Curriculum Vitae

Roman Kogan

Contact information

Name:	Roman Kogan	E-mail:	romwell@gmail.com
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Education

- **2010 - 2017:** Ph.D. in Mathematics, Texas A&M University

  Area: Geometric Group Theory; advisor: Rostislav Grigorchuk.

  PhD Thesis: *Measures Induced by Automata and their Actions*, available at http://romankogan.net/math/KoganThesis.pdf (also in OAKTrust)

- **2005 - 2010:** B.Sc. in Mathematics (Computer Science Minor), SUNY Stony Brook.

Work experience

- **2021 - current** Roblox, Inc (San Mateo, CA)

  Studio Tools Team - Senior Software Engineer

  - Perspective 3D move/rotate/scale modeling tools

- **2018 - 2020** Google, Inc (Mountain View, CA) GEO - HULK (Semantic Location Mapping) - Software Engineer L4:

  - Place visit inference from WiFi scans
  - Automatically generate map data from crowdsourced information
  - Hiking trails inference from UGC

- **2016 - 2018** Cadence Design Systems(San Jose, CA) Computational Lithography Team - Lead Software Engineer:

  - Custom ORM for SQLite-based file format
  - Distributed computation caching with off-the shelf key-value stores
  - Fast mask corner rounding approximation algorithm

  - Single matrix multiplication Zernike coefficient scaling
  - Fast intensity map biasing
  - Fast process window ellipse computation

- **2014** Microsoft (Redmond, WA)
  SNaP Team - Intern:
  - OVSDB with Microsoft virtual switch schema

Mathematical software

- NvTrees: computations and visualizuation in Thompson groups nV ;
- ChordDiagrams: basis computation for the space of chord diagrams of links .

Preprints

- *Automatic logarithm and associated measures*, with R. Grigorchuk and Y. Vorobets https://arxiv.org/abs/1812.00069
- *Images of Markov measures*, with R. Grigorchuk and Y. Vorobets

Publications

- *On a Basis for the Framed Link Vector Space Spanned by Chord Diagrams*, with Brian Bischof and David Yetter.

  Journal of Knot Theory and Its Ramifications - JKTR , vol. 18, no. 12, 2009.

  Available at http://arxiv.org/pdf/0801.3253

Mathematical Research Interests

- Geometric Group Theory (finite-state tree automorphisms and measures, Thompson group and its generalizations);
- Knot Theory (finite type invariants, Khovanov homology, Legendrian knots);
- Computational Geometry and Topology.

Talks and Presentations

- **Nov 2018** Talk: *Graphs of Action and the Automatic Logarithm*, Groups and Dynamics seminar, Texas A&M.
- **April 2018** Talk: *Finite state measures.* Zassenhaus Groups and Friends Conference at USF.
- **Nov 2017:** Talk: *Finite-State Automata and Measures.* Graduate Student Seminar, Texas A&M Mathematics department
- **Mar 2017** Poster: *Markov, Sofic and Gibbs measures associated with automaton maps*, YGGT VI, Oxford, UK
- **Feb 2016** Poster: *Measure induced by automata acting on binary trees*, YGGT V, KIT, Germany
- **June 2015** Poster: *Algorithms and Software for Computation in n-dimensional Thompson Groups nV* YGGT IV, Spa, Belgium, and Growth, Symbolic Dynamics and Combinatorics of Words in Groups, Paris, France.
- **March 2014:** Talk: *Getting Closer To Amoebas.* Graduate Student Seminar, Texas A&M Mathematics department
- **April 2010:** Poster: *Proving Bennequin Inequality from Knot Diagrams.* EURECA Poster session, SUNY Stony Brook
- **August 2007:** Talk: *An Orbital Basis for the Framed Link Vector Space of Chord Diagrams* (with B. Bischof). Young Mathematician's Conference at Ohio State University.

Workshops ans Summer Schools

- Trees, dynamics and locally compact groups, Dusseldorf - June 2018
- Fall Workshop in Computational Geometry - November 2011
- IMA 2011 PI Summer Graduate Program: Topological Methods in Complex Systems - July 2011
- Texas Algebraic Geometry Symposium - April 2011
- Fall Workshop in Computational Geometry - October 2010

Teaching Experience

- **2010-2016**: Graduate Teaching Assistant, Texas A&M University
  - **Spring 2016**: MAT 131 (Calculus I) - Instructor of Record
  - **Spring 2012, 2013, 2014:** MAT 152 (Calculus II with MATLAB)

    Duties: Lab and recitation TA: conducting recitations, making and grading weekly quizzes, grading MATLAB assignments.
  - **Fall 2013:** MAT 361 (Euclidean and Non-Euclidean geometry, grading)
  - **Fall 2012:** MAT 439 (Differential Geometry, grading)
  - **Fall 2011:** MAT 151 (Calculus I with MATLAB)

    Duties: Lab and recitation TA.
- Undergraduate Teaching Assistant, SUNY Stony Brook
  - **Spring 2008:** AMS 345 (Computational geometry with Joseph Mitchell, SUNYSB)

    Duties: Grading homework and exams.
  - **Fall 2006:** CSE 150 (Foundations of Computer Science Honors with Michael Bender, SUNYSB)

    Duties: Recitation TA; writing and grading homework assignments.

Undergraduate Research

- **2010:** Legendrian Knots: a simpler proof of Bennequin's theorem (**Advisor**: Olga Plamenevskaya)
- **2009:** Legendrian Knots (**Advisor**: Sergei Tabachnikov)
- **2008:** Conjugacy problem in multi-dimensional Thompson groups nV (**Advisors**: Collin Bleak & Francesco Matucci)
- **2007:** Bases of the space of Vassiliev invariants of links (**Advisor**: David N. Yetter)

Competitions

- **2009 ACM ICPC World Finals**

  Team Honorable Mention
- **2008 ACM ICPC Greater NY region**

  - 1st place team

- **2005 Putnam**
  - Honorable Mention: score of 49 with 73rd place nationwide

Programming Languages

Java, C, C++, C#, Python, Mathematica, Matlab.

Spoken Languages

English, Russian, Ukrainian.

Membership

American Mathematical Society, SPIE