

CURRICULUM VITAE

GIULIO TIOZZO

Department of Computer and Math Sciences
University of Toronto Scarborough

Department of Mathematics
University of Toronto

1. ACADEMIC HISTORY

EDUCATION

Harvard University, Cambridge MA

Ph.D. Mathematics, 2013.

Thesis: *Entropy, dimension and combinatorial moduli for one-dimensional dynamical systems*

Advisor: Curtis T. McMullen.

Scuola Normale Superiore di Pisa, Italy

Diploma di Licenza in Mathematics, cum laude, 2008.

Università di Pisa, Italy

M.A. Mathematics, cum laude, 2008.

Thesis: *Dynamics of continued fractions and central limit theorem*, advisor S. Marmi.

B.A. Mathematics, cum laude, 2006.

EMPLOYMENT

Assistant Professor, University of Toronto	2016-now
Gibbs Assistant Professor, Yale University	2014-16
ICERM Postdoctoral Institute Fellow, Brown University	2013-14
<u>Short visits</u>	
Research Member, MSRI, Berkeley	Spring 2022
Research Member, MSRI, Berkeley	Fall 2020
Summer Collaboration Program, IAS, Princeton	June 2022

RESEARCH INTERESTS

Dynamical systems: complex dynamics, random walks, ergodic theory, Teichmüller theory.

GRANTS AND AWARDS

André-Aisenstadt Prize	2021
Alfred P. Sloan Research Fellowship in Mathematics	2018-20
Ontario Early Researcher Award	2019-24
Connaught New Researcher Award	2017
NSERC Discovery Grant, <i>Ergodic Theory of Low-Dimensional Dynamical Systems</i>	2017-22
NSF Conference Grant (co-PI), <i>Boundaries of Random Walks and Applications</i>	2019
Departmental Teaching Fellow in Mathematics, Harvard University	2012-13
Certificate of Distinction in Teaching, Harvard University	Fall 2011

<i>Jean E. de Valpine</i> Fellowship, Harvard University	2010-11, 2012-13
<i>Benedetto Sciarra</i> Prize, Scuola Normale Superiore	2008-09
International Mathematical Olympiad, Three Bronze Medals	2001, 2002, 2003
Italian Mathematical Olympiad, 1 st place	2003

2. SCHOLARLY AND PROFESSIONAL WORK

PUBLICATIONS

Published or accepted for publication

1. *Shannon's theorem for locally compact groups*,
with B. Forghani, **Ann. Probab.**, accepted (2021).
2. *A central limit theorem for the degree of a random product of Cremona transformations*,
with N.-B. Dang, **Indiana Univ. Math. J.**, accepted (2021).
3. *The core entropy for polynomials of higher degree*,
with Y. Gao, **J. Eur. Math. Soc. (JEMS)**, accepted (2020).
4. *Random walks, WPD actions, and the Cremona group*,
with J. Maher, **Proc. London Math. Soc.** 123 (2021), no. 2, 153–202.
5. *Generalizations of Douady's magic formula*,
with A. Epstein, **Ergodic Theory Dynam. Systems** (2021),
doi:10.1017/etds.2021.67.
6. *The bifurcation locus for numbers of bounded type*,
with C. Carminati, **Ergodic Theory Dynam. Systems** (2021),
doi:10.1017/etds.2021.28.
7. *Thermodynamic formalism for coarse expanding dynamical systems*,
with T. Das, F. Przytycki, M. Urbański, A. Zdunik,
Comm. Math. Phys. 384 (2021), 165–199.
8. *Cusp excursion in hyperbolic manifolds and singularity of harmonic measure*,
with A. Randecker, **J. Mod. Dyn.** 17 (2021), 183–211.
9. *Entropy and drift for Gibbs measures on geometrically finite manifolds*,
with I. Gekhtman, **Trans. Amer. Math. Soc.**, 373 (2020), 2949–2980.
10. *Counting problems in graphs products and relatively hyperbolic groups*,
with I. Gekhtman, S. Taylor, **Israel J. Math.** 237 (2020), 311–371.
11. *Galois conjugates of entropies of real unimodal maps*,
Int. Math. Res. Not. IMRN 2020 (2020), no. 2, 607–640.
12. *A central limit theorem for random closed geodesics: proof of the Chas-Li-Maskit conjecture*,
with I. Gekhtman, S. Taylor, **Adv. Math.** 358 (2019), 106852.
13. *Excursions of generic geodesics in right-angled Artin groups and graph products*,
with Y. Qing, **Int. Math. Res. Not. IMRN** (2019), rnz294.
14. *Random walks of infinite moment on free semigroups*,
with B. Forghani, **Probab. Theory Related Fields** 175 (2019), no. 3, 1099–1122.
15. *Random walks on weakly hyperbolic groups*,
with J. Maher, **J. Reine Angew. Math.** 742 (2018), 187–239.
16. *Counting loxodromics for hyperbolic actions*,
with I. Gekhtman, S. Taylor, **J. Topol.** 11 (2018), no. 2, 379–419.

17. *Continued fractions with $SL(2, \mathbb{Z})$ -branches: combinatorics and entropy*,
with C. Carminati, S. Isola, **Trans. Amer. Math. Soc.** 370 (2018), no. 7, 4927–4973.
18. *The local Hölder exponent for the entropy of real unimodal maps*,
Sci. China Math. 61 (2018), no. 12, 2299–2310.
19. *Word length statistics for Teichmüller geodesics and singularity of harmonic measure*,
with V. Gadre, J. Maher, **Comment. Math. Helv.** 92 (2017), no. 1, 1–36.
20. *Generalised continuation by means of right limits*,
with D. Sauzin, **J. Anal. Math.** 133 (2017), no. 1, 27–49.
21. *The local Hölder exponent for the dimension of invariant subsets of the circle*,
with C. Carminati, **Ergodic Theory Dynam. Systems** 37 (2017), no. 6, 1825–1840.
22. *Continuity of core entropy of quadratic polynomials*,
Invent. Math. 203 (2016), no. 3, 891–921.
23. *Random extensions of free groups and surface groups are hyperbolic*, with S. Taylor,
Int. Math. Res. Not. IMRN 2016 (2016), no. 1, 294–310.
24. *Sublinear deviation between geodesics and sample paths*,
Duke Math. J. 164 (2015), no. 3, 511–539.
25. *Topological entropy of quadratic polynomials and dimension of sections of the Mandelbrot set*,
Adv. Math. 273 (2015), 651–715.
26. *Word length statistics and Lyapunov exponents for Fuchsian groups with cusps*,
with V. Gadre, J. Maher, **New York J. Math.** 21 (2015), 511–531.
27. *The entropy of Nakada’s α -continued fractions: analytical results*,
Ann. Sc. Norm. Super. Pisa Cl. Sci. 13 (2014), 1009–1037.
28. *Tuning and plateaux for the entropy of α -continued fractions*,
with C. Carminati, **Nonlinearity** 26 (2013), 1049–1070.
29. *Dynamics of continued fractions and kneading sequences of unimodal maps*,
with C. Bonanno, C. Carminati, S. Isola,
Discrete Contin. Dyn. Syst. 33 (2013), no. 4, 1313–1332.
30. *A canonical thickening of \mathbb{Q} and the entropy of α -continued fraction transformations*,
with C. Carminati, **Ergodic Theory Dynam. Systems** 32 (2012), no. 4, 1249–1269.
31. *The entropy of α -continued fractions: numerical results*,
with C. Carminati, S. Marmi, A. Profeti, **Nonlinearity** 23 (2010), 2429–2456.

Preprints

32. *The fundamental inequality for cocompact Fuchsian groups*,
with P. Kosenko, **submitted**, available at [arXiv:2012.07417](https://arxiv.org/abs/2012.07417).
33. *Sublinearly Morse Boundary II: Proper geodesic spaces*,
with Y. Qing, K. Rafi, **submitted**, available at [arXiv:2011.03481](https://arxiv.org/abs/2011.03481).
34. *Central limit theorems for counting measures in coarse negative curvature*,
with I. Gekhtman, S. Taylor, **submitted**, available at [arXiv:2004.13084](https://arxiv.org/abs/2004.13084).
35. Appendix in *Sublinearly Morse boundary I: $CAT(0)$ spaces*,
by Y. Qing, K. Rafi, **submitted**, available at [arXiv:1909.02096](https://arxiv.org/abs/1909.02096).

3. TEACHING EXPERIENCE

COURSES TAUGHT

At Toronto:

Undergraduate

MATB43 Introduction to Analysis	Fall 2021
MATA32 Calculus I for Management	Winter 2021
MATD35 Introduction to Dynamical Systems	Winter 2020
MATC34 Complex Analysis I	Fall 2017, Fall 2021
MATD34 Complex Analysis II	Winter 2017, Winter 2019, Winter 2020

Graduate

MAT1045 Topics in Ergodic Theory	Fall 2021
MAT1847 Introduction to Holomorphic Dynamics	Winter 2021
MAT1045 Introduction to Ergodic Theory	Fall 2018
MAT1847 Topics in Holomorphic Dynamics	Winter 2018
MAT1045 Topics in Ergodic Theory: random walks on groups	Fall 2016

At Yale:

Vector Calculus and Linear Algebra II	Spring 2015, Spring 2016
Intermediate Complex Analysis	Spring 2015, Spring 2016
Vector Calculus and Linear Algebra I	Fall 2014, Fall 2015

At Harvard:

Multivariable calculus	Spring 2013
Introduction to calculus	Fall 2010, Fall 2011
Tutorial <i>Dynamics of analytic maps and small divisor problems</i>	Fall 2009

INVITED TALKS

Conference talks

1. Invited to *Modern Group Theory and Related Topics (ICM satellite)*, Moscow, June 2022
2. Invited to *6th Brazilian School of Dynamical Systems*, Ceará, Brazil, October 2021
3. Invited to *First Dynamical Systems Summer Meeting*, Bedlewo, Poland, August 2021
4. Invited to *Simons Symposium on Algebraic, Complex and Arithmetic Dynamics*, Gleneagles, Scotland, May 2021 (postponed to 2022)
5. *The geometry of Julia sets*, IMPAN Warsaw, Poland, July 2020 (online)
6. Invited to *Groups, Random Walks and Dynamics*, Paris, France, June 2020 (postponed)
7. Invited to *Random walks in mathematics, physics, and society*, Queen's U, April 2020 (postponed)
8. Invited to *North Carolina Ergodic Theory Workshop*, Chapel Hill, April 2020 (postponed)
9. *Dynamics Day*, Northwestern University, March 2020
10. *Complex Dynamics in the Southern Hemisphere*, Santiago, Chile, January 2020
11. *Fields Medal Symposium: in honor of Artur Avila*, Toronto, November 2019
12. *Illustrating Dynamics and Probability*, ICERM, Providence, November 2019
13. *Ergodic Theory and Related Fields*, Bucharest, Romania, October 2019

14. *Dynamics, measures and dimensions*, Bedlewo, Poland, April 2019
15. *60 years of dynamics and number expansions*, Pisa, December 2018
16. *William Rowan Hamilton Geometry and Topology Workshop*, Trinity College, Dublin, August 2018
17. *Growth in topology and number theory*, Bonn, July 2018
18. *Complex and arithmetic dynamics*, Northwestern U, May 2018
19. *Ergodic theory and dynamical systems*, UNC Chapel Hill, April 2018
20. *Computation in geometry and topology*, U Warwick, December 2017
21. *Complex dynamics and quasi-conformal geometry* in memoriam of Tan Lei, Angers, October 2017
22. *Dynamics in Number Theory and Geometry*, Queen's University, August 2017
23. *Geometric and probabilistic properties of infinite groups*, Lille, June 2017
24. *Aperiodic Patterns in Crystals, Numbers and Symbols*, Leiden, June 2017
25. *Probabilistic methods in topology*, CRM Montreal, November 14-18, 2016
26. *Bloomington Geometry Workshop*, Univ. Indiana, April 8-10, 2016
27. *Renormalization in Dynamics*, Pisa, April 4-8, 2016
28. *Fractal Geometry, Hyperbolic Dynamics and Thermodynamical Formalism*, ICERM, March 7-11, 2016
29. *Dynamical developments: Complex Dynamics and Teichmüller Theory (in honor of J.H. Hubbard)*, Jacobs University, Bremen, August 17-21, 2015
30. *Boundaries and Ergodic Geometry*, Univ. Notre Dame, June 1-5, 2015
31. *Midwest Dynamical Systems Conference*, Univ. Michigan at Ann Arbor, November 8, 2014
32. *Journées dynamiques holomorphes*, Angers, France, May 29, 2014
33. *Mapping class groups and Teichmüller theory*, Ramat Hanadiv, Israel, May 14, 2014
34. *Random walks on groups*, Institut Henri Poincaré, Paris, January 30, 2014
35. *Holomorphic and symbolic dynamics*, Toulouse, January 21, 2014
36. *Approximation and numeration*, Université Paris Diderot, December 20, 2013
37. *Geometric structures in low-dimensional dynamics*, ICERM, Providence, November 18, 2013
38. *Topological and combinatorial problems in complex dynamics*, Pisa, Italy, October 17, 2013
39. *Complex Dynamics and Arithmetic Geometry*, UIC, Chicago, June 5, 2013
40. *Probability and Numbers*, TU Delft, Netherlands, April 3, 2013
41. *Random walks on groups*, University of Michigan at Ann Arbor, March 30, 2013

Short talks

42. AMS meeting, session on *Constructive Aspects of Complex Analysis*, Honolulu HI, March 22-25, 2019
43. AMS meeting, session on *Geometric Group Theory*, Buffalo NY, September 2017
44. AMS meeting, session on *Dynamics, Geometry and Number Theory*, Denton TX, September 2017

45. CMS meeting, session on *Stochastic Properties of Dynamical Systems*, Niagara Falls, December 4, 2016
46. Joint Mathematics Meetings, session on *Dynamics in One and Several Complex Variables*, San Antonio, January 10, 2015
47. *Ahlfors-Bers Colloquium*, dynamics session, Yale, October 24, 2014
48. *Euro-Nordic Congress of Mathematics*, Lund, Sweden, June 10, 2013
49. *Combinatorics, Automata and Number Theory 2012*, Luminy, France, May 24, 2012
50. *Dynamical Systems: Perspectives and Prospects*, Warwick, UK, April 19, 2012
51. *Numeration 2011*, Liège, Belgium, June 9, 2011
52. AMS Sectional Meeting, Worcester MA, April 10, 2011
53. *Periodic Approximation in Dynamics*, CRM De Giorgi, Pisa, Italy, January 29, 2010

Mini courses

54. *Random walks on weakly hyperbolic groups*, MSRI Berkeley (online), September 2020
55. *An introduction to entropy in one complex variable*, Peking University, China, December 2019 (one-month graduate course)
56. *Random walks on the Cremona group*, Del Duca Workshop, Toulouse, September 2019
57. *An introduction to core entropy*, Bedlewo, Poland, April 6-8, 2019
58. *Random walks on weakly hyperbolic groups*, Fields Institute Toronto, August 24-28, 2018
59. *Entropy in dimension one*, RIMS Kyoto, December 7-11, 2014

Colloquia

60. University of Michigan, April 23, 2019
61. City College of New York, December 6, 2018
62. Millican Lecture, University of North Texas, November 12, 2018
63. Queen's University, November 25, 2016
64. IUPUI, Indianapolis, October 7, 2016
65. Seoul National University, South Korea, March 2016
66. Rice University, February 17, 2016
67. University of Toronto, January 27, 2016
68. MIT, January 25, 2016
69. Brandeis University, January 22, 2016
70. University of Utah, January 14, 2016
71. Ohio State University, January 12, 2016
72. Northwestern University, January 6, 2016
73. University of Texas at Austin, December 7, 2015
74. Boston College, November 23, 2015
75. Undergraduate Math Society Colloquium, Yale, January 22, 2015
76. Jacobs University, Bremen, February 3, 2014
77. Washington University in St Louis, April 11, 2013

Seminars

78. Invited to OSU ergodic theory seminar (online), December 2021
79. ENS Paris group theory seminar (online), May 22, 2021
80. *Numeration* global seminar (online), May 11, 2021
81. Bremen dynamics seminar (online), March 22, 2021
82. Enriques-Lebesgue seminar (online), January 18, 2021
83. University of Porto (online), December 18, 2020
84. University of Michigan (online), December 15, 2020
85. Geometric Group Theory in East Asia (online), December 10, 2020
86. University of Wisconsin (online), October 21, 2020
87. ViSGaT seminar - KAIST (online), May 26, 2020
88. DinAmici seminar - Univ. of Rome Tor Vergata (online), May 14, 2020
89. Peking University, China, December 19, 2019
90. Chinese Academy of Sciences, Beijing, December 13, 2019
91. NYU Shanghai, China, December 10, 2019
92. Queen's University, November 1, 2019
93. Stony Brook University, October 25, 2019
94. Boston College, October 21, 2019
95. University of Chicago, March 11, 2019
96. Yale University, February 5, 2019
97. Columbia University, December 7, 2018
98. University of Michigan, April 16, 2018
99. McMaster University, March 8, 2018
100. Penn State University, December 4, 2017
101. University of Chicago, April 10, 2017
102. Harvard University, April 4, 2017
103. Yale University, April 2, 2017
104. Stony Brook University, March 30, 2017
105. University of Toronto, September 19, 2016
106. University of Utah, January 15, 2016
107. Ohio State University, December 3, 2015
108. University of Connecticut, October 9, 2015
109. University of Illinois at Urbana-Champaign, September 15, 2015
110. Temple University, April 28, 2015
111. University of Utah, March 13, 2015
112. University of Chicago, March 9, 2015
113. Penn State University, February 16, 2015
114. COOL Seminar, Institut Henri Poincaré, Paris, December 19, 2014

115. Université d'Angers, France, December 18, 2014
116. Scuola Normale Superiore, Pisa, Italy, December 16, 2014
117. City University of New York, April 11, 2014
118. University of Michigan at Ann Arbor, March 24, 2014
119. University of Texas at Austin, March 19, 2014
120. Northwestern University, February 25, 2014
121. University of Chicago, February 24, 2014
122. Brown University, February 19, 2014
123. Boston College, February 13, 2014
124. Université Paris XIII, January 29, 2014
125. COOL Seminar, Institut Henri Poincaré, Paris, January 10, 2014
126. École Normale Supérieure de Lyon, January 8, 2014
127. Harvard University, December 4, 2013
128. ICERM Brown University, November 4, 2013
129. TU Graz, Austria, July 5, 2013
130. University of Leoben, Austria, July 2, 2013
131. COOL Seminar, Institut Henri Poincaré, Paris, June 21, 2013
132. Université d'Orléans, France, June 18, 2013
133. Université d'Angers, France, December 18, 2012
134. University of Ottawa, October 23, 2012
135. SUNY at Stony Brook dynamics seminar, October 19, 2012
136. CUNY geometry and topology seminar, October 16, 2012
137. Harvard dynamics seminar, September 12, 2012
138. TU Delft, Netherlands, July 12, 2012
139. CRM De Giorgi, Pisa, Italy, June 27, 2012
140. Université de Genève, Switzerland, June 19, 2012
141. Cornell University dynamics seminar, April 27, 2012
142. Harvard dynamics seminar, January 11, 2012
143. Boston University dynamics seminar, March 21, 2011
144. Scuola Normale Superiore di Pisa, Italy, January 10, 2011
145. Harvard dynamics seminar, November 17, 2010
146. Harvard dynamics seminar, December 2, 2009
147. PUC Rio de Janeiro, Brazil, May 30, 2008

SUPERVISORY ACTIVITIES

Postdoctoral fellows

1. Kirill Lazebnik, 2020-now
2. Yan Mary He, 2018-now
3. Yulan Qing, 2019-20 (joint with K. Rafi)

4. Ilya Gekhtman, 2018-20
5. Anja Randecker, 2017-19 (joint with K. Rafi)

PhD students

1. Petr Kosenko, *Entropy and drift for random walks on cocompact Fuchsian groups*, 2018-now
2. Reila Zheng, *Counting periodic points in Hubbard trees*, 2018-now
3. Mariam Al-Hawaj, *Generalized pseudo-Anosovs from Hubbard trees*, 2017-now

PhD thesis committees

1. Adriano Pacifico, 2021-now
2. Wenbo Li, 2021-now
3. Lemonte Alie-Lamarche, 2021-now
4. Alexandru Gatea, 2021-now
5. Julian Ransford, 2021-now
6. Maria Pedreira, 2020-now
7. Lucas Ashbury-Bridgwood, 2020-now
8. Stanislav Balchev, 2020-now
9. Pouya Honaryar, 2020-now
10. Assaf Bar-Natan, 2019-now
11. Mateusz Olechnowicz, 2018-now
12. Ivan Telpukhovskiy, 2018-21
13. Yvon Verberne, 2017-20

MA students

1. Adriano Pacifico, 2018-19
Thesis: *Geometry and dynamics of the Cremona group*

Undergraduate projects

1. Kunal Chawla (NSERC USRA project):
Drift estimates for random walks on right-angled Artin groups, 2021
2. Hussain Kadhem, *The lamplighter group and the strong Atiyah conjecture*, 2020
3. Alex Karapetyan - Curtis Grant - Isabel Beach, *Ergodic theory and geodesic flows*, 2020
4. Amanda Petcu - Schinella D'Souza, *Counting hyperbolic components in the main molecule*, 2019
5. Jenkin Tsui, *Complex dynamical systems*, 2018
6. Anmol Bhullar, *Linearization of analytic germs of diffeomorphisms of $(\mathbb{C}, 0)$* , 2018
7. Andrew McCormack, *An application of importance sampling to graph excursions*, 2017
8. Gian Paolo Labuguen, *The Böttcher coordinate and the filled Julia set*, 2017
9. Robbie Nohra, *Topics in game theory - the price of anarchy*, 2017

4. ORGANIZATION AND SERVICE

Within the Department

- Alumni/Outreach committee 2021-22
- Merit (PTR) committee 2020-21
- Hiring committee 2017-18, 2018-19, 2019-20, 2021-22
- Graduate committee 2016-17, 2017-18, 2018-19, 2019-20
- Colloquium committee 2016-17
- Co-organizer, Dynamics seminar 2016-17, 2017-18, 2018-19, 2019-20

Outside the Department

- Co-organizer, semester on *Randomness and Geometry*, Fields Institute Jan - Jun 2024

- AMS-Simons Travel Grants Committee - Amer. Math. Society Feb 2021 - Jan 2024
- Co-organizer, conference on *Random walks beyond hyperbolic groups*, American Institute of Mathematics, San Jose (CA) Jun 2020 (postponed to 2022)
- Co-organizer, workshop on *Boundaries of random walks and applications*, Bowdoin College, Brunswick (ME) (funded by NSF conference grant: 30000 USD) Jun 2019
- Co-organizer, Geometry and topology seminar, Yale University 2015-16
- Co-organizer, Postdoc and graduate student seminar, ICERM, 2013-14
- Organizer, session on *Random walks and geometry*, meeting of the Canadian Mathematical Society, Ottawa Dec 2013
- Co-organizer, workshop on *Continued fractions, Interval exchanges and Applications to geometry*, CRM De Giorgi, Pisa Jun 2013
- Referee (in some cases in multiple occasions) for *Adv. Math.*, *Arnold Math. J.*, *Ann. Ec. Norm. Sup.*, *Comm. Math. Phys*, *Conform. Geom. Dyn.*, *Duke Math. J.*, *Discrete Contin. Dyn. Syst.*, *Enseign. Math.*, *Ergodic Theory Dynam. Systems*, *Exp. Math.*, *Geom. Topol.*, *Groups Geom. Dyn.*, *Int. Math. Res. Not. IMRN*, *Invent. Math.*, *J. Eur. Math. Soc. (JEMS)*, *J. Mod. Dyn.*, *J. Reine Angew. Math.*, *Monatsh. Math.*, *Nonlinearity*, *Potential Anal.*, *Trans. Amer. Math. Soc.*
- Reviewer for Mathematical Reviews
- Grant reviewer, Agence Nationale de la Recherche - France
- Grant reviewer, NWO - Netherlands Organisation for Scientific Research

MEDIA

Profile featured in *Canadian excellence, Global recognition: Celebrating Canada's 2018 winners of major international research awards*, 2018 edition, by *Universities Canada*, link