

CURRICULUM VITAE

ARISTOTELIS PANAGIOTOPOULOS

PERSONAL AND CONTACT INFORMATION

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Research My research interests lie in the interactions between descriptive set theory and dynamics of large topological groups, drawing motivation from problems in algebraic topology, model theory, differential geometry, operator theory, and combinatorics.

POSITIONS HELD

2024 Jan - present **Assistant Professor**, *Faculty of Mathematics, University of Vienna, Austria*

Past Academic Positions

2021 Sep - 2023 Dec **Postdoctoral Associate**,
Department of Mathematical Sciences, Carnegie Mellon University, USA

2020 Sep - 2021 Aug **Postdoctoral Research Fellow**,
Cluster of Excellence: Dynamics–Geometry–Structure,
Institute for Mathematical Logic and Foundational Research, University of Münster, Germany.

2017 Sep - 2020 Jun **Harry Bateman Research Instructor**,
Department of Mathematics,
California Institute of Technology, USA.

Past Employment

2010 Sep - 2012 Jun Curriculum Design & Instructor
Art & Mathematics, Herakleidon Museum, Athens, Greece

EDUCATION

2017 Aug **PhD in Mathematics** (Date: 07.08.2017)
University of Illinois at Urbana-Champaign, USA
Thesis: Structures and Dynamics; Supervisor: S. Solecki

2012 Aug

Diploma in Applied Mathematics and Physics,
National Technical University of Athens, Greece

GRANTS AND AWARDS

- 2022 Sep - 2025 Aug** Principal Investigator for the NSF Grant DMS2154258:
“Dynamics Beyond Turbulence & Obstructions to Classification”
Amount: 179,999 USD
- 2014 Aug - 2015 May** Focal Point Breakthrough Grant, graduate college at UIUC
Transnational Solidarity Initiative research group
- 2014 Spring** Research scholarship, University of Illinois Research Board
- 2013 Spring** Research scholarship, University of Illinois Research Board
- 2012 Aug** Graduation merit award for academic excellence
School of Applied Mathematics and Physics, NTUA
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MATH WRITING

Publications and Submitted Preprints

Incompleteness Theorems for Observables in General Relativity

Physical Review Letters, 131 (17), (2023), 171402,
joint with G. Sparling and M. Christodoulou. [[Arxiv](#)]

The definable content of homological invariants II: Čech cohomology and homotopy classification

Submitted, (2022), joint with J. Bergfalk and M. Lupini. [[Arxiv](#)]

The definable content of homological invariants I: Ext & \lim^1 [[Arxiv](#)]

Submitted, (2022), joint with J. Bergfalk and M. Lupini.

Every CBER is smooth below the Carlson-Simpson generic partition. [[Arxiv](#)]

Fundamenta Mathematicae, 262 (1), (2023), 85–103, joint with A. Wang.

Universality vs Genericity and C_4 -free graphs. [[Arxiv](#)]

European Journal of Combinatorics, 106, (2022)

joint with K. Tent.

Examples of weak amalgamation classes. [[Arxiv](#)]

Mathematical Logic Quarterly, 682, (2022), 178-188

joint with A. Krawczyk, A. Kruckman, and W. Kubiś.

On Polish groups admitting non-essentially countable actions. [[Arxiv](#)]

Ergodic Theory and Dynamical Systems, 42 (1), (2022), 180-194,

joint with A.S. Kechris, M. Malicki, and J. Zielinski,

A combinatorial model for the Menger curve. [[Arxiv](#)]

Journal of Topology and Analysis, 14 (1), (2022), 203-229,

joint with S. Solecki.

Dynamical obstructions to classification by (co)homology and other TSI-group invariants. [[Arxiv](#)]

Transactions of the American Mathematical Society, 374 (12), (2021), 8793-8811,

joint with S. Allison.

Strong ergodicity phenomena for Bernoulli shifts of bounded algebraic dimension. [[Arxiv](#)]
Submitted, (2021), joint with A. Shani.

Higher dimensional obstructions for star reductions. [[Arxiv](#)]
Fundamenta Mathematicae, 255 (2), (2021), 209-230,
joint with A. Kruckman.

Games orbits play and obstructions to Borel reducibility. [[Arxiv](#)]
Groups, Geometry, and Dynamics, 12 (4), (2018), 1461-1483,
joint work with M. Lupini.

Extendability of automorphisms of generic substructures. [[Arxiv](#)]
Israel Journal of Mathematics, 208, (2015), 483-508.

Other Preprints and Research Notes

The automorphism group of the random poset does not admit a generic pair. [[Arxiv](#)]
Preprint, (2020), joint with A. Kwiatkowska.

The generic combinatorial simplex. [[Arxiv](#)]
Preprint, (2020), joint with S. Solecki.

Definable (co)homology, pro-torus rigidity, and (co)homological classification. [[Arxiv](#)]
Preprint, (2019), joint with J. Bergfalk and M. Lupini.

Compact spaces as quotients of projective Fraïssé limits. [[Arxiv](#)]
Preprint, (2016).

Work in preparation

The dynamics of α -unbalanced Polish groups, (2023+), with S. Allison.

Course notes

An introduction to Set Theory.
A. Panagiotopoulos, quarter-long course notes [[pdf](#)]

Computability III: advanced topics in computability.
A. Panagiotopoulos, quarter-long course notes [[pdf](#)]

Computability II: Gödel's incompleteness theorems.
A. Panagiotopoulos, quarter-long course notes [[pdf](#)]

A graduate course in groups and dynamics.
A. Panagiotopoulos, quarter-long graduate course notes [[pdf](#)]

INVITED TALKS, COLLOQUIA, AND SEMINARS

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| 2023 Sep 25 | Model theory and groups Conference, University of Münster, Germany
Title: <i>The class and dynamics of α-balanced Polish groups</i> |
| 2023 Aug 25 | Structures Semester Conference: DST & Dynamics, Warsaw, Poland
Title: <i>The class and dynamics of α-balanced Polish groups</i> |

- 2023 Mar 29 Association for Symbolic Logic, North American Meeting, UCI, USA
Title: *Incompleteness for Observables in General Relativity*
- 2022 Dec 07 Logic Seminar, California Institute of Technology, USA
Title: *Incompleteness for Observables in General Relativity*
- 2022 August BLAST 2022, Chapman University, California, USA
Mini Course: *The definable content of (co)homological invariants*
Aug 8 *Part I: Background, motivation, and main results.*
Aug 9 *Part II: Ulam stability for quotients of abelian, pro-countable groups.*
Aug 10 *Part III: Definable Čech cohomology and homotopy classification*
- 2022 Aug 18 Second Congress of Greek Mathematicians SCGM-2022, Athens, Greece
Title: *Dynamical obstructions to classification by (co)homology*
- 2022 May 18 Caltech Logic Seminar, USA
Title: *Strong ergodicity for Bernoulli shifts of bounded dimension*
- 2022 Apr 9 2022 ASL North American meeting, Cornell University, USA
Title: *Strong ergodicity for Bernoulli shifts of bounded dimension*
- 2022 Mar 1 Mathematical logic seminar, Carnegie Mellon University, USA
Title: *Every CBER is smooth below a Milliken-generic strong subtree*
- 2022 Jan 17 Groups and Dynamics: Topology, Measure, and Borel Structure, Oberwolfach, Germany
Title: *Dynamical obstructions to classification by (co)homology*
- 2021 Oct 21 Intro to Descriptive Set Theory Seminar, Georgia Tech, USA
Title: *Dynamics as obstructions to classification*
- 2021 Oct 6 Graduate student & postdoc seminar, Carnegie Mellon University, USA
Title: *Using dynamics as obstructions to classification*
- 2021 Aug 18 Totally Disconnected Locally Compact Groups via Actions, Banff, CA
Title: *Ulam stability for of abelian non-archimedean Polish groups*
- 2021 Jun 18 Boise Extravaganza in Set Theory, Boise State University, USA
Title: *Dynamical obstructions to classification by (co)homology*
- 2021 Feb 16 Set Theory Reading Group Seminar, Carnegie Mellon University, USA
Title: *Ulam stability for of abelian non-archimedean Polish groups*
- 2021 Feb 16 Logic Seminar, Carnegie Mellon University, USA
Title: *The definable content of Čech cohomology*
- 2020 Dec 6 CMS Winter Meeting 2020, Montreal, Canada
Title: *Dynamical obstructions to classification by (co)homology*
- 2020 Nov 10 Logic seminar, University of Florida, USA
Title: *Dynamical obstructions to classification by (co)homology*
- 2020 Oct 15 Logic seminar, University of Münster, Germany
Title: *Dynamical obstructions to classification*
- 2020 Sep 14 Topologia seminar, Uniwersytet Wrocławski, Poland
Title: *Dynamical obstructions to classification by (co)homology*
- 2020 Mar 01 South Eastern Logic Symposium 2020, Gainesville, Florida, USA
Title: *Definable (co)homology and classification of solenoids*
- 2020 Jan 24 Logic Colloquium, University of California at Los Angeles, USA
Title: *Definable (co)homology and classification of solenoids*
- 2019 May 03 Logic Colloquium, University of California at Los Angeles, USA

- Title:** *Bernoulli shifts for Polish groups and a question of Kechris*
- 2019 Nov 17** Plenary speaker at Caltech Harvey Mudd 2019 Math Competition
Title: *The mathematics of impossible*
- 2019 Nov 09** Advances in Functional Analysis, AMS Fall West. Sec. Meeting, USA
Title: *Unitary equivalence is hard*
- 2019 Nov 09** Fractal Geometry & Dynamical Systems, AMS Fall West. Sec. Meeting
Title: *A combinatorial model for the Menger curve*
- 2019 May 24** UCLA-Caltech Cabal Seminar, University of California at Los Angeles
Title: *Higher dimensional obstructions for star reductions*
- 2019 May 21** Set theory, ASL North American Annual Meeting, New York, USA
Title: *Higher dimensional obstructions for star reductions*
- 2019 May 03** Logic Colloquium, University of California at Los Angeles, USA
Title: *Bernoulli shifts for Polish groups and a question of Kechris*
- 2019 March 21** Combinatorics Seminar, Univ. of Victoria at Wellington, New Zealand
Title: *The Fraïssé construction*
- 2019 March 19** Logic Colloquium, University of Victoria at Wellington, New Zealand
Title: *Dynamics as obstruction to classification*
- 2018 Dec 07** Logic Seminar, Carnegie Mellon University, USA
Title: *Higher dimensional obstructions for star reductions*
- 2018 Dec 05** Mathematics Logic Seminar, Cornell University, USA
Title: *Higher dimensional obstructions for star reductions*
- 2018 Oct 27** Advances in Operator Theory, Operator Algebras, and Operator Semigroups, AMS Fall Western Sectional Meeting, San Francisco, USA
Title: *Unitary equivalence is hard*
- 2018 May 17** Set theory, ASL North American Annual Meeting, Macomb, USA
Title: *Higher dimensional obstructions for star reductions*
- 2018 Jan 13** Joint Mathematics Meetings, San Diego, USA
Title: *Games orbits play*
- 2017 Nov 13** Logic & Set Theory Seminar, University of California at Irvine
Title: *Games orbits play*
- 2017 Oct 20** Logic Colloquium, University of California at Los Angeles
Title: *Games orbits play*
- 2017 June 14** 6th Cornell Conference on Analysis, Probability, and Mathematical Physics on Fractals, Cornell University, USA
Title: *A projective Fraïssé presentation of the Menger curve*
- 2016 Dec 09** Ramsey 2016 DocCourse, Prague, Czech Republic
Title: *The n -simplex as a projective Fraïssé limit*
- 2016 May 19** Logic Seminar, California Institute of Technology, USA
Title: *Extendability of automorphisms of generic substructures*
- 2016 April 09** AMS Spring Western Sectional Meeting, Salt Lake City, Utah
Title: *Menger compacta and projective Fraïssé limits*
- 2016 March 24** Mathematics Colloquium, National Technical Univ. of Athens, Greece
Title: *Fraïssé limits and extreme amenability*
- 2016 March 05** Descriptive Set Theory Day, University of Illinois at Chicago, USA
Title: *Extendability of automorphisms of generic substructures*

2016 March 02	Graduate Colloquium, University of Illinois at Urbana-Champaign Title: <i>Menger compacta: where logic meets homotopy</i>
2016 Feb 16	Logic Seminar, University of Illinois at Chicago, USA Title: <i>Menger compacta and projective Fraïssé limits</i>
2015 Dec 07	CMS Winter Meeting, Montreal, Canada Title: <i>Menger compacta and projective Fraïssé limits</i>
2015 July 03	When Topological Dynamics meets Model Theory, Marseilles, France Title: <i>Compact spaces as projective Fraïssé limits</i>

SCIENTIFIC VISITS

2020 September (2 weeks)	Visiting <i>Mathematical Institute, University of Wrocław.</i> <i>Host:</i> A. Kwiatkowska.
2019 March (2 weeks)	Visiting <i>Victoria University of Wellington.</i> <i>Host:</i> M. Lupini.
2018 December (1 week)	Visiting <i>Carnegie Mellon University.</i> <i>Host:</i> J. Zielinski & Clinton Conley.
2018 December (1 week)	Visiting <i>Cornell University.</i> <i>Host:</i> S. Solecki.
2016 May (2 weeks)	Visiting California Institute of Technology. <i>Host:</i> M. Lupini.

TEACHING EXPERIENCE

Carnegie Mellon University.

2023 Fall	Topics Course: Dynamics of Polish groups (21-800) <i>Graduate level course</i>
2023 Spring	Calculus II (21-112) <i>Large classroom setup: ~150 students</i>
2022 Spring	Calculus II (21-112) <i>Large classroom setup: ~250 students</i>
2021 Fall	Algebraic Topology (21-752) <i>Graduate level course</i>

California Institute of Technology.

2020 Spring	Descriptive set theory (Math 116c) <i>Ranked by students: 5.00/5.00</i>
2020 Winter	Axiomatic set theory (Math 116b) <i>Ranked by students: 5.00/5.00</i>
2019 Fall	Mathematical Logic (Math 116a) <i>Ranked by students: 5.00/5.00</i>

2019 Spring	Computability III: advanced topics (Math 117c) <i>Ranked by students: 5.00/5.00</i>
2019 Winter	Computability II: Gödel's incompleteness theorems (Math 117b) <i>Ranked by students: 5.00/5.00</i>
2018 Fall	Groups and dynamics: a topics course (Math 191a) <i>Ranked by students: 5.00/5.00</i>
2018 Spring	Descriptive set theory (Math 116c) <i>Ranked by students: 5.00/5.00</i>
2018 Winter	Axiomatic set theory (Math 116b) <i>Ranked by students: 4.67/5.00</i>
2017 Fall	Mathematical Logic (Math 116a) <i>Ranked by students: 4.25/5.00</i>

University of Illinois at Urbana-Champaign.

2017 Spring	Instructor for the course Ideas in Geometry (Math 119). <i>On the list of teachers ranked as excellent by their students.</i>
2016 Spring	Instructor for a Calculus II class (Math 231). <i>On the list of teachers ranked as excellent by their students.</i>
2015 Fall	Teaching assistant for a Calculus II (merit) class (Math 231). <i>On the list of teachers ranked as excellent by their students.</i>
2014 Fall	Teaching assistant for a Calculus I (merit) class (Math 221). <i>On the list of teachers ranked as excellent by their students.</i>
2013 Fall	Teaching assistant for a Calculus II (merit) class (Math 231). <i>On the list of teachers ranked as excellent by their students.</i>
2012 Fall	Teaching assistant for two Calculus II (merit) classes (Math 231).

MENTORING

2023 Summer <i>Program:</i> <i>Student:</i> <i>Research Project:</i>	Department of Mathematical Sciences, Carnegie Mellon University. Project Funded by NSF Grant DMS2154258 Dhruv Kulshreshtha (U. Michigan) On the classification of homeos of the Sierpinski Carpet.
2023 Summer <i>Program:</i> <i>Student:</i> <i>Research Project:</i>	Department of Mathematical Sciences, Carnegie Mellon University. Project Funded by NSF Grant DMS2154258 Christina Kwon On the classification of all Gaussian Surfaces.
2022 Summer <i>Program:</i> <i>Students:</i> <i>Research Project:</i>	Department of Mathematical Sciences, Carnegie Mellon University. Summer Experiences in Mathematical Sciences (SEMS) Tianwei Li, Veda V. Vakkada, Ziyun Liu, Projective amalgamation for planar connected graphs.
2019 Summer <i>Program:</i> <i>Students:</i> <i>Research Project:</i>	Department of Mathematics, California Institute of Technology. Summer Undergraduate Research Fellowship (SURF) Allison Y. Wang Infinite Ramsey theory and hyperfiniteness.

2019 Spring	Department of Mathematics, California Institute of Technology.
<i>Program:</i>	Reading Course (Ma 98)
<i>Student:</i>	Allison Y. Wang
<i>Research Project:</i>	Borel determinacy and applications.
2018 Summer	Department of Mathematics, California Institute of Technology.
<i>Program:</i>	Summer Undergraduate Research Fellowship (SURF)
<i>Students:</i>	Luke Juusola
<i>Research Project:</i>	Projective Fraïssé theory and strong amalgamation.

SERVICE

Community work

2016 Fall	Co-organized a Diversity Workshop for Teaching Assistants, Department of Mathematics, University of Illinois at Urbana-Champaign.
2013 Spring	Volunteer tutor at Danville correctional center, IL, USA Education Justice Project [EJP].

Seminar organizing

2018 Aug - 2020 Dec	<i>Postdoc Math Seminar</i> , California Institute of Technology.
2019 Spring	<i>Homotopy Type Theory Learning Seminar</i> [HoTTS], California Institute of Technology.

Outreach

2018 Nov 20	<i>The “limits” of Mathematics</i> , Seminars for Freshmen, California Institute of Technology.
2017 Nov 28	<i>Impossible constructions</i> , Seminars for Freshmen, California Institute of Technology.
2016 Mar 14	<i>Fractal Geometries and Codes</i> , π -day workshops, Department of Mathematics open house, University of Illinois at Urbana-Champaign.
2010 Sep - 2012 Jun	I offered approximately 150 mini workshops for high-school and junior high-school students on <i>Art & Mathematics</i> at the Herakleidon museum in Athens, Greece, on various topics: <i>Paradoxes and Illusions</i> ; <i>Non-Euclidean geometries and Escher</i> ; <i>Explorations of infinity in art and mathematics</i> ; <i>Projective geometry and art in Renaissance</i> ; <i>Music, harmony, and mathematics</i> .

Committees

2019 Jan - 2020 June	Caltech Postdoctoral Association representative for mathematics California Institute of Technology.
2016 Aug - 2017 May	Graduate Affairs Committee, Department of Mathematics, University of Illinois at Urbana-Champaign.

Refereeing

- Fundamenta Mathematicae (3 papers)
- Mathematical Logic Quarterly (4 papers)

- Journal of Mathematical Logic (1 paper)
- Annals of Pure and Applied Logic (1 paper)
- NSF grant proposals (2 reviews)