **Isodiametry, variance, and regular simplices from particle interactions**. *Archive for Rational Mechanics and Analysis*, 2021. `https://doi.org/10.1007/s00205-021-01632-9`

- with R.J. McCann. **On Fejes Tóth's conjectured maximizer for the sum of angles between lines**. *Applied Mathematics and Optimization*, 2021. `https://doi.org/10.1007/s00245-020-09745-5`
- with R.J. McCann. **Maximizing powers of the angle between pairs of points in projective space**. `https://arxiv.org/pdf/2007.13052.pdf`
- with R.J. McCann. **On the cardinality of sets in Rd obeying a slightly obtuse angle bound**. `https://arxiv.org/pdf/2007.13871.pdf`
- **Geometry of multi–marginal martingale optimal transportations and duality**. `https://arxiv.org/pdf/1611.01496.pdf`
- **A Hodge theoretic extension of Shapley axioms**. `https://arxiv.org/pdf/2106.15094.pdf`
- **Hodge theoretic reward allocation for generalized cooperative games on graphs**. `https://tlim0213.github.io/folder/papers/ShapleyGeneralGraph.pdf`

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. `https://winter20.cms.math.ca` `https://vimeo.com/showcase/7914175`
- Oct-Nov 2020. *Four lecture series.* online. `https://sites.google.com/site/junkeejeon/seminar`
- 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. `https://math.gatech.edu/seminars-colloquia/series/pde-seminar/tongseok-lim-20191001`
- 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.* Oaxaca, Mexico. `https://www.birs.ca/events/2018/5-day-workshops/18w5080` `http://videos.birs.ca/2018/18w5080/201805161150-Lim.mp4`
- 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. `https://fam.tuwien.ac.at/events/vs-mfp/`
- Dec 2017. *Mathematics Seminar.* Dublin City University, Ireland.
- Sep 2017. *Martingale Optimal Transport (and Friends).* University of Oxford, UK. `http://people.maths.ox.ac.uk/obloj/MOT2017.html`
- Jul 2017. *Stochastic Processes and their Applications (SPA) 2017.* Moscow, Russia. `http://www.spa2017.org/`

- May 2017. *Oxford-Princeton Workshop on Financial Mathematics & Stochastic Analysis.* Oxford, UK.
  https://www.maths.ox.ac.uk/groups/mathematical-finance/research/oxfordprinceton-workshop-2017
- Jan 2017. *Mathematics Seminar.* Strasbourg University, France.
- Jan 2017. *Advances in Financial Mathematics.* Paris, France.
  https://fin-risks2017.sciencesconf.org/program
- Jan 2017. *Mathematics Seminar.* Ecole Polytechnique, Palaiseau, France.
- Jan 2017. *Paris Bachelier Seminar.* Paris, France.
  http://www.bachelier-paris.fr/programme/
- Nov 2016. *Mathematical Finance Internal Seminar.* University of Oxford, UK.
  https://www.maths.ox.ac.uk/node/16453
- 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.
  https://cims.nyu.edu/webapps/content/more/OTEAE-Workshop
- Mar 2016. *Skorokhod embeddings, Martingale Optimal Transport and their applications.* Oxford, UK.
  https://people.bath.ac.uk/mapamgc/SEPMOT.html
- Feb 2016. *Vienna Seminar in Mathematical Finance and Probability.* TU Wien, Austria.
  https://fam.tuwien.ac.at/events/vs-mfp/
- Sep 2015. *Mathematics Seminar.* Ecole Polytechnique, Palaiseau, France.
- Sep 2015. *European Summer School In Financial Mathematics.* Institute of Risk and Insurance, France.
  http://www.cmap.polytechnique.fr/~euroschoolmathfi15/euroschoolmathfi15.html
- Aug 2015. *KIAS CMC minischool on Analysis, Geometry, and Optimal Transport.* KIAS, Korea.
  http://home.kias.re.kr/MKG/h/MiniAGO2015/?pageNo=1498

ACADEMIC SERVICE & CONFERENCE ORGANIZATION

- Organizer for *ShanghaiTech-Yonsei Mathematics Conference*, 15-16 Nov 2019.
  https://sites.google.com/view/shanghaiyonseimath/home

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. 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   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.
  `http://www.fields.utoronto.ca/activities/20-21/hydrodynamics`
· Fields Research Fellowship. June 2019. University of Toronto, Canada.
  `http://www.fields.utoronto.ca/about`
· Four Year Doctoral Fellowship (4YF) recipient. 2011 - 2015. University of British Columbia, Canada.
· Kwanjeong Scholarship recipient. 2011 - 2016. Kwanjeong Educational Foundation, Seoul, Korea.
  `http://en.ikef.or.kr/aboutus/aboutus`
· 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.