

Department of Mathematics  
University of Illinois at Urbana-Champaign  
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## Anush Tserunyan

- RESEARCH**      **Descriptive set theory** as applied to **ergodic theory** and Borel dynamics, measured group theory, descriptive combinatorics, and Borel equivalence relations in general. Also includes finite **combinatorics** and some applications of logic to other areas of mathematics such as Ramsey theory and arithmetic combinatorics.
- EDUCATION**
- 2013 Jun      *Ph.D. in Mathematics*, **University of California at Los Angeles**, CA, USA  
Advisors: Alexander S. Kechris (Caltech), Itay Neeman (UCLA)  
Thesis: *Finite generators for countable group actions; Finite index pairs of equivalence relations; Complexity measures for recursive programs*
- 2007 Jun      *M.S. in Informatics and Applied Mathematics*, 2007, **Yerevan State University**, Armenia
- 2005 Jun      *B.S. in Informatics and Applied Mathematics*, 2007, **Yerevan State University**, Armenia
- ACADEMIC APPOINTMENTS**
- Main**
- 2015 Aug–present      *Assistant Professor*, Mathematics Department, **University of Illinois at Urbana-Champaign**, USA
- 2013 Aug–2015 Aug      *J.L. Doob Research Assistant Professor*, Mathematics Department, **University of Illinois at Urbana-Champaign**, USA
- Editorial**
- 2017 Dec–present      *Editor*, [Archive for Mathematical Logic](#), Springer
- Visiting**
- 2018 Jun 3–30      *Visiting Fellow*, **Bernoulli Center**, Lausanne, Switzerland  
Program: *Descriptive set theory and Polish groups*
- 2016 Mar 14–Apr 29      *Visiting Fellow*, **Institut Mittag-Leffler**, Djursholm, Sweden  
Program: *Classification of operator algebras: complexity, rigidity, and dynamics*
- GRANTS AND AWARDS**
- Grants**
- 2015–2018      NSF Grant DMS-1501036  
Principal Investigator of project “Treeable equivalence relations and the use of probability groups in arithmetic combinatorics”
- 2014–2015      AMS Simons Travel Grant
- 2006–2007      Armenian National Science and Education Fund Grant  
Investigator of project “On Pairs of Disjoint Matchings of a Graph”  
Principal Investigator: Vahan Mkrtchyan
- Awards**
- 2015      Emil Artin Junior Prize in Mathematics [[Wikipedia](#)]
- 2012–2013      Dissertation Year Fellowship, UCLA
- 2011      Robert Sorgenfrey Distinguished Teaching Award, UCLA
- 2010–2011      Mangasar M. Mangasarian Fellowship for continuing graduate students, UCLA
- 2007      Chancellor’s Prize for incoming graduate students, UCLA
- 2005      Presidential Award “*Best Undergraduate Student in Sciences and Information Technologies*”  
Awarded by a former president of Armenia Robert Kocharyan
- 2004      Anania Shirakatzi Scholarship for excellent studies, Yerevan State University

**Research publications and preprints**

- A. Tserunyan, *Pointwise ergodic theorem for locally countable quasi-pmp graphs*, submitted (2018) [[pdf](#)]
- A. Bernshteyn, M. Delcourt, H. Towsner, A. Tserunyan, *A short nonalgorithmic proof of the containers theorem for hypergraphs*, submitted (2018) [[pdf](#), [arXiv](#)]
- A. Tserunyan, *A descriptive set theorist's proof of the pointwise ergodic theorem*, submitted (2017) [[pdf](#)]
- B. D. Miller, A. Tserunyan, *Edge sliding and ergodic hyperfinite decomposition*, submitted (2017) [[arXiv](#)]
- A. Tserunyan, *Mixing and double recurrence in probability groups*, submitted (2017) [[arXiv](#)]
- A. Tserunyan, *A Ramsey theorem on semigroups and a general van der Corput lemma*, **Journal of Symbolic Logic**, vol. 81 (2016), no. 2, pp. 718–741
- A. Tserunyan, *Finite generators for countable group actions in the Borel and Baire category settings*, **Advances in Mathematics**, vol. 269 (2015), pp. 585–646
- A. Tserunyan, *Characterization of a class of graphs related to pairs of disjoint matchings*, **Discrete Mathematics**, vol. 309 (2009), no. 4, pp. 693–713
- V. Mkrtchyan, V. Musoyan, A. Tserunyan, *On edge-disjoint pairs of matchings*, **Discrete Mathematics**, vol. 308 (2008), no. 23, pp. 5823–5828

**Work in preparation**

- A. Bernshteyn, M. Delcourt, A. Tserunyan, *A containers-type theorem for algebraic-geometric hypergraphs*
- A. Tserunyan, *A descriptive construction of actions on trees and Stallings' theorem*
- A. Tserunyan, *Topological dimension and Baire category in Euclidean spaces*
- A. Tserunyan, *Finite index subequivalence relations and treeability*

**Course notes**

- A. Tserunyan, *Introduction to Descriptive Set Theory*, semester-long course notes [[pdf](#)]
- A. Tserunyan, *Mathematical Logic*, semester-long course notes [[pdf](#)]
- A. Tserunyan, *A quick introduction to basic set theory* [[pdf](#)]
- A. Tserunyan, *Topics in logic and applications*, three-day course notes for advanced undergraduates [[pdf](#)]

**Reviews**

A review of “C. T. Conley and B. D. Miller, A bound on measurable chromatic numbers of locally finite Borel graphs, *Mathematical Research Letters*, vol. 23, no. 6 (2016), pp. 1633–1644”, **The Bulletin of Symbolic Logic**, vol. 23 (2017), no. 3, pp. 334–336 [[pdf](#), [DOI](#)]

**Plenary**

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|----------------|--|
| 2018 Jul 23–28 | (Upcoming) <i>Plenary speaker</i> at Logic Colloquium 2018, Udine, Italy   |
| 2017 Jun 18–24 | <i>Principal speaker</i> at the 41 <sup>st</sup> Summer Symposium in Real Analysis, The College of Wooster, OH, USA                |
| 2015 Mar 25–28 | <i>Plenary speaker</i> at the North American Annual Meeting of the Association for Symbolic Logic, UIUC, Urbana-Champaign, IL, USA |

**Colloquia and seminars (selected)**

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|-------------|--|
| 2017 Jun 2  | Cabal Seminar, University of California at Los Angeles, Los Angeles, CA, USA                               |
| 2017 May 30 | Descriptive Set Theory Seminar, California Institute of Technology, Pasadena, CA, USA                      |
| 2016 Sep 30 | Mathematics Colloquium, Queen's University, Kingston, ON, Canada   |
| 2016 May 12 | Research Seminar, Kurt Gödel Research Center for Mathematical Logic, University of Vienna, Vienna, Austria |

- 2016 Feb 25 Mathematics Colloquium (Oliver Club), Cornell University, NY, USA
- Mini-courses**
- 2017 May 5–11 The 15<sup>th</sup> Annual Spring Institute: Noncommutative Geometry and Operator Algebras, Vanderbilt University, TN, USA  
Mini-course: *Countable Borel equivalence relations, ergodicity, and turbulence*
- 2016 Jun 6–10 Undergraduate Summer School within Thematic Program on Model Theory, University of Notre Dame, IN, USA  
Mini-course: *Introduction to Model Theory II*
- 2013, Jul 14–Aug 3 Undergraduate Logic Summer School, Logic Center, UCLA, CA, USA  
Mini-course: *Descriptive Set Theory*
- 2012, Jun 24–Jul 14 Undergraduate Logic Summer School, Logic Center, UCLA, CA, USA  
Mini-course: *First Order Logic and Gödel's Incompleteness Theorem*
- All conference and workshop talks**
- 2018 Jul 23–28 (Upcoming) *Plenary speaker* at Logic Colloquium 2018, Udine, Italy
- 2018 Feb 5–9 (Upcoming) Borel Combinatorics and Ergodic Theory Conference, Bernoulli Center, Lausanne, Switzerland
- 2018 Jan 10–13 First Mexico/USA Logic Fest, Instituto Tecnológico Autónomo de México, Mexico City, Mexico
- 2017 Sep 15–17 Simon Fest, Rutgers University, NJ, USA
- 2017 Jun 18–24 *Principal speaker* at the 41<sup>st</sup> Summer Symposium in Real Analysis, The College of Wooster, OH, USA
- 2017 Jun 5–9 Concentration Week on Ergodic Theory and Operator Algebras, Texas A&M University, TX, USA
- 2017 May 5–11 The 15<sup>th</sup> Annual Spring Institute: Noncommutative Geometry and Operator Algebras, Vanderbilt University, TN, USA
- 2017 Feb 11–19 Set Theory Workshop, Oberwolfach, Germany
- 2016 Dec 12–16 Current Trends in Descriptive Set Theory Workshop, Erwin Schrödinger Institute for Mathematics and Physics, Vienna, Austria
- 2016 Oct 20–23 Set Theory Workshop, University of Illinois at Chicago, IL, USA
- 2016 Sep 11–16 Workshop on Set Theory and Its Application in Topology, Banff International Research Station, Oaxaca, Mexico
- 2016 Aug 38–Sep 3 Measured Group Theory Workshop, Oberwolfach, Germany
- 2016 Jul 31–Aug 6 Set Theory Special Session, Logic Colloquium 2016, Leeds, UK
- 2016 Mar 23 Workshop “Classification and Set Theory”, Institut Mittag-Leffler, Sweden
- 2015 Oct 30–Nov 1 Midwest Dynamical Systems Meeting, Ohio State University, OH, USA
- 2015 Aug 2–4 36<sup>th</sup> Semiannual Wasatch Topology Conference, Park City, UT, USA
- 2015 Jul 19–24 Combinatorics Meets Ergodic Theory Workshop, Banff International Research Centre, Banff, AB, Canada
- 2015 Mar 25–28 *Plenary speaker* at the North American Annual Meeting of the ASL, UIUC, Urbana-Champaign, IL, USA
- 2015 Mar 7 3<sup>rd</sup> Annual Midwest Women in Mathematics Symposium, Dominican University, IL, USA
- 2015 Feb 28–Mar 1 Spring Conference in Set Theory and Computability, University of Florida, Gainesville, FL, USA
- 2015 Jan 10–Feb 1 Very Informal Gathering 18 in honor of Tony Martin, UCLA Logic Center, Los Angeles, CA, USA
- 2014 June 2–6 Logic, Dynamics, and Interactions 2, University of North Texas, Denton, TX, USA
- 2014 May 24–28 Ramsey Theory Conference, University of Denver, Denver, CO, USA
- 2014 Apr 5–6 AMS Western Spring Sectional Meeting, University of New Mexico, Albuquerque, NM, USA
- 2014 Jan 12–18 Oberwolfach Workshop on Set Theory, Oberwolfach, Germany
- 2013 Oct 5–6 AMS Fall Southeastern Sectional Meeting, University of Louisville, Louisville, KY, USA

2013 May 8–11 ASL North American Annual Meeting, Waterloo, ON, Canada  
 2013 Mar 1–3 AMS Spring Southeastern Sectional Meeting, University of Mississippi, Oxford, MS, USA  
 2012 Oct 6–7 MAMLS Conference, Rutgers University, New Brunswick, NJ, USA  
 2012 Sep 10–14 Workshop on Applications to Operator Algebras, Fields Institute, Toronto, ON, Canada

RESEARCH  
VISITS AND  
WORKSHOPS

**Workshops**

2018 Jul 15–20 (Upcoming) Ramsey Theory in Logic, Combinatorics and Complexity, University Residential Center, Bertinoro (Forl-Cesena), Italy  
 2017 Aug 14–18 Nonstandard methods in combinatorial number theory, American Institute of Mathematics, CA, USA

**Research visits**

2018 Jun 3–30 (Upcoming) Special semester on “Descriptive Set Theory and Polish Groups”, Bernoulli Center, Lausanne, Switzerland  
 2017 Jun 1–4 Host: Andrew Marks, UCLA, CA, USA  
 2017 May 27–Jun 1 Host: Alexander Kechris, Caltech University, CA, USA  
 2016 Dec 4–11 Host: Benjamin Miller, Kurt Gödel Research Center for Mathematical Logic, University of Vienna, Vienna, Austria  
 2016 Jun 31–Jul 9 Host: Damien Gaboriau, École Normale Supérieure de Lyon, Lyon, France  
 2016 May 1–13 Host: Benjamin Miller, Kurt Gödel Research Center for Mathematical Logic, University of Vienna, Vienna, Austria  
 2016 Mar 14–Apr 29 Special semester on “Classification of operator algebras: complexity, rigidity, and dynamics”, Institut Mittag-Leffler, Djursholm, Sweden  
 2016 Feb 21–26 Host: Justin Moore, Cornell University, Ithaca, USA

ADVISING

**Ph.D. students**

2015 Aug–present *Anton Bernshteyn*, Math. Dept., University of Illinois at Urbana-Champaign  
 2017 Jul–present *Dakota Ihli*, Math. Dept., University of Illinois at Urbana-Champaign

**Master’s students**

2017 Jul–present *Wei Dai*, M.S. student, Math. Dept., University of Illinois at Urbana-Champaign

TEACHING

**Topics courses: graduate**

2015 Spring *Classification in Ergodic Theory*, Math 595, UIUC, IL, USA

**Graduate courses**

2018 Spring (Ongoing) *Set Theory*, Math 574–ST, UIUC, IL, USA  
 2017 Fall *Mathematical Logic*, Math 570, UIUC, IL, USA  
 2017 Spring *Real Analysis*, Math 540, UIUC, IL, USA  
 2016 Fall *Model Theory*, Math 571, UIUC, IL, USA  
 2015 Fall *Mathematical Logic*, Math 570, UIUC, IL, USA  
 2014 Fall *Mathematical Logic*, Math 570, UIUC, IL, USA  
 2014 Spring *Descriptive Set Theory*, Math 574–DST, UIUC, IL, USA

**Undergraduate courses**

2017 Fall *Fundamental Mathematics (Honors)*, Math 347H, UIUC, IL, USA  
 2017 Spring *Set Theory and Topology*, Math 432, UIUC, IL, USA  
 2015 Fall *Fundamental Mathematics*, Math 347, UIUC, IL, USA  
 2014 Fall *Elementary Real Analysis*, Math 444, UIUC, IL, USA  
 2013 Fall *Applied Linear Algebra*, Math 415, UIUC, IL, USA  
 2011 Fall *Calculus of Several Variables (Honors)*, Math 32AH, UCLA, IL, USA

## SERVICE

### Editorial

2017 Dec–present *Editor*, [Archive for Mathematical Logic](#), Springer

### Publication reviews

A review of “C. T. Conley and B. D. Miller, A bound on measurable chromatic numbers of locally finite Borel graphs, *Mathematical Research Letters*, vol. 23, no. 6 (2016), pp. 16331644”, *The Bulletin of Symbolic Logic*, vol. 23 (2017), no. 3, pp. 334–336 [[pdf](#), [DOI](#)]

### Refereeing

Discrete Mathematics (Elsevier)

Ergodic Theory and Dynamical Systems (Cambridge University Press)

Fundamenta Mathematicae (Polish Academy of Sciences)

Journal of the EMS (European Mathematical Society)

Proceedings of the AMS (American Mathematical Society)

Studia Mathematica (Polish Academy of Sciences)

### Conference and workshop organization

2018 May 16–19 Organizer of “Set Theory” special session, *ASL North American Annual Meeting 2018*, Macomb, IL, USA

2018 Jan 10–13 Organizer of plenary talks, *ASL Winter Meeting 2018 with the JMM*, San Diego, CA, USA

### Seminar organization

2018 Spring Co-organizer, *Operator Algebra and Descriptive Set Theory* joint learning seminar on “Cost and  $\ell^2$ -Betti numbers”, UIUC, IL, USA

2016 Fall–2018 Spring *Logic* seminar, UIUC, IL, USA

2016 Fall–2018 Spring *Model Theory and Descriptive Set Theory* learning seminar, UIUC, IL, USA

2015 Fall *Logic* seminar, UIUC, IL, USA

2015 Fall *Model Theory and Descriptive Set Theory* learning seminar, UIUC, IL, USA

2014 Spring *Descriptive Ergodic Theory* learning seminar, UIUC, IL, USA

2009 Spring *Logic* learning seminar on “Descriptive Complexity Theory”, UCLA, CA, USA

### Committees

2017–2018 Graduate Recruiting and Application Screening, Mathematics, UIUC, IL, USA

2017–2018 Postdoc Search, Mathematics, UIUC, IL, USA

2017–2018 Comp Exams: Mathematical Logic (Math 570), Mathematics, UIUC, IL, USA

2016–2017 Honors Courses, Mathematics, UIUC, IL, USA

2016–2017 Comp Exams: Real Analysis (Math 540), Mathematics, UIUC, IL, USA

2016–2017 Comp Exams: Mathematical Logic (Math 570), Mathematics, UIUC, IL, USA

2015–2016 Postdoc Search, Mathematics, UIUC, IL, USA

2015–2016 Comp Exams: Mathematical Logic (Math 570), Mathematics, UIUC, IL, USA

OLYMPIADS 2014 Jun *Second-place*, First Pan-Armenian Open Programming Contest, Yerevan, Armenia

NONACADEMIC JOBS 2004 Jul–2007 Mar *Software Engineer*, Ponté Solutions CJSC, Yerevan, Armenia

Job description: programming in C++, graph-theoretic algorithms, computational geometry

LANGUAGES Armenian, English, Russian, very basic French (can read math if needed)