

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, *A descriptive construction of trees and the Stallings theorem*
- A. Tserunyan, *Pointwise ergodic theorem for locally countable quasi-pmp graphs* (2018) [[pdf](#)]
- A. Bernshteyn, M. Delcourt, H. Towsner, A. Tserunyan, *A short nonalgorithmic proof of the containers theorem for hypergraphs* (2018) [[pdf](#), [arXiv](#)]
- A. Tserunyan, *A descriptive set theorist's proof of the pointwise ergodic theorem* (2018) [[pdf](#)]
- B. D. Miller, A. Tserunyan, *Edge sliding and ergodic hyperfinite decomposition* (2017) [[arXiv](#)]
- A. Tserunyan, *Mixing and double recurrence in probability groups* (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, *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 st 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 15th 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 August (Upcoming) Group Theory and Dynamical Systems, UT Austin, Austin, TX, USA
- 2018 Jul 23–28 (Upcoming) *Plenary speaker* at Logic Colloquium 2018, Udine, Italy
- 2018 Feb 5–9 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 41st 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 15th 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 36th 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 3rd 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
- 2018 Jun 3–30 (Upcoming) Special semester on “Descriptive Set Theory and Polish Groups”, Bernoulli Center, Lausanne, Switzerland
- 2017 Aug 14–18 Nonstandard methods in combinatorial number theory, American Institute of Mathematics, CA, USA

Research visits

- 2018 Nov (Upcoming) Hosts: Lewis Bowen and Kate Juschenko, Caltech, Austin, TX, USA
- 2018 Oct (Upcoming) Host: Alexander Kechris, Caltech, Pasadena, CA, USA
- 2017 Jun 1–4 Host: Andrew Marks, UCLA, Los Angeles, CA, USA
- 2017 May 27–Jun 1 Host: Alexander Kechris, Caltech, Pasadena, 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. 1633–1644”, **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

- 2020 May 11–15 Organizer of a workshop on “Measured group theory, Benjamin–Schramm convergence, and Borel combinatorics”, CIRM, Luminy, France
 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 ℓ^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 2004 Jul–2007 Mar *Software Engineer*, Ponté Solutions CJSC, Yerevan, Armenia

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

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