

Curriculum Vitae

Personal:

Name: Gabor Lippner

Born: 26/11/1979, Budapest, Hungary

Language skills:

English: fluent

German: fair

Positions:

2020-now Associate Professor, Northeastern University, Department of Mathematics

2014-2020 Assistant Professor, Northeastern University, Department of Mathematics

2010-2014 Postdoctoral fellow, Harvard University, Department of Mathematics (advisor: S.-T. Yau)

2008-2009 Research Assistant, Eotvos University Budapest, Department of Computer Science

2006-2008 Research Assistant, Alfred Renyi Institute of Mathematics, Hungarian Academy of Sciences
Young researcher

Education:

- Eotvos University Budapest, Ph.D. in Mathematics (summa cum laude) 2009. Title of thesis: Multiple-point formulas and their applications, Supervisor: András Szűcs
- Marie Curie Fellowship at the University of Liverpool (January - July 2005, supervisor: Victor Goryunov)
- Eotvos University Budapest, Diploma (M.Sc equivalent) in Mathematics, 2003. Title of thesis: Multiple point manifolds of immersions, Supervisor: András Szűcs

Grants:

- NSF Grant No DMS-1800738 (2018-2021, \$150,000)
- Simons Foundation Collaboration Grant for Mathematicians (2017-2022, \$36,000, terminated in 2018)
- ARO Grant No 68668 (years 2016-2019, joint with Dima Krioukov and Maxim Kitsak,\$350,000)
- BSF Grant No 2014208: Geometric, Analytic and Probabilistic Aspects of Harmonic functions on Graphs and Manifolds (years 2015-2019, joint with Dan Mangoubi and Shing-Tung Yau, \$108,000).
- AMS-Simons Travel Grant (2013-2015)

Awards:

- Renyi Kato Prize of the J. Bolyai Math. Soc (2002)
- Schweitzer Math. Competition (3rd Prize: 2000,2002; 2nd Prize: 2001)
- International Math. Competition for University students: 2nd Prize (1999), 1st Prize (2000), Grand 1st Prize (2001,2002)

- International Mathematical Olympiad (gold medal: 1997, 1998)

Advising

- Whitney Drazen (Northeastern University), PhD advisor since Fall 2016
- Jonier Antunes (Northeastern University), PhD advisor since Fall 2017
- Tong Zhang (Northeastern University), PhD co-advisor, graduated in 2017
- Shuang Liu (Visiting Graduate Student from Renmin University, Beijing, China, 10/2015 - 09/2016)
- Florentin Munch (Visiting Graduate Student from University of Potsdam, Germany, 01/2017 - 12/2017)
- Ariya Shajii (Weston High School, MA), Yau Awards Competition, 2012
Title of Paper: Computationally Determining the Dimensions of the Homology Groups of Directed Graphs.
Result: Bronze Medal.

Teaching:

Northeastern University

- Introduction to Graph Theory (MATH 3545): spring 2020
- Graph Theory (MATH7233): fall 2014, fall 2015, fall 2016, fall 2017, fall 2018, fall 2019, fall 2020
- Calc 1 (MATH1341): fall 2017, fall 2018, fall 2019
- Calc 2 (MATH1342): spring 2015, spring 2017
- Discrete Mathematics (MATH2310): fall 2015
- Mathematical Heritage of Hungary, Dialogue of Civilizations Program, Summer 2019, Summer 2020 (virtual)

Harvard University

- Graph limits (268x, fall 2011)

Eotvos Uni. Budapest

- Introduction to Discrete Mathematics (2000-2009)
- Algebraic topology (2003,2004,2006,2009)
- Algebraic topology problem solving seminar (2004)
- Calculus II (2003,2005)
- Calculus I (2006,2007)
- Amenable groups (2009)

Budapest Semesters in Mathematics

- Combinatorics (2007 Spring, 2008 Spring)
- Geometric graph theory (teaching assistant) (2007 Fall)
- Introduction to topology (2008 Spring, 2008 Fall, 2009 Fall)

Invited talks:

Conferences:

- September 2003, Singularity Theory and Its Applications, Sapporo, Japan
- August 2004, Keldysh Centennial Conference, Moscow, Russia
- March 2010, Combinatorics, Groups, Algorithms and Complexity, Columbus, OH
- December 2010, Complex Networks, Arlington, VA
- June 2011, Groups, graphs, and stochastic processes, Banff, Canada

- January 2013, AMS-MMA Joint Meeting, San Diego, CA
- August 2016, Workshop on Discrete Analysis, Shanghai, China
- September 2016, AMS Sectional Meeting, Bowdoin College, Maine
- May 2017, CCEGN-2017, Critical and Collective Effects in Graphs and Networks
- Aug 2017, International Conference on Analysis and Geometry and Graphs and Manifolds, Potsdam, Germany
- April 2018, Algebraic Graph Theory and Quantum Walks Workshop, Waterloo, CA
- June 2018, SIAM Discrete Mathematics Conference, Denver, CO
- June 2018, CCEGN-2018, Critical and Collective Effects in Graphs and Networks, Eindhoven, Netherlands
- Sept 2018, AMS Sectional Meeting, Wilmington, DE
- April 2019, AMS Sectional Meeting, Hartford, CT

Seminars:

2005:

Singularity Seminar, University of Liverpool, UK
 Topology Seminar, University of Manchester, UK

2008:

Topology Seminar, Renyi Institute, Budapest, Hungary

2009:

Combinatorics Seminar, Renyi Institute, Budapest, Hungary
 Large Networks Seminar, Eotvos University, Budapest, Hungary

2010:

Differential Geometry Seminar, Harvard University, Cambridge, MA
 SCANS Seminar, Northeastern University, Boston, MA

2011:

Large Graphs Seminar, Renyi Institute, Budapest, Hungary
 Basic Notions Seminar, Harvard University, Cambridge, MA
 Differential Geometry Seminar, Harvard University, Cambridge, MA

2012:

Combinatorics Seminar, MIT, Cambridge, MA
 Everytopic Seminar, Brandeis University, Waltham, MA
 Basic Notions Seminar, Harvard University, Cambridge, MA
 Geometry and Topology Seminar, Brown University, Providence, RI
 Combinatorics Seminar, University of Rhode Island, Kingston, RI
 GASC Seminar, Northeastern University, Boston, MA

2013:

Geometry Seminar, Boston College, Chestnut Hill, MA

2014:

Special Colloquium, ETH Zurich
 Special Colloquium, University of Waterloo

2015:

Combinatorics Seminar, MIT, Cambridge, MA
 Differential Geometry Seminar, Harvard University, Cambridge, MA
 Analysis and Geometry Seminar, Northeastern University, Boston, MA

2016:

CS Theory Seminar, Northeastern University, Boston, MA
 GASC Seminar, Northeastern University, Boston, MA

Combinatorics Seminar, MIT, Cambridge, MA
Combinatorics Seminar, Brandeis, Waltham, MA

2017:

CMSA Colloquium, Harvard University, Cambridge, MA
Large Graphs Seminar, Renyi Institute, Budapest, Hungary
Analysis and PDE Seminar, Hebrew University, Jerusalem, Israel
GASC Seminar, Northeastern University, Boston MA

2018:

Large Graphs Seminar, Renyi Institute, Budapest, Hungary
Combinatorics Seminar, OSU, Columbus, OH

2019:

Discrete Mathematics Seminar, WPI, Worcester, MA
Probability Seminar, MIT, Boston, MA
Combinatorics Seminar, Yale, New Haven, CT
Combinatorics Seminar, BYU, Provo, UT
AIM Seminar, Northeastern University, Boston, MA
Arts and Sciences Seminar Series, Clarkson University, Potsdam, NY

Service:

- Member of NSF DMS Combinatorics Review Panel, 2018-19
- Organized a special session "Extremal Graph Theory and Quantum Walks on Graphs" at the 2018 Spring AMS Northeastern Sectional meeting.
- Organized the "Random graphs, simplicial complexes, and their applications" workshop Northeastern.
- Member of the committee of the Arany Daniel mathematics competition for high school students (2001-2009)
- Secretary of the Scientific Section of the Bolyai Janos Mathematical Society (2006-2009)
- Secretary of the Schweitzer Math. Competition Problem Committee (2006, 2008)

Publications:

- [1] F. Bauer, G. Lippner, Eigenvalue sums for lattice subgraphs, in preparation.
- [2] W. Drazen, O. Eisenberg, M. Kempton, G. Lippner, Pretty good fractional revival via magnetic fields, in preparation
- [3] G. Lippner, D. Mangoubi, Strong Liouville theorem on nilpotent groups - an elementary proof, in preparation
- [4] W. J. Cunningham, P. vd. Hoorn, D. Krioukov, G. Lippner, Convergence of Olivier-Ricci curvature in random geometric graphs on Riemannian manifolds, in preparation
- [5] P. vd. Hoorn, W. J. Cunningham, G. Lippner, C. Trugenberger, D. Krioukov, Ollivier-Ricci curvature convergence in random geometric graphs, submitted, [arXiv](#)
- [6] A. Chan, W. Drazen, O. Eisenberg, M. Kempton, G. Lippner, Approximate quantum fractional revival in paths and cycles, submitted, [arXiv](#)
- [7] A. Chan, G. Coutinho, W. Drazen, O. Eisenberg, C. Godsil, M. Kempton, G. Lippner, C. Tamon, H. Zhan, Fundamentals of fractional revival in graphs, submitted, [arXiv](#)
- [8] P. vd. Hoorn, G. Lippner, E. Mossel, Regular graphs with many triangles, submitted, [arXiv](#)
- [9] M. T. Angulo, G. Lippner, Y-Y. Liu, A-L. Barabasi, Sensitivity of complex networks and emergence of dynamic behavior, submitted, [arXiv](#)

- [10] M. Kempton, G. Lippner, F. Munch, S-T Yau, Large-scale Ricci curvature of graphs, preprint, to appear in *Calc. Var. PDE*, [arXiv](#)
- [11] G. Lippner, S. Liu, Li-Yau inequality on virtually Abelian groups, to appear in *Comm. Anal. Geom.*, [arXiv](#).
- [12] B. Allen†, C. Sample, R. Jencks, J. Withers, P. Steinhagen, L. Brizuela, J. Kolodny, D. Parke, G. Lippner, Y. A. Dementieva, Transient amplifiers of selection and reducers of fixation for death-Birth updating on graphs, to appear in *PLOS Computational Biology*, [arXiv](#)
- [13] C. Godsil, K. Guo, M. Kempton, G. Lippner F. Munch, State transfer in strongly regular graphs with an edge perturbation, *Journal of Combinatorial Theory A* **172** (2020) May, 105181, [arXiv](#), [DOI](#)
- [14] M. T. Schaub, A. R. Benson, P. Horn, G. Lippner, A. Jadbabaie, Random walks on simplicial complexes and the normalized Hodge 1-Laplacian, *SIAM Review* **62** (2020) No 2, 353–391, [arXiv](#), [DOI](#)
- [15] B. Allen†, G. Lippner†, M. Nowak, Evolutionary games on isothermal graphs, *Nature Communications* **10**, 5107 (2019) [arXiv](#), [DOI](#)
- [16] O. Eisenberg, M. Kempton, G. Lippner, Pretty good quantum state transfer in asymmetric graphs via potential, *Discrete Mathematics* **342** (2019) no. 10, 2821–2833 [arXiv](#), [DOI](#)
- [17] P. vd. Hoorn, G. Lippner, D. Krioukov, Sparse maximum-entropy random graphs with a given power-law degree distribution, *J. Stat. Phys* [arXiv](#), [DOI](#)
- [18] M. Kempton, G. Lippner, S-T Yau, Pretty good quantum state transfer in symmetric spin networks via magnetic field, *Quant. Inf. Proc.* **16** (2017) no. 9, 210, [arXiv](#), [DOI](#)
- [19] B. Allen, G. Lippner, Y-T Chen, B. Fotouhi, N. Momeni, M. Nowak, S-T Yau, Evolutionary dynamics on any population structure, *Nature*, **544** (2017) 227–230, [arXiv](#), [DOI](#)
- [20] E. Csoka, G. Lippner, Invariant random perfect matchings in Cayley graphs, *Groups, Geometry, and Dynamics*, **11** (2017) no. 1, 1–33, [arXiv](#), [DOI](#)
- [21] M. Kempton, G. Lippner, S-T Yau, Perfect state transfer on graphs with a potential, *Quant. Inf. Comput.*, **17** (2017) no. 3&4, 0303–0327, [arXiv](#), [journal](#)
- [22] G. Lippner, D. Mangoubi, On the sharpness of a three circles theorem for discrete harmonic functions, *Int. Math. Res. Notices* (2017) no. 5, 1487–1503, [arXiv](#), [DOI](#)
- [23] M. T. Angulo, J. A. Moreno, G. Lippner, A-L. Barabasi, Y-Y. Liu, Fundamental limitations in network reconstruction, *J. Royal Soc. Interface* **14** (2017), 20160966, [DOI](#)
- [24] E. Csoka, G. Lippner, O. Pikhurko, König’s Line Coloring and Vizing’s Theorems for Graphings, *Forum Math. Sigma* **4** (2016), e27, [arXiv](#), [DOI](#)
- [25] G. Lippner, D. Mangoubi, Harmonic functions on the lattice: Absolute monotonicity and propagation of smallness, *Duke Math. J.* **164** (2015) No 13, 2577–2595, [arXiv](#), [DOI](#)
- [26] F. Bauer, P. Horn, Y. Lin, G. Lippner, D. Mangoubi, S-T Yau, Li-Yau inequality on graphs, *J. of Diff. Geom.* **99** (2015) No 3, 359–405 [arXiv](#), [journal](#).
- [27] O. A. Camarena, E. Csoka, T. Hubai, G. Lippner, L. Lovasz, Positive graphs, *Eur. J. of Combin.*, **52** (2015) Part B, 290–301, [arXiv](#), [DOI](#)
- [28] P. Horn, G. Lippner, Two layer 3D floor planning, *Electr. J. of Combin.* **20** (2013) no. 4, [arXiv](#), [journal](#).
- [29] Y. Lin, G. Lippner, S.-T. Yau, Quantum tunneling on graphs, *Comm. Math. Phys.* **311** (2012) no. 1. 113–132, [arXiv](#), [DOI](#).
- [30] G. Elek, G. Lippner, An analogue of the Szemerédi Regularity Lemma for bounded degree graphs, preprint, [arXiv](#).
- [31] Y. Lin, G. Lippner, D. Mangoubi, S.-T. Yau, Nodal geometry of graphs on surfaces, *Disc. Cont. Dyn. Sys.* **28** (2010) no. 3. 1291–1298, [arXiv](#), [DOI](#).

- [32] G. Elek, G. Lippner, Borel oracles. An analytic approach to constant time algorithms, *Proc. Amer. Math. Soc.* **138** (2010) 2939–2947, [arXiv](#), [DOI](#).
- [33] G. Elek, G. Lippner, Sofic equivalence relations, *Journal of Func. Anal.* **258** (2010) no. 5. 1692–1708, [arXiv](#), [DOI](#).
- [34] G. Lippner, A. Szűcs, Multiplicative properties of Morin maps, *Alg. & Geom. Top.* **10** (2010) 1437–1454, [arXiv](#), [DOI](#).
- [35] G. Lippner, Singularities of projected immersions revisited, *Alg. & Geom. Top.* **9** (2009) 1623–1635, [arXiv](#), [DOI](#).
- [36] V. Goryunov, G. Lippner, Simple framed curve singularities, *Banach Center Publications* **82** (2008), 85–100, [DOI](#).
- [37] Gy. Károlyi, G. Lippner, P. Valtr, Empty convex polygons in almost convex sets, *Period. Math. Hung.* **55** (2007) No 2. 121–127, [DOI](#).
- [38] G. Braun, G. Lippner, Characteristic numbers of multiple-point manifolds, *Bull. London Math. Soc.* **38** (2006) 667–678, [DOI](#).
- [39] G. Lippner, A. Szűcs, A new proof of Herbert’s multiple-point formula, (Russian) *Fundam. Prikl. Mat.* **11** (2005), no. 5, 107–116; english translation in *J. Math. Sci. (N. Y.)* **146** (2007), no. 1, 5523–5529, [DOI](#).
- [40] G. Lippner, On double points of immersions of spheres, *Man. Math.* **113/2** (2004), 239–250, [DOI](#).
- [41] G. Kun, G. Lippner, Large empty convex polygons in k -convex sets, *Period. Math. Hung.* **46** (2003), 91–98, [DOI](#).