Bill Mance
Curriculum Vitae

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Education

- Habilitation in Mathematics (2017)   Polish Academy of Sciences
  Referees: Maciej Radziejewski, Tomasz Downarowicz, Mariusz Lemańczyk
  Dissertation Topic: Contrasting notions of normal numbers with respect to the Cantor series
  expansions and certain fractals

- Ph.D. in Mathematics (2010)   The Ohio State University
  Advisor: Dr. Vitaly Bergelson
  Dissertation Topic: Normal numbers with respect to the Cantor series expansion

- M.S. in Mathematics (2004)   The Ohio State University

- B.S. in Mathematics,   Carnegie Mellon University
  with minors in Computer Science and Psychology (2003)

Employment

- Profesor Nadzwyczajny (Associate Professor), Adam Mickiewicz University, 2018 – present

- Adiunkt (Assistant Professor), Mathematics, Adam Mickiewicz University, 2017 – 2018

- Adiunkt (Assistant Professor), Mathematics, Polish Academy of Sciences (IM PAN), 2015 – 2017

- RTG Postdoctoral Fellow, Mathematics, University of North Texas, 2012 – 2015
  Advisor: Dr. Mariusz Urbański

- Post-doctorate Lecturer, Mathematics, The Ohio State University, 2010 – 2012

- Graduate Teaching Associate, Mathematics, The Ohio State University, 2003 – 2010

Honors and Achievements

- Awarded the SONATA BIS grant 2019/34/E/ST1/00082 for the project "Set theoretic methods in
  dynamics and number theory," NCN (The National Science Centre of Poland) for the sum of 1.6
  million PLN from 2020 to 2025.

- Outstanding Mentor Award, presented by the Office of Texas Governor Rick Perry with funding to
  attend the 2013 Governor's Science and Technology Champions Academy. No more than fifteen of
  these are awarded in the state of Texas each year.

Publications

Co-authors in **bold** are high school students and <u>underlined</u> co-authors are undergraduate students.

Submitted Preprints

25. "On the Borel complexity of continued fraction normal, absolutely abnormal numbers," arXiv:2111.11522 (with S. Jackson and J. Vandehey)

Accepted or Published Papers

24. "A non-Borel special alpha-limit set in the square," to appear in Ergodic Theory Dynam. Systems (with S. Jackson and S. Roth)

23. "Descriptive complexity in Cantor series," to appear in J. Symb. Log. (with D. Airey and S. Jackson)

22. "Some complexity results on sets related to normal numbers," to appear in Canad. J. Math. (with D. Airey and Stephen Jackson)

21. "Borel complexity of sets of normal numbers via generic points in subshifts with specification," Trans. Amer. Math. Soc. **373** (7), 4561–4584 (2020) (with D. Airey, S. Jackson, and Dominik Kwietniak)

20. "Hotspot lemmas for non-compact spaces," Math. Notes **108** (3–4), 434–439 (2020) (with D. Airey)

19. "On the Transcendence of certain real numbers," Bull. Aust. Math. Soc. **99** (3), 392—402 (2019) (with Veekesh Kumar)

18. "Normality of different orders for Cantor series expansions," Nonlinearity **30** (10), 3719–3742 (2017) (with D. Airey)

17. "Construction of μ-normal numbers," Monatsh. Math. **179**(2), 259–280 (2016) (with M. Madritsch)

16. "On the Hausdorff dimension of some sets of numbers defined through the digits of their Q-Cantor series expansions," J. Fractal Geom. **3** (2), 163–186 (2016) (with D. Airey)

15. "Normal number constructions for Cantor series with slowly growing bases," Czech. Math. J. **66**(2), 465–480 (2016) (with D. Airey and J. Vandehey)

14. "Unexpected distribution phenomenon resulting from Cantor series expansions," Adv. Math. **279**, 372–404 (2015) (with **D. Airey**)

13. "Shrinking targets for non-autonomous dynamical systems corresponding to Cantor series expansions," Bull. Aust. Math. Soc. **92** (2), 205–213 (2015) (with L. Fishman, D. Simmons, and M. Urbański)

12. "On the Hausdorff dimension of countable intersections of certain sets of normal numbers," J. Théor. Nombres de Bordeaux **27** (1), 199–217 (2015)

11. "Normality preserving operations for Cantor series expansions and associated fractals, II," New York J. Math. **21**, 1311–1326 (2015)(with D. Airey and J. Vandehey)

10. "Normality preserving operations for Cantor series expansions and associated fractals, I," Illinois J. Math. **59** (3), 531–543 (2015) (with D. Airey)

9. "Normal equivalencies for eventually periodic basic sequences," Indag. Math. **26** (3), 476–484 (2015) (with D. Airey)

8. "Number theoretic applications of a class of Cantor series fractal functions, II," Int. J. Number Theory **11** (02), 407–435 (2015) (with **B. Li**)

7. "Number theoretic applications of a class of Cantor series fractal functions, I," Acta Math. Hungar. **144** (2), 449–493 (2014)

6. "Bounded Lüroth Expansions: Applying Schmidt Games where Infinite Distortion Exists," Acta Arith. **158**, 33–47 (2013) (with J. Tseng)

5. "Cantor series constructions of sets of normal numbers," Acta Arith. **156**, 223–245 (2012)

4. "Typicality of normal numbers with respect to the Cantor series expansion," New York J. Math. **17** 601–617 (2011)

3. "Cantor series constructions contrasting two notions of normality," Monatsh. Math. **164**, 1–22 (2011) (with C. Altomare)

2. "Construction of normal numbers with respect to the Q-Cantor series expansion for certain Q," Acta Arith. **148**, 135–152 (2011)

Dissertation

1. "Normal numbers with respect to the Cantor series expansion," dissertation (2010)

Research Visits

- University of North Texas in Denton, TX, United States, June 2021 (three weeks). Worked with Dylan Airey, Stephen Jackson, Samuel Roth, and Joseph Vandehey

- University of Utrecht in Utrecht, Netherlands, February 2020 (one week). Worked with Karma Dajani.

- Silesian University in Opava, Czechia, January (two weeks). Worked with Samuel Roth.

- John Cabot University in Rome, Italy, December 2019 (one week). Worked with Sara Munday.

- University of North Texas in Denton, TX, United States, September 2019 (two weeks). Worked with Stephen Jackson.

- Harish-Chandra Research Institute in Allahabad, India, February 2019 (one month). Worked with Veekesh Kumar.

- University of North Texas in Denton, TX, United States, September 2018 (three weeks). Worked with Stephen Jackson.

- National Pedagogical Dragomanov University in Kyiv, Ukraine, June 2018 (three weeks). Worked with Roman Nikiforov.

- University of North Texas in Denton, TX, United States, September 2017 (two weeks). Worked with Stephen Jackson.

- National Pedagogical Dragomanov University in Kyiv, Ukraine, July 2017 (three weeks). Worked with Roman Nikiforov.

- National Pedagogical Dragomanov University in Kyiv, Ukraine, January 2017 (three weeks). Worked with Roman Nikiforov.

- University of North Texas in Denton, TX, United States, July 2016 (two weeks). Worked with Stephen Jackson.

- National Pedagogical Dragomanov University in Kyiv, Ukraine, June 2016 (two weeks). Worked with Roman Nikiforov.

- Nicolaus Copernicus University in Toruń, Poland, January 2015 (three weeks). Worked with Mariusz Lemańczyk.

- Université de Strasbourg in Strasbourg, France, November 2014 (two weeks). Worked with Yann Bugeaud.

- Graz University of Technology in Graz, Austria for The National Research Network in Analytic Combinatorics and Probabilistic Number Theory (funded by the Austrian Science Foundation), July 2012 (one month). Worked with Manfred Madritsch.

- Graz University of Technology in Graz, Austria for The National Research Network in Analytic Combinatorics and Probabilistic Number Theory (funded by the Austrian Science Foundation), March 2011 (two weeks). Worked with Manfred Madritsch.

Presentations

Plenary Talks

- *The Hausdorff dimension of sets of numbers defined by their Q-Cantor series expansions*, The Sixth International Conference on Analytic Number Theory and Spatial Tessellations, Kyiv, Ukraine, Fall 2018

- *Normal numbers with respect to the Cantor series expansions and possible applications in algebraic geometry*, Algebraic and geometric methods of analysis, Odessa, Ukraine, Summer 2017

Conference Talks:

- *Borel complexity of sets of normal numbers via generic points in subshifts with specification*, The 26th International Conference on Difference Equations and Applications (ICDEA 2021) (online)

- *Borel complexity of sets of normal numbers via generic points in subshifts with specification*, Vitaly Bergelson's Surprise 70th Birthday Conference (online)

- *Hotspot Lemmas for Noncompact Spaces*, One World Numeration Seminar (online)

- *Descriptive Complexity in Cantor series*, Numeration 2019, Vienna, Austria

- *Borel complexity of sets of normal numbers via generic points in subshifts with specification*, Conference on Dynamical Systems Celebrating Michał Misiurewicz's 70th Birthday, Kraków, Poland, Spring 2019

- *Essentially non-normal numbers*, Equidistribution: Arithmetic, Computational and Probabilistic Aspects, Singapore, Spring 2019

- *Borel complexity of sets of normal numbers via generic points in subshifts with specification*, Equidistribution: Arithmetic, Computational and Probabilistic Aspects, Singapore, Spring 2019

- *Some complexity results in the theory of normal numbers*, Numeration 2018, Paris, France, Summer 2018

- *Normal numbers for the Cantor series expansion and possible applications in algebraic geometry*, Wandering Seminar in Dynamical Systems, Warsaw, Poland, Fall 2017

- *Essentially nonnormal numbers for random Cantor series expansions*, Numeration 2017, Rome, Italy, Summer 2017

- *Normality of Different Orders for the Cantor Series Expansions*, Normal Numbers: Arithmetic, Computational and Probabilistic Aspects, Vienna, Austria, Fall 2016

- *Normality of Different Orders for the Cantor Series Expansions*, Numeration 2016, Prague, Czech Republic, Spring 2016

- *On the Hausdorff dimension of some sets of numbers defined through the digits of their Q-Cantor series expansions*, Ergodic Theory of Dynamical Systems, Będlewo, Poland, Fall 2015

- *Unexpected distribution phenomenon resulting from Cantor series expansions*, Fractal Geometry and Dynamics, Będlewo, Poland, Fall 2015

- *On the Hausdorff dimension of some sets of numbers defined through the digits of their Q-Cantor series expansions*, Special Session on Fractal Geometry and Ergodic Theory, Spring Southeastern AMS Sectional Meeting, Huntsville, Alabama, Spring 2015

- *On the Hausdorff dimension of some sets of numbers defined through the digits of their Q-Cantor series expansions*, Special Session on Smooth Dynamical Systems and Ergodic Theory, Spring Central AMS Sectional Meeting, East Lansing, Michigan, Spring 2015

- *On the Hausdorff dimension of some sets of numbers defined through the digits of their Q-Cantor series expansions*, Special Session on Connections in Number Theory, Fall Southeastern AMS Sectional Meeting, Greensboro, North Carolina, Fall 2014

- *Number theoretic applications of a class of Cantor series fractal functions*, RTG Research Conference: Logic, Dynamics, and Their Interactions II, Denton, Texas, Summer 2014

- *Unexpected distribution phenomenon resulting from Cantor series expansions*, Special Session on Fractal Geometry and Dynamical Systems, Spring Central AMS Sectional Meeting, Lubbock, TX, Spring 2014

- *On the Hausdorff Dimension of Countable Intersections of Certain Sets of Normal Numbers*, Special Session on Diophantine Approximation on Manifolds and Fractals: Dynamics, Measure Theory and Schmidt Games, Spring Western AMS Sectional Meeting, Boulder, Colorado, Spring 2013

- *On the Hausdorff Dimension of Countable Intersections of Certain Sets of Normal Numbers*, Special Section on Fractal Geometry and Ergodic Theory, Spring Southeastern AMS Sectional Meeting, Oxford, Mississippi, Spring 2013

- *Normal numbers with respect to the Cantor series expansion*, Analytic Combinatorics and Probabilistic Number Theory: Closing Conference of the FWF-Network,Vienna, Austria, Summer 2012

- *Normal numbers with respect to the Cantor series expansion*, Dynamical systems session, Canadian Mathematical Society Summer Meeting, Edmonton, Canada, Summer 2011

Colloquium Talks:

- *Normal numbers*, John Cabot University, Rome, Italy, Fall 2019

- *Normal numbers*, Indian Institute of Technology Delhi, Delhi, India, Winter 2019

- *Applications of descriptive set theory to number theory and dynamics*, Millican Colloquium, University of North Texas, Fall 2018

- *Normal numbers with respect to the Cantor series expansions and possible applications to studying algebraic varieties*, National Academy of Sciences of Ukraine Institute of Mathematics, Spring 2018

- *Normal numbers*, Millican Colloquium, University of North Texas, Fall 2017

- *Normal numbers*, National Academy of Sciences of Ukraine Institute of Mathematics, Spring 2017

- *Different flavors of normal numbers*, Duquesne University, Spring 2015

- *Different flavors of normal numbers*, University of Michigan - Dearborn, Spring 2015

- *Unexpected distribution phenomenon resulting from Cantor series expansions*, Oakland University, Spring 2015

- *Normal Numbers*, Oakland University, Spring 2014

- *Normal Numbers*, University of Michigan - Dearborn, Spring 2014

- *Normal Numbers*, Duquesne University, Spring 2013

- *Normal numbers: a survey with open problems*, Murray State University, Fall 2012

- *Normal numbers with respect to the Cantor series expansions*, Millican Colloquium, University of North Texas, Fall 2012 (part one in a series of three talks)

Mini Courses:

- *Normal numbers in various numeration systems*, Harish-Chandra Research Institute (Allahabad, India), six lectures

Seminar Talks:

- *Descriptive complexity in Cantor series*, National Pedagogical Dragomanov University (Kyiv, Ukraine), Summer 2021

- *Borel complexity of sets of normal numbers via generic points in subshifts with specification*, National Pedagogical Dragomanov University (Kyiv, Ukraine), Summer 2020

- *Borel complexity of sets of normal numbers via generic points in subshifts with specification*, Roma Tre University, Rome, Italy, Fall 2019

- *Normal numbers with respect to the Cantor series expansions and possible applications to studying algebraic varieties*, Harish-Chandra Research Institute, Allahabad, India, Winter 2019

- *Essentially non-normal numbers for Cantor series expansions*, National Pedagogical Dragomanov University (Kyiv, Ukraine), Fall 2018

- *Unexpected distribution phenomenon resulting from Cantor series expansions*, National Pedagogical Dragomanov University (Kyiv, Ukraine), Spring 2018

- *Normal numbers with respect to the Cantor series expansions and possible applications to studying algebraic varieties*, Number theory seminar, The Ohio State University, Fall 2018

- *A strengthening of classical results on essentially non-normal numbers for b-ary expansions*, RTG Logic and Dynamics Seminar, University of North Texas, Fall 2018

- *Unexpected distribution phenomenon resulting from Cantor series expansions*, National Pedagogical Dragomanov University (Kyiv, Ukraine), Spring 2018

- *Some complexity results in the theory of normal numbers*, National Pedagogical Dragomanov University (Kyiv, Ukraine), Spring 2018

- *Some complexity results in the theory of normal numbers*, Number theory seminar, Technical University of Graz (Graz, Austria), Spring 2018

- *Normal numbers with respect to the Cantor series expansions and possible applications in algebraic geometry*, RTG Logic and Dynamics Seminar, University of North Texas, Fall 2017

- *Normal numbers with respect to the Cantor series expansions and possible applications in algebraic geometry*, Nicolaus Copernicus University (Toruń, Poland), Summer 2017

- *Normality of Different Orders for the Cantor Series Expansions*, National Pedagogical Dragomanov University (Kyiv, Ukraine), Spring 2017

- *Unexpected distribution phenonemon involving Cantor series expansions*, Number theory seminar, Technical University of Graz (Graz, Austria), Fall 2016

- *Normality of Different Orders for the Cantor Series Expansions*, RTG logic and dynamics seminar, University of North Texas, Summer 2016

- *Normality of Different Orders for the Cantor Series Expansions*, IM PAN (Warsaw, Poland), Spring 2016

- *Normality with respect to the Cantor series expansions*, National Pedagogical Dragomanov University (Kyiv, Ukraine), Spring 2016

- *Normality of Different Orders for the Cantor Series Expansions*, Adam Mickiewicz University (Poznań, Poland), Spring 2016

- *Normality of Different Orders for the Cantor Series Expansions*, Nicolaus Copernicus University (Toruń, Poland), Spring 2016

- *Normal numbers with respect to the Cantor series expansions*, University of Gdansk (Gdansk, Poland), Spring 2016

- *Normal numbers with respect to the Cantor series expansions*, Wroclaw University of Technology (Wroclaw, Poland), Spring 2016

- *Normal numbers with respect to the Cantor series expansions*, University of Warmia and Mazury (Olsztyn, Poland), Spring 2016

- *Normal numbers*, University of Warsaw (Warsaw, Poland), Fall 2015

- *Normal numbers with respect to the Cantor series expansions*, University of Warsaw (Warsaw, Poland), Fall 2015

- *Unexpected distribution phenomenon resulting from Cantor series expansions*, Ergodic Theory and Probability Seminar, The Ohio State University, Spring 2015

- *Normal numbers with respect to the Cantor series expansions*, Number Theory Seminar, Adam Mickiewicz University (Poznań, Poland), Spring 2015

- *Normal numbers with respect to the Cantor series expansions*, Dynamical Systems Seminar, Nicolaus Copernicus University (Toruń, Poland), Spring 2015

- *Unexpected distribution phenomenon resulting from Cantor series expansions*, Dynamical Systems Seminar, University of Southern California, Spring 2014

- *On the Hausdorff Dimension of Countable Intersections of Certain Sets of Normal Numbers*, RTG Logic and Dynamics Seminar, University of North Texas, Spring 2014

- *Unexpected distribution phenomenon resulting from Cantor series expansions*, Dynamical Systems Seminar, University of Houston, Spring 2014

- *Unexpected distribution phenomenon resulting from Cantor series expansions*, Ergodic Theory Seminar, Rice University, Spring 2014

- *Number Theoretic Applications of a Class of Cantor Series Fractal Functions*, RTG Logic and Dynamics Seminar, University of North Texas, Fall 2013

- *On the Hausdorff Dimension of Countable Intersections of Certain Sets of Normal Numbers*, Ergodic Theory and Probability Seminar, The Ohio State University, Spring 2013

- *An introduction to normal numbers with open problems*, Informal Mathematics Research Problem Session, University of North Texas, Fall 2012

- *Construction of fractal sets of normal numbers*, Dynamical Systems Seminar, University of North Texas, Fall 2012

- *Normal numbers with respect to the Cantor series expansions (part 2)*, RTG Logic and Dynamics Seminar, University of North Texas, Fall 2012 (part three in a series of three talks)

- *Normal numbers with respect to the Cantor series expansions (part 1) - elaborating on Colloquium talk 9/10*, RTG Logic and Dynamics Seminar, University of North Texas, Fall 2012 (part two in a series of three talks)

- *Explicit constructions of μ-normal numbers*, Ergodic theory seminar, University of Illinois at Urbana-Champaign, Winter 2012

- *Normal numbers with respect to the Cantor series expansion*, Number theory seminar, Technical University of Graz (Graz, Austria), Spring 2011

- *Normal numbers with respect to the Cantor series expansion*, Number theory seminar, University of Illinois at Urbana-Champaign, Autumn 2010

- *Winning sets, Cantor series and fractal sets of normal numbers with arbitrary Hausdorff dimension*, Ergodic Theory Seminar, The Ohio State University, Autumn 2010

- *Many Facets of Normality*, Symbolic Dynamics Working Group, The Ohio State University, Autumn 2009

- *Normal Numbers and Uniform Distribution*, What Is? Seminar, The Ohio State University, Summer 2009

Talks aimed at students:

- *Normal numbers*, Igor Sikorsky Kyiv Polytechnic Institute (Kyiv, Ukraine), Fall 2018

- *Normal numbers*, National Aviation University (Kyiv, Ukraine), Fall 2018

- *Normal numbers*, Oakland University Summer Mathematics Institute, Oakland University, Summer 2016

- *Different flavors of normal numbers*, Math Club, Carnegie Mellon University, Spring 2015

- *Normal Numbers*, Math Club, Carnegie Mellon University, Spring 2013

- *Explorations in Normal Numbers*, Euclidean Math Club, Murray State University, Fall 2012

- *Fractals, Schmidt Games, and Sets of Non-Normal Numbers*, Radical Pi, The Ohio State University, Winter 2012

- *Research in Normal Numbers*, Radical Pi, The Ohio State University, Winter 2009

- *What are Normal Numbers?*, Radical Pi, The Ohio State University, Spring 2008

Conferences Attended

- The 26th International Conference on Difference Equations and Applications (ICDEA 2021), Summer 2021 (online)

- Vitaly Bergelson's Surprise 70th Birthday Conference, Fall 2020 (online)

- Numeration 2019, Vienna, Austria, Summer 2019

- Conference on Dynamical Systems Celebrating Michał Misiurewicz's 70th Birthday, Kraków, Poland, Spring 2019
- Equidistribution: Arithmetic, Computational and Probabilistic Aspects, Singapore, Spring 2019
- Dynamics, measures and dimensions, Będlewo, Poland, Spring 2019
- The Sixth International Conference on Analytic Number Theory and Spatial Tessellations, Kyiv, Ukraine, Fall 2018
- Ergodic aspects of modern dynamics in honour of Mariusz Lemańczyk on his 60th birthday, Będlewo, Poland, Summer 2018
- Numeration 2018, Paris, France, Summer 2018
- Wandering Seminar in Dynamical Systems, Fall 2017
- Numeration 2017, Rome, Italy, Summer 2017
- Algebraic and geometric methods of analysis, Odessa, Ukraine, Summer 2017
- Normal Numbers: Arithmetic, Computational and Probabilistic Aspects, Vienna, Austria, Fall 2016
- Numeration 2016, Prague, Czech Republic, Spring 2016
- Ergodic Theory of Dynamical Systems, Będlewo, Poland, Fall 2015
- Fractal Geometry and Dynamics, Będlewo, Poland, Fall 2015
- Topics in Analysis and Holomorphic Dynamics, Będlewo, Poland, Fall 2015
- Young Mathematicians Conference, Columbus, Ohio, Summer 2015
- Spring Southeastern AMS Sectional Meeting, Huntsville, Alabama, Spring 2015
- Spring Central AMS Sectional Meeting, East Lansing, Michigan, Spring 2015
- Fall Southeastern AMS Sectional Meeting, Greensboro, North Carolina, Fall 2014
- Young Mathematicians Conference, Columbus, Ohio, Summer 2014
- 37th conference on stochastic processes and their applications, Buenos Aires, Argentina, Summer 2014
- 16th Latin American Symposium on Mathematical Logic, Buenos Aires, Argentina, Summer 2014
- RTG Research Conference: Logic, Dynamics, and Their Interactions II, Denton, Texas, Summer 2014
- Spring Central AMS Sectional Meeting, Lubbock, Texas, Spring 2014
- 2013 Intel International Science and Engineering Fair, Phoenix, AZ, Summer 2013
- Spring Western AMS Sectional Meeting, Boulder, Colorado, Spring 2013
- Spring Southeastern AMS Sectional Meeting, Oxford, Mississippi, Spring 2013
- Analytic Combinatorics and Probabilistic Number Theory: Closing Conference of the FWF-Network, Vienna, Austria, Summer 2012
- Logic, Dynamics and Their Interactions, with a Celebration of the Work of Dan Mauldin, Denton, Texas, Summer 2012
- Canadian Mathematical Society Summer Meeting, Edmonton, Canada, June 2011
- Joint Mathematics Meetings, New Orleans, Louisiana, Winter 2011
- MathFest, Pittsburgh, Pennsylvania, Summer 2010
- Joint Mathematics Meetings, San Francisco, California, Winter 2010
- CBMS Conference in Ergodic Ramsey Theory, Charleston, Illinois, Summer 2008

Mentoring and REU Participation

- Faculty mentor at the 2013 RTG Summer Undergraduate Math Scholars Program (REU) at University of North Texas. Mentored Dylan Airey. Produced one paper which was published in Adv. Math.

- Faculty mentor at the 2014 RTG Summer Undergraduate Math Scholars Program (REU) at University of North Texas. Mentored Dylan Airey, Dylan Cooney, and Aidan Young. Five papers have been published in Illinois J. Math, Journal of Fractal Geometry, New York J. Math., Indag. Math., and Czech. Math. J.

- Faculty mentor at the 2015 RTG Summer Undergraduate Math Scholars Program (REU) at University of North Texas. Mentored Dylan Airey, Jill Kaiser (unofficial), Anagha Krishnan, and Aidan Young.

Masters Students Mentored

- Konrad Banaś, "Construction of full Hausdorff dimension fractal of Q-normal numbers with Q almost converging to infinity," at University of Adam Mickiewicz (2020)

Undergraduate Students Mentored

- Konrad Banaś

  - Advised on a bachelors thesis "Introduction to Galois theory and its basic applications" at University of Adam Mickiewicz (2018)

- Dylan Airey (student at University of Texas, 2013–2017)

  - Gave presentation *Some complexity results on sets related to normal numbers* at RTG logic and dynamics seminar at University of North Texas
  - Gave presentation *Some complexity results on sets related to normal numbers* at The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Orlando, Florida
  - Gave presentation *Some complexity results on sets related to normal numbers* at Wrocław University of Technology
  - Gave presentation *Some complexity results on sets related to normal numbers* at University of Gdańsk
  - Gave presentation *Some complexity results on sets related to normal numbers* at University of Warmia and Mazury
  - Gave presentation *Some complexity results on sets related to normal numbers* at University of Warsaw
  - Gave presentation *Some complexity results on sets related to normal numbers* at Nicolaus Copernicus University
  - Gave presentation *Some complexity results on sets related to normal numbers* at IM PAN
  - Coauthored paper "Normality preserving operations for Cantor series expansions and associated fractals, I," published in Illinois J. Math.
  - Coauthored paper "Normal equivalencies for eventually periodic basic sequences," published in Indag. Math
  - Coauthored paper "Normal number constructions for Cantor series with slowly growing bases," published in Czech. Math. J.
  - Coauthored paper "Normality preserving operations for Cantor series expansions and associated fractals, II," published in New York J. Math.

- Coauthored paper "On the Hausdorff dimension of some sets of numbers defined through the digits of their Q-Cantor series expansions," published in J. Fractal Geom.
- Gave presentation *Unexpected distribution phenomenon resulting from Cantor series expansions* at the Logic Seminar at California Institute of Technology
- Gave presentation *The Hausdorff dimension of sets of numbers defined by their Q-Cantor series expansions* at the AMS Session on Number Theory, 2015 Joint Mathematics Meetings
- Gave presentation *Unexpected distribution phenomenon resulting from Cantor series expansions* at the Special Session on Connections in Number Theory, Fall Southeastern AMS Sectional Meeting
- Gave presentation *Unexpected distribution phenomenon resulting from Cantor series expansions*, Young Mathematicians Conference, Summer 2014
- Gave presentation *Unexpected distribution phenomenon resulting from Cantor series expansions*, RTG Research Conference: Logic, Dynamics, and Their Interactions II, Summer 2014
- Gave presentation *Unexpected distribution phenomenon resulting from Cantor series expansions*, RTG Logic and Dynamics Seminar, University of North Texas, Spring 2014
- Gave presentation *Ergodic properties of different types of series expansions*, Informal Mathematics Research Problem Sessoin, University of North Texas, Spring 2014

- Max Kouphin and Beier Lu (students at University of North Texas, Summer 2013)

  - Summer 2013 research project

- Taylor Terry (student at University of North Texas, Fall 2013)

  - Advised on honors project for real analysis

- Aidan Young (student at University of Oklahoma, 2015–present)

  - Finishing a research project on fractal geometry.

High School Students Mentored

- Dylan Airey (student at The Texas Academy of Mathematics and Science in Denton, Texas 2012–2013)

  - Coauthored paper "Unexpected Distribution Phenomenon resulting from Cantor Series Expansions," published in Adv. Math.
  - Presented science fair project *Q-Distribution Normality on Bounded Bases* at 2013 Intel International Science and Engineering Fair
  - Presented science fair project *Q-Distribution Normality on Bounded Bases* at 2013 ExxonMobil Texas Science and Engineering Fair
    * 1st place in the Mathematical Sciences division
    * 1st place Mu Alpha Theta
    * Qualified for Intel International Science and Engineering Fair
  - Presented science fair project *Q-Distribution Normality on Bounded Bases* at 2013 Fort Worth Regional Science and Engineering Fair
    * 1st place in the Mathematical Sciences division
    * 1st place US Army
    * 1st place Mu Alpha Theta
    * Qualified for ExxonMobil Texas Science and Engineering Fair
  - Gave presentation *Normal Numbers in a Variety of Number Systems* at the University of North Texas Normal Numbers Seminar, Spring 2013

- Gave presentation *Comparing two notions of normality for Cantor Series Expansions* at the University of North Texas RTG Logic and Dynamics Seminar

- Dylan Cooney (student at The Texas Academy of Mathematics and Science in Denton, Texas 2014)

- Anagha Krishnan (student at The Texas Academy of Mathematics and Science in Denton, Texas Summer 2015)

- Matthew Kuo (student at The Texas Academy of Mathematics and Science in Denton, Texas 2013–2014)

- Brian Li (student at Upper Arlington High School in Upper Arlington, Ohio 2011–2013)
  - Coauthored paper "Number Theoretic Applications of a Class of Cantor Series Fractal Functions Part II," published in Int. J. Number Theory
  - Gave presentation *Normal Numbers: A Notion of Randomness* at Radical Pi (undergraduate math club at The Ohio State University), Winter 2012
  - Presented science fair project *Normal Numbers: A Notion of Randomness* at Central Ohio Regional Science & Engineering Fair, Winter 2012

- Aidan Young (student at The Texas Academy of Mathematics and Science in Denton, Texas 2014–2015)
  - Gave presentation *Preliminary Results on the Extended Cantor Series Expansion* at the Informal Mathematics Research Problem Sessoin, University of North Texas, Fall 2014
  - Gave presentation *Ergodic and Number-Theoretic Properties of the β-Expansion* at the University of North Texas Dynamical Systems Seminar

Teaching Experience

Courses Taught at University of Adam Mickiewicz

- Uniform distribution mod 1 and normal numbers (Ph.D. level)

- Algebra 1 (masters level)

- Ergodic theory of numbers

- Analytic geometry

- Algebra 1

- Linear Algebra and Geometry

Courses Taught at University of North Texas:

- Math 1720: Calculus II

- Math 2700: Linear Algebra & Vector Geometry

- Math 3000: Real Analysis I

- Math 3510: Introduction to Abstract Algebra I

- Math 3610: Real Analysis II

Courses Taught at The Ohio State University as a Lecturer:

- Math 132: Mathematical Analysis for Business III

- Math 150: Elementary Functions

- Math 152,153, 254: Calculus and Analytic Geometry II,III, IV

- Math 366: Discrete Mathematical Structures I

- Math 548: Introductory Analysis II

- Math 568: Introductory Linear Algebra I

Courses Taught at The Ohio State University as a Teaching Assistant:

- Math 132: Mathematical Analysis for Business III

- Math 151,152, 254: Calculus and Analytic Geometry I,II, IV

- Math 161: Accelerated Calculus with Analytic Geometry I

- Math 415: Ordinary and Partial Differential Equations

Courses Taught at Carnegie Mellon University as a Teaching Assistant

- 21-115: Differential Calculus

- 21-116: Integral Calculus

Courses Graded at Carnegie Mellon University

- 21-610: Algebra I (masters level)

Service

- Referee for New York Journal of Mathematics, Acta Arithmetica, Journal of Number Theory, Nonlinearity, Journal of Mathematical Analysis and Applications, Acta Mathematica Scientia, and Journal of Computer and System Sciences

- Organizer for Dynamical Systems seminar at University of North Texas Spring 2013, Fall 2013, Spring 2014, Fall 2014, and Spring 2015

- On the planning committee for the Logic, Dynamics, and Their Interactions II conference held at University of North Texas in June 2014

- Organizer of an informal working group on normal numbers at The Ohio State University

- Committee member with the College of Engineering at the Ohio State University working to reform Math 415: Ordinary and Partial Differential Equations

Professional Development

- 2013 Governor's Science and Technology Champions Academy, Summer 2013

Community Outreach

- Gave a talk on normal numbers at Ulcinj High School in Ulcinj, Montenegro

- Gave talk at Rowlett High School, Fall 2014

- Mathematical consultant for the play "Proof" performed by the drama department at University of North Texas

Other Accomplishments

Best lifts as a competitive powerlifter in the 220 lb (100 kg) weight class

- 615 lb (279 kg) squat

- 435 lb (197 kg) bench press

- 630 lb (286 kg) deadlift

- 1680 lb (762 kg) total: classified as master