Curriculum Vitae of Thomas Weighill

PERSONAL INFORMATION

Email: thomas (dot) weighill (at) tufts (dot) edu

EXPERIENCE

Postdoctoral

- Research Assistant Professor, Metric Geometry and Gerrymandering Group, Jonathan M. Tisch College of Civic Life, Tufts University (July 2020 –)

- Posdoctoral Fellow, Metric Geometry and Gerrymandering Group, Jonathan M. Tisch College of Civic Life, Tufts University (July 2019 – June 2020)

Teaching

- Tufts University (2019 – 2020):
Point-Set Topology: Spring 2020
Topological Data Analysis: Fall 2020.

- University of Tennessee, as GTA (2015 – 2019):
Math 119 College Algebra: Fall 2015
Math 125 Basic Calculus: Spring 2016, Summer 2016.
Math 251 Matrix Algebra I: Fall 2016*, Spring 2017*, Summer 2017* (online course), Fall 2017*, Spring 2018, Fall 2018*, Spring 2019* (∗ = primary instructor).

- Participated in Mentorship Progam at the University of Tennessee (2015 – 2019)

Research

- Graduate Research Assistantship with Dr Cory Hauck,
Oak Ridge National Lab (Spring 2015)

EDUCATION

Postgraduate

- PhD in Mathematics, University of Tennessee (2019)
Thesis title: *On some coarse geometric notions inspired by topology and category theory*
Advisor: Jerzy Dydak

- Master's in Mathematics (MSc) (cum laude), Stellenbosch University (2014)
Thesis title: *Bifibrational duality in non-abelian algebra and the theory of databases*
Supervisor: Zurab Janelidze

Undergraduate

- Bachelor of Engineering (Electronic and Electrical) (cum laude), Stellenbosch University (2012)

High School

- National Senior Certificate, Paarl Boys High School (2008)

GRANT ACTIVITY

- Project lead on the project *RCV and Minority Representation*, funded by New America under the Electoral Reform and Research Group.

SERVICE

Conference organization

- Member of organizing committee: UTK Geometric Topology Workshop, Knoxville TN, 2019.

Leadership and community involvement

- Engineering Student Council, Stellenbosch University (2011)

- Academic Affairs Council, Stellenbosch University (2011)

- Editor of Eendrag residence newspaper, the *Vires Unitatis* (2011)

- Maties Community Service marketing team (2010)

AWARDS AND SCHOLARSHIPS

- Chancellor's Award for Extraordinary Professional Promise, University of Tennessee (2019)

- Spike Tickle STEM Fellowship (2017)

- Dorothea & Edgar Eaves Teaching Award (2016)

- Chancellor's medal, Stellenbosch University (2014)

- S2A3 medal, Stellenbosch University (2014)

- MIH Media Lab Bursary (2013–2014)

- National Research Foundation Innovation Masters Scholarship (2013–2014)

- Postgraduate Merit Bursary (2013)

- Rector's Award for Outstanding Achievement (2012)

- Mathematical Contest in Modelling: Meritorious Winner (2011)

- Square Kilometre Array Undergraduate Scholarship (2010–2011)

- First place at Pan-African Mathematics Olympiad, Benin (2008)

- Runner-up in South African Maths Olympiad (2008)

PUBLICATIONS

Book chapters

- J. Rodden and **T. Weighill**, *Political Geography: A Case Study of Districting in Pennsylvania*, to appear in Political Geometry, edited by M. Duchin and O. Walch, Birkhauser, 2021. Preprint at `arxiv.org/abs/2010.14608`.

- L. Guth, A. Nieh and **T. Weighill**, *Three Applications of Entropy to Gerrymandering*, to appear in Political Geometry, edited by M. Duchin and O. Walch, Birkhauser, 2021. Preprint at `arxiv.org/abs/2010.14972`.

Papers

- T. Abrishami, N. Guillen, P. Rule, Z. Schutzman, J. Solomon, **T. Weighill** and Si Wu, *Geometry of Graph Partitions via Optimal Transport*, SIAM Journal on Scientific Computing 42.5, 2020, A3340-A3366.

- L. Higginbotham and **T. Weighill**, *Coarse quotients by group actions and the maximal Roe algebra*, Journal of Topology and Analysis 11(4), 2019, 875–907.

- J. Dydak and **T. Weighill**, *Monotone-light factorizations in coarse geometry*, Topology and its Applications 239, 2018, 160–180.

- J. Dydak and **T. Weighill**, *Extension theorems for large scale spaces via coarse neighbourhoods*, Mediterranean Journal of Mathematics 15, 2018, 59.

- **T. Weighill**, *Mal'tsev objects, R_1-spaces and ultrametric spaces*, Theory and Applications of Categories 32, 2017, 1485-1500.

- **T. Weighill**, *On spaces with connected Higson coronas*, Topology and its Applications 209, 2016, 301–315.

- Z. Janelidze and **T. Weighill**, *Duality in non-abelian algebra III. Normal categories and 0-regular varieties*, Algebra Universalis 77, 2017, 1-28.

- Z. Janelidze and **T. Weighill**, *Duality in non-abelian algebra II. From Isbell bicategories to Grandis exact categories*, J. Homotopy Relat. Struct. 11, 2016, 553–570.

- Z. Janelidze and **T. Weighill**, *Duality in non-abelian algebra I. From cover relations to Grandis ex2-categories*, Theory and Applications of Categories 29.11, 2014, 315–331.

- B. Murrell, S. Moola, A. Mabona, **T. Weighill**, D. Sheward, S.L.K. Pond and K. Scheffler, *FUBAR: A fast, unconstrained Bayesian approximation for inferring selection*, Mol. Biol. Evol. 30(5), 2013, 1196-1205.

- B. Murrell, J.O. Wertheim, S. Moola, **T. Weighill**, K. Scheffler and S.L.K. Pond, *Detecting individual sites subject to episodic diversifying selection*, PLoS Genetics 8(7), 2012.

- B. Murrell, **T. Weighill**, J. Buys, R. Ketteringham, S. Moola, G. Benade, L. du Buisson, D. Kaliski, T. Hands and K. Scheffler, *Non-Negative Matrix Factorization for Learning Alignment-Specific Models of Protein Evolution*, PLoS ONE 6(12), 2011.

TALKS AND POSTERS

Invited talks

- TGDA Seminar, Ohio State (online), 2020.

- Tufts Mathematics of Data Science Virtual Lecture Series, online, 2020.

- Special Colloquium, Stanford University, 2019.

- Special Session on "Recent Advances in Coarse Geometry", AMS Spring Sectional Meeting, Auburn AL, 2019.

- Session on Algebraic Topology and Applications, 52nd Spring Topology and Dynamical Systems Conference, Auburn AL, 2018.

Contributed talks

- UTK Geometric Topology Workshop, Knoxville TN, 2019.

- General Session on Topology, Joint Mathematics Meetings, Baltimore MD, 2019.

- Workshop in Geometric Topology, Provo UT, 2017.

- Summer Conference on Topology and its Applications, Dayton OH, 2017.

- Workshop in Geometric Topology, Colorado Springs CO, 2016.

- Graduate Student Topology and Geometry Conference, Bloomington IN, 2016.

- Young Topologists Meeting, Lausanne, 2015.

- South African Mathematical Society (SAMS) Annual Congress, Johannesburg, 2014.

- Fibrations in Computation Workshop, Glasgow, 2014.

- Workshop on Categorical Methods in Algebra and Topology, Coimbra, 2014.

- South African Mathematical Society (SAMS) Annual Congress, Pietermaritzburg, 2013.

- Category Theory International Conference, Macquarie University, Sydney, 2013.

Posters

- *Warped spaces and the maximal Roe algebra*, Workshop on Large Scale Geometry and Applications, Fields Institute, Toronto, Canada, 2018 (invited).

- *On a characterisation of codomain functors arising from classes of morphisms*, Category Theory International Conference, Cambridge, 2014.

- *Dimensionality reduction for learning alignment-specific amino acid substitution models*, Society for Molecular Biology and Evolution (SMBE) Annual Meeting 2011, Kyoto. Poster was awarded best undergraduate poster.

RESEARCH VISITS

- Invited by Professor Marino Gran to visit the School of Mathematics at Université catholique de Louvain, 15–20 June 2014.