Ilie D. Ugarcovici

Curriculum Vitae[1]

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Department of Mathematical Sciences
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Education

Ph.D., Mathematics, The Pennsylvania State University (08/2004)
Research interests: Dynamical Systems and Ergodic Theory, Population Dynamics

M.S., Mathematics, University of Timisoara, Romania (06/1998)

B.S., Mathematics, University of Timisoara, Romania (06/1997)

Academic Appointments

Professor, Department of Mathematical Sciences, DePaul University 7/2022-present

Associate Professor, Department of Mathematical Sciences, DePaul University 7/2011-6/2022

Assistant Professor, Department of Mathematical Sciences, DePaul University 7/2006-6/2011

G. C. Evans Instructor, Department of Mathematics, Rice University 8/2004-6/2006

Administrative Appointments

Graduate Program Director, MS Program in Applied Mathematics 7/2017-06/2024

External Grants (funded)

Simons Foundation Collaboration Grant for Mathematicians ($35,000) 09/2013-08/2019
Dynamical systems and the geometry of orbits, Principal Investigator

National Science Foundation Research Grant DMS-0703421 ($88,930) 07/2007-06/2011
Invariant measures and symbolic coding for dynamical systems, Principal Investigator

DePaul Grants (funded)

Quality of Instruction Council summer stipend ($3,500) Summer 2021
Course Content Integration and Collaboration in MAT 484 and MAT 485

Quality of Instruction Council department initiative grant ($7,500) 07/2021-12/2022
Support for Bi-Modal Graduate Courses in Mathematics (with Y. Kashina and D. Habtzghi)

College of Science and Health Faculty R&D Grant ($4,700) Summer 2013
Dynamical systems with multi-dimensional orbits

University Research Council competitive research leave Winter&Spring 2013
Dynamical Systems and Applications

College of Liberal Arts & Sciences Faculty R&D Grant ($4,200) Summer 2007, 2011

University Research Council conference support ($1,700) 10/2007

[1]Last updated July 16, 2024

Refereed Journal Articles

- A. Abrams, S. Katok, I. Ugarcovici, On topological entropy of (a, b)-continued fraction transformations, Nonlinearity, **36** (2023), 2894–2908, https://doi.org/10.1088/1361-6544/acc6b2.
- A. Abrams, S. Katok, I. Ugarcovici, Rigidity and flexibility of entropies of boundary maps associated to Fuchsian groups, Mathematics Research Reports, **3** (2022), 1–19, https://mrr.centre-mersenne.org/articles/10.5802/mrr.10/.
- A. Abrams, S. Katok, I. Ugarcovici, Flexibility of measure-theoretic entropy of boundary maps associated to Fuchsian groups, Ergodic Theory and Dynamical Systems, **42** (2022), 389–401, (first published online April 2021), https://doi.org/10.1017/etds.2021.14.
- A. Şahin, M. Schraudner, I. Ugarcovici, A strongly aperiodic shift of finite type on the discrete Heisenberg group using Robinson tilings, Illinois J. of Math., **65** (2021), no. 3, 655-686, https://doi.org/10.1215/00192082-9446050.
- S. Katok, I. Ugarcovici, Structure of attractors for boundary maps associated to Fuchsian groups, Geometriae Dedicata, 191 (2017), 171-198. (See also Correction, Geometriae Dedicata, 198 (2019), 189-191.) https://doi.org/10.1007/s10711-017-0251-z.
- S. Lightwood, A. Şahin, I. Ugarcovici, The structure and spectrum of Heisenberg odometers, Proceedings of American Mathematical Society **142** (2014), 2429-2443. https://doi.org/10.1090/S0002-9939-2014-11963-0.
- S. Katok, I. Ugarcovici, Applications of (a, b)-continued fraction transformations, Ergodic Theory and Dynamical Systems, **32** (2012), 755–777. https://doi.org/10.1017/S0143385711000460
- M. Gidea, J. Meiss, I. Ugarcovici, H. Weiss, Applications of KAM theory to population dynamics, Journal of Biological Dynamics, **5** (2011), 44–63.
- S. Katok, I. Ugarcovici, Structure of attractors for (a, b)-continued fraction transformations, Journal of Modern Dynamics **4** (2010), 637–690.
- S. Katok, I. Ugarcovici, Theory of (a, b)-continued fraction transformations and applications, Electronic Research Announcements in Math. Sciences **17** (2010), 20–33.
- I. Ugarcovici, H. Weiss Chaotic attractors and physical measures for some density-dependent population models, Nonlinearity **20** (2007), 2897–2906.
- S. Katok, I. Ugarcovici, Symbolic dynamics for the modular surface and beyond, Bull. Amer. Math. Soc. **47** (2007), 87–132.
- I. Ugarcovici, On hyperbolic measures and periodic orbits, Discrete and Continuous Dynamical Systems **16** (2006), 505–512.

- S. Katok, I. Ugarcovici, Arithmetic coding of geodesics on the modular surface via continued fractions, CWI Tract **135** (2005), Math. Centrum Wisk. Inform., 59–77.
- S. Katok, I. Ugarcovici, Geometrically Markov geodesics on the modular surface Moscow Math. Journal **5** (2005), 135–151.
- I. Ugarcovici, H. Weiss, Chaotic dynamics of a nonlinear density dependent population model, Nonlinearity **17** (2004), 1689–1711.

Book Chapter

A. Abrams, S. Katok, I. Ugarcovici, Rigidity of topological entropy of boundary maps associated to Fuchsian groups, in A Vision for Dynamics in the 21st Century—the legacy of Anatole Katok, 19–47, Cambridge University Press, Cambridge, 2024.

Editor of special volume (with A. Şahin and M. Gidea)

"Discrete and Continuous Dynamical Systems", vol. 2, no. 2 (2009), 221–416.

Selected Invited Talks at Conferences

- "A strongly aperiodic subshift of finite type on the Heisenberg group (03/2016)
  50th Spring Topology and Dynamical Systems Conference, Baylor University
- "A strongly aperiodic subshift of finite type on the Heisenberg group" (03/2015)
  AMS Sectional Meeting, Session on "Symbolic Dynamics and Ergodic Theory", Georgetown University
- "Fuchsian groups and generalized boundary maps" (08/2014)
  Dynamics Workshop, Banff Research Station, Canada
- "Fuchsian groups and generalized boundary maps" (04/2013)
  AMS Sectional Meeting, Session on "Multidimensional dynamics", Iowa State
- "Hyperbolic and elliptic behavior in population dynamics" (05/2010)
  AIMS International Conference on Dynamical Systems, Diff. Eqns. and Applications Session on "Applied hyperbolic and elliptic dynamics", Dresden, Germany
- "Structure of attractors for (a,b)-continued fractions" (07/2009)
  International Conference, Max-Planck Institute for Mathematics, Bonn
- "Generalized Gauss-type interval maps" (03/2009)
  AMS meeting, Session on "Ergodic Theory and Dynamics", University of Illinois
- "Continued fractions, natural extension maps and their geometric structure" (05/2008)
  Workshop on Low Complexity Dynamics, Banff Research Station, Canada
- "Continued fractions, natural extension maps and their geometric structure" (05/2008)
  AIMS International Conference on Dynamical Systems, Diff. Eqns. and Applications Session on "Smooth Dynamical Systems", University of Texas-Arlington

- "Chaotic attractors and structured population models" (05/2006)
  International Workshop on Global Dynamics, Northwestern University
- "Existence of chaotic attractors in structured population models" (04/2006)
  AMS Sectional Meeting, Session on "Nonuniform hyperbolicity", San Francisco
- "Periodic orbits and hyperbolic measures" (05/2005)
  SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah
- "Geometrically Markov Geodesics on the Modular Surface" (01/2004)
  AMS National Meeting, Special Session on "Coding, Geometry and Dynamics"

Selected Seminar and Colloquium Presentations

- "Invitation to dynamical systems" (11/2019)
  Mathematics Colloquium, Purdue University-Northwest
- "The structure and spectrum of odometer systems" (03/2017)
  Analysis Seminar, West Virginia University
- "Fuchsian groups and generalized boundary maps" (11/2013)
  Dynamical Systems Seminar, Northwestern University
- "The structure and spectrum of Heisenberg odometers" (05/2012)
  Ergodic Theory and Probability Seminar, Ohio State University
- "The structure and spectrum of Heisenberg odometers" (11/2011)
  Ergodic Theory Seminar, University of Illinois at Urbana-Champaign
- "On a two-parameter family of continued fraction transformations" (02/2010)
  Dynamical Systems Seminar, Northwestern University
- "Geodesic flows, cross-section maps and generalized continued fractions" (04/2008)
  Dynamics Seminar, University of Chicago
- "Physical measures and chaotic attractors for some multidimensional maps" (02/2007)
  Center for Dynamical Systems Colloquium, Georgia Tech
- "Chaotic dynamics in a density-dependent population model" 02/2007
  Mathematical Sciences Seminar, Northeastern Illinois University,
- "Coding geodesics on the modular surface and continued fractions" (01/2007)
  Ergodic Theory and Probability Seminar, Ohio State University
- "Existence of physical invariant measures for some chaotic attractors" (10/2006)
  Dynamical Systems Seminar, Northwestern University
- "Existence of physical invariant measures for some chaotic attractors" (10/2005)
  Dynamical Systems Seminar, Rice University

- "Existence of physical invariant measures for some chaotic attractors" (10/2005)
  Analysis-Geometry Seminar, Rice University
- "Hyperbolic measures and periodic orbits" (10/2004)
  Analysis-Geometry Seminar, Rice University
- "On periodic orbits and hyperbolic measures" (09/2004)
  Analysis Seminar, University of Houston
- "Chaotic dynamics in a density-dependent population model" (10/2003)
  Workshop in Dynamical Systems and Related Topics, Penn State
- "Geometrically Markov Geodesics on the Modular Surface" (10/2002)
  Workshop in Dynamical Systems and Related Topics, Penn State

Other Conferences Attended

- Workshop in Dynamical Systems and Related Topics, Penn State (10/2022)
- International conference "2020 Vision for Dynamics", Bedlewo, Poland (08/2019)
- Workshop "Symbolic dynamics on finitely presented groups", Univ. of Chile (12/2014)
- Conference "From Dynamics to Complexity", Fields Institute, Toronto (05/2012)

Sponsored Research Visits

- Mathematical Institute of the Polish Academy of Sciences, Warsaw, Poland (08/2019)
- Max-Plank Institute for Mathematics, Bonn, Germany (07/2009, 07/2007)
- ETH-Zürich, Switzerland (07/2002)
- Newton Institute for Mathematics, Cambridge, UK (07/2000)

Teaching Experience at DePaul (2006–present)

Undergraduate Courses Taught

- MAT 101 College Algebra (Spring 2010)
- MAT 130 Precalculus (Fall 2007, 2008, 2012, 2019, 2020, 2022, 2023; Spring 2012, 2016, 2021, 2022, Winter 2024)
- MAT 131 Trigonometry (Spring 2009; Fall 2010)
- MAT 140 and MAT 141 Discrete Mathematics I, II (Fall 2006/Spring 2007)
- MAT 151 Calculus II (Spring 2007, Fall 2018)
- MAT 170-172 Calculus with Scientific Applications I, II, III (AY 2013-2014, 2014-2015)
- MAT 260 Multivariable Calculus I (Fall 2016, 2017)
- MAT 304 Differential Equations (Spring 2009, 2010, 2011, 2016, 2017, 2019, 2020)
- MAT 320-321 Geometry I, II (Fall 2006—2011; Winter 2007—2012)

- MAT 337 Complex Analysis (Spring 2015)
- MAT 390 Mathematics Reading and Research (JYEL course) (Spring 2011)

Cross-listed Undergraduate/Graduate Courses Taught

- MAT 384/484 Mathematical Modeling (Fall 2012—2023)
- MAT 385/485 Numerical Analysis I (Winter 2007—2012, 2016—2024)
- MAT 386/486 Numerical Analysis I (Spring 2016—2024)

Graduate Courses Taught

- MMT 440 History of Math for Middle School Teachers (Fall 2011)
- MAT 597 Advanced Topics in Analysis (Summer 2014)
- MAT 611 Calculus II for teachers (Winter 2008)
- MAT 620 Geometry for teachers (Spring 2012, Winter 2016, 2017)
- MAT 640 Multivariable calculus for teachers (Fall 2012)
- MAT 644 Differential Equations for teachers (Summer 2015, 2016, 2020, 2022)

Hybrid/Online Courses Taught

- MAT 130 PreCalculus (Spring 2012, Fall 2012, Fall 2020, Spring 2021)
- MAT 304 Differential Equations (Spring 2020)
- MAT 644 Differential Equations for teachers (Summer 2020, 2022)
- MAT 384/484 Mathematical Modeling (Fall 2020, 2021, 2022, 2023)
- MAT 385/485 Numerical Analysis I (Winter 2021, 2022, 2023)
- MAT 386/486 Numerical Analysis II (Spring 2020, 2021, 2022, 2023)

Supervision of Undergraduate Independent Studies (MAT 399) & Research

- Independent studies on subjects as Numerical Analysis, Mathematical Modeling, Dynamical Systems, Complex Analysis, Geometry, Differential Equations:
  Su '20 (2 students), Su '18 (1 student), Sp '15 (1 student), Wi '15 (2 students), Sp '14 (1 student), Sp '12 (4 students), Fa '11 (2 students), Fa '10 (1 student), Sp '10 (1 students), Fa '09 (2 students), Fa '07 (1 student)
- supervised student research paper: S. Brogan, 'United States Population Future Estimates and Long-Term Distribution', DePaul Discoveries, Vol. 7 (2018), Art. 11.
- supervised student funded by DePaul's Undergraduate Summer Research Program (2015)
- supervised poster at DePaul Science, Math, and Technology Showcase
  Fall 2015, 2014, 2009, 2007
- supervised two undergraduate research assistants (NSF funded) (2009, 2008)

Supervision of Graduate Independent Studies (MAT 599) & Research

- Independent studies on subjects as Numerical Analysis, Mathematical Modeling, Dynamical Systems, Complex Analysis, Geometry, Differential Equations:
  Su '23 (1 student), Wi '23 (1 student), Sp '22 (2 students), Wi '22 (1 student), Sp '21 (1 student), Fa '20 (1 student), Su '20 (1 student), Sp '20 (2 students), Wi '20 (1 student), Fa '19 (1 students), Su '19 (1 student), Sp '19 (1 student), Fa '18 (1 student), Su '18 (1 student), Sp '18 (2 students), Wi '18 (1 student), Fa '17 (1 student), Su '17 (1 student), Wi '17 (1 student), Su '15 (1 student), Su '14 (2 students), Su '13 (1 student), Sp '12 (3 students), Fa '11 (1 student), Sp '10 (4 students), Sp '09 (1 student),
- directed two master's theses (Spring 2022)
- supervised two graduate research assistants (NSF funded) (2010, 2008)

Doctoral Dissertation Committee, reader, University of Illinois at Chicago (Fall 2015)
Jessica Dyer, *'Dynamics of Equicontinuous Group Actions on Cantor Sets'*

Service at DePaul University

University level

- Committee on Curriculum and Programs, member (2019–present)
- University Research Council, member (2013-2019)
- Faculty Grievance Board, member (Fall 2014)
- Library Review Board, member (2011-2017)
- LSP working group on Capstone courses, member (2010-2011)

College level

- Grade Challenge Board, member (2017-2019, 2021-2022), chair (2019-2021)
- Graduate Research Excellence in Academics & Training Committee, member (Feb 2019-present)
- Scholarship Committee (LA&S), member (2007-2011)

Departmental level

- Course Redesign Committee, chair (2018-2024), member (2008–2018)
- Community Building and Outreach Committee, member (2022–2023)
- Academic Program Review Committee, member (2019-2022)
- Graduate Applied Math/Stats Programs Committee, co-chair (2017–2024), member (2015-2017)
- Program Development Committee, B.A. in Data Science, member (AY 2016–2017)
- Search Committee tenure track position in Analysis, chair (AY 2019-2020)

- Joint Search Committee tenure track position in Actuarial Science, co-chair (AY 2019-2020)
- Search Committee tenure track position in Applied Mathematics, chair (AY 2013-2014)
- Personnel Committee, chair (AY 2016-2017), member (2013-2016)
- Promotion and Tenure Committee, member (AY 2016-2017)
- Search Committee tenure track math positions, member (AY 2010-2011, 2015-2016)
- Analysis seminar co-organizer, (2008-2018)
- Library Committee, chair (2008-2014)
- Search Committee for NTT positions, member (2008-2010, 2011-2013)
- Mathematics Colloquium Committee, coordinator (2007-2011)
- Undergraduate Curriculum Committee, member (AY 2006-2007, 2008–2010)

Professional Service

- American Mathematical Society Travel Grants Committee, member (2016-2018)
- AMS-MAA-SIAM committee on employment opportunities, member (2014-2017)
- GRE Subject Test Mathematics Committee, member with honorarium (2012-2018)
- Journal of Modern Dynamics, Associate Editor for production, with honorarium (2015–present)
- Journal Reviewer: Ergodic Theory and Dynamical Systems, Nonlinearity, ERA-AMS, Dynamical Systems–An International Journal, Journal of Modern Dynamics, Foundations of Computational Mathematics, CRM Proceedings, Communications in Nonlinear Science, Proceedings AMS, SIAM Journal of Applied Mathematics, Discrete and Continuous Dynamical Systems.
- Textbook Reviewer: Biocalculus: Calculus, Probability, and Statistics for the Life Sciences, 1st edition, James Stewart and Troy Day, Cengage (2013-2014)
- Conference co-organizer
  - ◇ "Recent Advances in Dynamical Systems, Geometry, and Number Theory", in honor of S. Katok, Penn State, August 27-28, 2022 (with F. Rodriguez Hertz and Y. Pesin)
  - ◇ AMS Special Session on "Ergodic and Symbolic Actions for Amenable Groups" Loyola University, October 2-4, 2015 (with A. Şahin)
  - ◇ AIMS Special Session on "Applied Hyperbolic and Elliptic Dynamics" Dresden, Germany, May 23-28, 2010 (with M. Gidea)
  - ◇ AMS Special Session on "Smooth Dynamical Systems" DePaul University, Oct. 5-6, 2007 (with M. Gidea)

- ◇ AMS Special Session on "Ergodic Theory and Symbolic Dynamical Systems" DePaul University, October 5-6, 2007 (with A. Sahin)
- ◇ "Applications of Measurable and Smooth Dynamical Systems to Number Theory" DePaul University, October 4, 2007 (with M. Gidea and A. Sahin)
- ◇ "Dynamics Ideas in Geometry, Topology and Number Theory" (in honor of S. Katok) Penn State, May 5-6, 2007 (with T. Foth and O. Sarig)

Community Service

Math Olympiad team coach, Bessie Rhodes Magnet School (grades 3-5), Evanston (2012-15)

Professional Affiliations

American Mathematical Society (since 1999)

Professional Development

- ○ CSH Academic Leaders Summer Development series August 2021
- ○ American Mathematical Society Mini-Conference on Education October 25, 2019 Washington DC
- ○ Midwest Summer Institute of Scientific Teaching at Univeristy of Chicago August 3-9, 2016 organized by Yale Center for Teaching and Learning
- ○ DePaul Online Teaching Series (DOTS) training program Spring 2011

Awards and Recognition

Scientific Teaching Fellow for commitment to STEM education (2016)
Summer Institute of Scientific Teaching, Yale Center for Teaching and Learning

Gerald Paetsch Advising Award, nominated (2016)

DePaul QM Star Award for excellence in online course design (2013)

College Teaching Award (LA&S), nominated (2010)

Max-Plank Institute for Mathematics Research Fellowship (3,200 EUR) (July 2009)

Graduate Student Outstanding Teaching Award (2004)
Graduate School, The Pennsylvania State University

McCammon Award for Distinguished Undergraduate Teaching in Mathematics (2002)
Department of Mathematics, The Pennsylvania State University

Graduate Student Teaching Award (2002, 2000)
Department of Mathematics, The Pennsylvania State University

Graduate Scholars Fellowship, The Pennsylvania State University (AY 1998-1999)

Tempus European Scholarship, Université Pierre et Marie Curie, Paris (Spring 1998)