

Adrian Ioana

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Personal

Born on January 18th, 1981 in Târgu-Jiu, Romania.

Romanian and US citizen.

Education

Ph.D. Mathematics, University of California, Los Angeles, June 2007.

Thesis title: Some rigidity results in the orbit equivalence theory of non-amenable groups.

Advisor: Sorin Popa.

B.S. Mathematics, University of Bucharest, Romania, June 2003.

Employment

Professor, University of California, San Diego, 2015-present.

Associate Professor, University of California, San Diego, 2013-2015.

Assistant Professor, University of California, San Diego, 2011-2013.

Clay Research Fellow, 2008-2011.

Olga Taussky-John Todd Instructor, Caltech, 2007-2008.

Research Interests

Operator Algebras (von Neumann algebras, C^* -algebras),
Ergodic Theory (measured group theory, orbit equivalence),
Group Theory (representation theoretic and analytic aspects),
Logic (descriptive set theory, continuous model theory).

Awards and Honors

Invited 45 minutes lecture, International Congress of Mathematicians (ICM),
Section 8 (Analysis and Operator Algebras), Rio de Janeiro, August 2018.

Invited Address, AMS Western Spring Sectional Meeting, Albuquerque, April 2014.

Sloan Foundation Fellowship, 2013-2015.

"Dimitrie Pompeiu" Prize for the year 2011 (awarded by the Romanian Academy in 2013).

NSF Career Grant DMS-1253402, 2013-2018.
 EMS Prize (awarded by the European Mathematical Society), 2012.
 NSF Grant DMS-1161074, 2012-2015.
 Bourbaki Seminar partly on item 5 from my list of publications, 2011.
 Clay Research Fellowship, 2008-2011.
 Clay Liftoff Fellowship, Summer 2007.
 Dissertation Year Fellowship (UCLA), 2006-2007.
 Member of the Institute of Mathematics of the Romanian Academy, since 2006.
 Horn-Moez Prize for excellence in first-year graduate studies (UCLA), 2004.
 Ranked first among mathematics major students, University of Bucharest, 2003.
 Merit Scholarship, University of Bucharest, 2000-2003.
 Silver medal, International Mathematics Olympiad, 1999.
 First place, Romanian National Mathematics Olympiad (10th grade), 1997.

Publications

1. A. Ioana, *A relative version of Connes $\chi(M)$ invariant and existence of orbit inequivalent actions*, Erg. Th. Dynam. Sys. **27** (2007), 1199–1213.
2. A. Ioana, J. Peterson and S. Popa, *Amalgamated free products of weakly rigid factors and calculation of their symmetry groups*, Acta Math. **200** (2008), 85–153.
3. A. Ioana, *Rigidity results for wreath product II_1 factors*, J. Funct. Anal. **252** (2007), 763–791.
4. A. Ioana, *Non-orbit equivalent actions of \mathbb{F}_n* , Ann. Sci. Éc. Norm. Supér **42**, fascicule 4 (2009), 675–696.
5. A. Ioana, *Orbit inequivalent actions for groups containing a copy of \mathbb{F}_2* , Invent. Math. **185** (2011), 55–73.
6. A. Ioana, *Cocycle superrigidity for profinite actions of property (T) groups*, Duke Math. J. **157** (2011), 337–367.
7. I. Chifan, A. Ioana, *Ergodic subequivalence relations induced by a Bernoulli action*, Geom. Funct. Anal. Vol. **20** (2010), 53–67.
8. A. Ioana, A.S. Kechris, T. Tsankov, *Subequivalence relations and positive-definite functions*, Groups Geom. Dyn., **3** (2009), 579–625.
9. A. Ioana, *Relative property (T) for the subequivalence relations induced by the action of $SL(2, \mathbb{Z})$ on \mathbb{T}^2* , Adv. Math. **224** (2010), 1589–1617.
10. I. Chifan, A. Ioana, *On Relative Property (T) and Haagerup's Property*, Trans. Amer. Math. Soc. **363** (2011), 6407–6420.
11. I. Chifan, A. Ioana, *On a Question of D. Shlyakhtenko*, Proc. Amer. Math. Soc. **139** (2011), 1091–1093.
12. A. Ioana, *W^* -superrigidity for Bernoulli actions of property (T) groups*, J. Amer. Math. Soc. **24** (2011), 1175–1226.

13. A. Ioana, S. Vaes, *Rigid actions need not be strongly ergodic*, Proc. Amer. Math. Soc. **140** (2012), no. 9, 3283–3288.
14. A. Ioana, S. Popa, S. Vaes, *A class of superrigid group von Neumann algebras*, Ann. of Math. **178** (2013), 231–286.
15. A. Ioana, Y. Shalom, *Rigidity for equivalence relations on homogeneous spaces*, Groups Geom. Dyn. **7** (2013), 403–417.
16. A. Ioana: *Uniqueness of the group measure space decomposition for Popa’s \mathcal{HT} factors*, Geom. Funct. Anal. **22** (2012), 699–732.
17. A. Ioana: *Compact actions and uniqueness of the group measure space decomposition of II_1 factors*, J. Funct. Anal. **262** (2012), 4525–4533.
18. A. Ioana: *Cartan subalgebras of amalgamated free product II_1 factors. With an appendix joint with Stefaan Vaes*, Ann. Sci. Éc. Norm. Supér (4) **48** (2015), no. 1, 71–130.
19. A. Ioana: *Classification and rigidity for von Neumann algebras*, European Congress of Mathematics, published by the EMS (2013), 601–625.
20. Y. Dabrowski, A. Ioana: *Unbounded derivations, free dilations and indecomposability results for II_1 factors*, Trans. Amer. Math. Soc. **368** (2016), no. 7, 4525–4560.
21. I. Chifan, A. Ioana, Y. Kida: *W^* -superrigidity for arbitrary actions of central quotients of braid groups*, Math. Ann. **361**(2015), 563–582.
22. A. Ioana: *Orbit equivalence and Borel reducibility rigidity for profinite actions with spectral gap*, J. Eur. Math. Soc. (JEMS) **18** (2016), no. 12, 2733–2784.
23. A. Ioana: *Strong ergodicity, property (T), and orbit equivalence rigidity for translation actions*, J. Reine Angew. Math. **733** (2017), 203–250.
24. R. Boutonnet, A. Ioana, A. Salehi Golsefidy: *Local spectral gap in simple Lie groups and applications*, Invent. Math. **208** (2017), no. 3, 715–802.
25. A. Ioana, R. Tucker-Drob: *Weak containment rigidity for distal actions*, Adv. Math. **302** (2016), 309–322.
26. R. Boutonnet, I. Chifan, A. Ioana: *II_1 factors with non-isomorphic ultrapowers*, Duke Math. J. **166** (2017), no. 11, 2023–2051.
27. L. Bowen, D. Hoff, A. Ioana: *von Neumann’s problem and extensions of non-amenable equivalence relations*, Groups Geom. Dyn. **12** (2018), no. 2, 399–448.
28. D. Gaboriau, A. Ioana, R. Tucker-Drob: *Cocycle superrigidity for translation actions of product groups*, preprint 2016 (arXiv:1603.07616).
29. D. Drimbe, D. Hoff, A. Ioana: *Prime II_1 factors arising from irreducible lattices in products of rank one simple Lie groups*, preprint 2016 (arXiv:1611.02209), to appear in J. Reine. Angew. Math. .
30. R. Boutonnet, A. Ioana: *Local spectral gap in the group of Euclidean isometries*, preprint 2017 (arXiv:1702.06323), to appear in I.M.R.N.
31. I. Chifan, A. Ioana: *Amalgamated free product rigidity for group von Neumann algebras*, Adv. Math. **329** (2018), 819–850.
32. A. Ioana: *Rigidity for von Neumann algebras*, preprint 2017 (arXiv:1712.00151), to appear in Proceedings to the 2018 ICM.

33. A. Ioana: *Compact actions whose orbit equivalence relations are not profinite*, preprint 2018 (arXiv:1807.05476).
 34. A. Ioana, P. Spaas: *A class of II_1 factors with a unique McDuff decomposition*, preprint 2018 (arXiv:1808.02965).

Teaching experience

UCSD

- Winter 2018, *Math 240B (Real Analysis)*.
 Fall 2017, *Math 109 (Mathematical Reasoning)* and *Math 240A (Real Analysis)*.
 Fall 2016, *Math 31AH (Advanced Calculus)* and *Math 142A (Introduction to Analysis)*.
 Spring 2016, *Math 220C (Complex Analysis)* and *Math 140C (Foundations of Real Analysis)*.
 Winter 2016, *Math 220 B (Complex Analysis)*.
 Spring 2015, *Math 31CH (Vector Calculus)*.
 Fall 2014, *Math 31AH (Advanced Calculus)* and *Math 241A (Functional Analysis)*.
 Spring 2014, *Math 247A (Topics in Real Analysis: Introduction to von Neumann Algebras)*.
 Fall 2013, Winter 2014, and Spring 2014, *Math 140ABC (Foundations of Real Analysis)*.
 Spring 2013, *Math 20F (Linear Algebra)*.
 Winter 2013 and Spring 2013, *Math 142AB (Introduction to Analysis)*.
 Spring 2012, *Math 20D (Introduction to Differential Equations)*.
 Winter 2012, *Math 142A (Introduction to Analysis)*.
 Winter 2012, *Math 247A (Topics in Real Analysis: Introduction to von Neumann Algebras)*.

UCLA

- Winter 2010, *Math 110A (Abstract Algebra)*.

Caltech

- Fall 2007 and Winter 2008, *Math 140AB (Functional Analysis: Introduction to Operator Algebras)*.

Supervision

PhD Students

- Daniel Hoff, graduated Spring 2016, now RTG Hedrick Assistant Adjunct Professor at UCLA.
 Daniel Drimbe, graduated Spring 2018, now PIMS Postdoctoral Fellow at University of Regina, Canada.
 Pieter Spaas, advanced to candidacy Spring 2017, expected to graduate Spring 2020.

Postdoctoral scholar

Rémi Boutonnet (2014-2015).

Service*Conferences co-organized*

Workshop *Classification problems in von Neumann algebras*, Banff International Research Station, 09/2019.

Member of the scientific organizing committee for the 2018 West Coast Operator Algebra Seminar.

Workshop *Classification of group von Neumann algebras*, American Institute of Mathematics, 01/2018.

West Coast Operator Algebra Seminar, UCSD, 10/2015.

Workshop *von Neumann Algebras and Ergodic Theory*, UCLA, 09/2014.

Special Session on *Rigidity in von Neumann Algebras and Ergodic Theory*, AMS Sectional Meeting, UCLA, 10/2010.

Special Session on *Operator Algebras*, AMS Sectional Meeting, UC Riverside, 11/2009.

Workshop *von Neumann Algebras and Ergodic Theory*, UCLA, 03/2009.

Seminars co-organized

Functional Analysis Seminar (Math 243), UCSD, 2017-2018.

Seminar in Operator Algebras (Math 243), UCSD, 2016-2017 and Spring 2012.

Learning Seminar on the Poisson Boundary, UCSD, Fall 2014 and Winter 2015.

Analysis Seminar, UCSD, 2012-2014.

High School Competitions

San Diego Honors Math Competition, 2012, 2014-2018.

Committees (at UCSD)

Academic Senate Representative: 2017-2019.

Department Council: 2015-2017.

Hiring Committee: 2014-2015, 2015-2016, and 2017-2018.

Graduate Admissions: 2012-2013 and 2013-2014.

Doctoral Committee: James Pascoe, David Zimmermann, Thanakorn Prinyasart, Donlapark Pornnopparath, Nina Pikula.

Panelist

NSF (3 times)

NSF (GRFP), 2016

Talks

Conference Talks

- Invited 45 minute lecture, International Congress of Mathematicians, Rio de Janeiro, 08/2018.
- Quantitative Linear Algebra Culminating Workshop*, Lake Arrowhead, CA, 06/2018.
- Workshop *Approximation properties in Operator Algebras and Ergodic Theory*, IPAM, UCLA, 05/2018.
- Tutorial (3 lectures), part of the Long Program *Quantitative Linear Algebra*, IPAM, UCLA, 03/2018.
- Workshop *New Methods for Zimmer's Conjecture*, IPAM, UCLA, 01/2018.
- AMS meeting, Special Session *Advances in Operator Algebras*, San Diego, 01/2018.
- AMS meeting, Special Session *Advances in Operator Algebras*, UC Riverside, 11/2017.
- Tutorial (4 lectures), Workshop *Model Theory of Operator Algebras*, UC Irvine, 09/2017.
- von Neumann Algebras and Measured Group Theory*, Institut Henri Poincaré, Paris, 07/2017.
- Lecture series (3 lectures), *Ergodic Theory and Operator Algebras*, Texas A&M University, 06/2017.
- GPOTS (plenary talk), Texas Christian University, 05/2017.
- Operator Algebras and Mathematical Physics* conference, Sendai (Japan), 08/2016.
- Workshop *Groups, Dynamics, and Operator Algebras*, Queen Mary University, London (UK), 07/2016.
- Lecture series (3 lectures), *Spring Institute on Noncommutative Geometry and Operator Algebras*, University of Bonn (Germany), 05/2016, part of the Hausdorff Trimester Program *von Neumann algebras*.
- Mini-conference *Ergodic Theory and Logic*, UCLA, 01/2016.
- East Coast Operator Algebras Symposium*, University of Iowa, 10/2015.
- Workshop *Noncommutative geometry*, Oberwolfach, 06/2015.
- GPOTS (plenary talk), Purdue University, 05/2015.
- Extended Probabilistic Operator Algebras Seminar, UC Berkeley, 05/2015.
- Lecture series (4 lectures), *Thirteenth Annual Spring Institute on Noncommutative Geometry and Operator Algebras*, Vanderbilt University, 05/2015.
- ICM Satellite Conference on Operator Algebras and Applications, Cheongpung, Korea, 08/2014.
- Invited Address, AMS Western Spring Sectional Meeting, Albuquerque, April 2014.
- Von Neumann Algebras and Measurable Group Theory, KU Leuven, Belgium, 07/2013.
- Intensive Month on Operator Algebra and Harmonic Analysis, Madrid, 05/2013.
- West Coast Operator Algebra Seminar*, Eugene, 10/2012.
- Workshop on Applications to Operator Algebras, Fields Institute, Toronto, 09/2012.
- Invited lecture, European Congress of Mathematics (45 minutes), Krakow, Poland, 07/2012.
- Workshop von Neumann Algebras and Ergodic Theory, UCLA, 05/2012.

- G^3 conference (Geometric Groups on the Gulf Coast), Pensacola Beach, 04/2012.
- Workshop II_1 factors: rigidity, symmetries and classification, Institute Henri Poincaré, 05/2011.
- Lecture series (6 lectures), *von Neumann algebras and ergodic theory of group actions*, Institute Henri Poincaré, 05/2011.
- Lecture series (2 lectures), Workshop *Group actions on measure spaces*, Texas AM University, 03/2011.
- Lecture series (4 lectures), Workshop AGORA, ENS Lyon, France, 06/2010.
- Lecture series (2 lectures), *Eighth Annual Spring Institute on Noncommutative Geometry and Operator Algebras*, Vanderbilt University, 05/2010.
- Workshop C^* -algebras, Oberwolfach, 03/2010.
- Workshop *Von Neumann algebras and group actions*, University of Copenhagen, 02/2010.
- Concentration Week on *Approximation Properties of Discrete Groups and Operator Spaces*, Texas AM University, 08/2009.
- Workshop *von Neumann Algebras and Ergodic Theory*, UCLA, 03/2009.
- Workshop *Von Neumann Algebras and Ergodic Theory of Group Actions*, Oberwolfach, 10/2008.
- The Sixth East Coast Operator Algebras Symposium*, Pennsylvania State University, 10/2008.
- Topics on von Neumann algebras*, Banff, Canada, 03/2008.
- West Coast Operator Algebra Seminar*, Long Beach, 02/2008.
- Workshop on von Neumann Algebras*, Fields Institute, Toronto, 11/2007.
- Workshop *von Neumann algebras and Ergodic Theory*, UCLA, 03/2007.
- Groupoids in operator algebras and noncommutative geometry*, Institute Henri Poincare, Paris, 03/2007.
- Wabash Modern Analysis Seminar*, Wabash College, 12/2006.
- Topics on von Neumann algebras*, Banff, Canada, 09/2006.
- The Fourth East Coast Operator Algebras Symposium*, Georgia Institute of Technology, Atlanta 09/2006.
- 21st International Conference in Operator Theory*, Timisoara, Romania, 06/2006.
- Beyond amenability: Groups, Actions and Operator Algebras*, UCLA, 05/2006.
- 6th Operator Algebras International Conference*, Bucharest, Romania, 08/2005.
- Reunion du GDR Algebres d'Operateurs*, Les Houches, France, 06/2005.
- Third Annual Spring Institute on Noncommutative Geometry and Operator Algebras*, Vanderbilt University, 05/2005.
- AMS meeting, Special Session *Von Neumann Algebras and Noncommutative Ergodic Theory*, Vanderbilt University, 10/2004.

Colloquia

Vanderbilt University, 10/2017.
 University of Iowa, 03/2015.
 Purdue University, 01/2013.
 University of Iowa, 11/2012.
 UCSD, 01/2011 and 10/2012.
 Vanderbilt University, 10/2010.
 University of Illinois at Chicago, 10/2010.
 UCLA, 04/2010.
 UC Riverside, 04/2009.
 Caltech, 08/2008.

Seminar Talks

Functional analysis seminar, UCLA, 03/2005, 10/2005, 05/2006, 10/2008, 01/2009, 10/2009, 02/2011, 11/2013, 04/2015, 10/2015, and 01/2017.
 Operator theory seminar, University of Iowa, 02/2017.
 Caltech/UCLA logic seminar, Caltech, 10/2006 (2 talks), 11/2010, 11/2013, and 10/2015.
 Geometry and Dynamics Seminar, ENS Lyon, 06/2014.
 Linear Analysis Seminar, Texas AM University, 02/2014.
 Geometry Seminar, Purdue University, 01/2013.
 Subfactor Seminar, UC Berkeley, 10/2010.
 Subfactor Seminar, Vanderbilt University, 10/2006, 01/2009, 10/2010 and 10/2017.
 Operator algebra seminar, K.U. Leuven, Belgium, 06/2010.
 Logic seminar, Caltech, 11/2008.
 Geometry and topology seminar, Caltech, 10/2008.
 Analysis seminar, UCLA, 05/2007.
 Mathematical physics seminar, Caltech, 04/2007.
 Operator algebras seminar, Purdue University, 12/2006.
 Operator algebras seminar, Institut de Mathematiques de Jussieu, Paris, 12/2004.

Talks aimed at students

Undergraduate Student Colloquium (UCSD), 11/2012 and 12/2015.
 Graduate Student Colloquium (UCSD), 02/2016.

Longer visits

Professeur Invité, Université Paris-Diderot, Paris 7, May 2011 (1 month).

ENS Lyon, France, June 2010 (2 weeks).

K.U. Leuven, Belgium, June 2010 (2 weeks).

Institute des Mathematiques de Jussieu, Paris, Fall 2004.

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