



Udayan "Dario" Darji

A Global Nomad Mathematician

Personal

U.S. Citizen

Research Interests

Dynamical Systems, Applications of Descriptive Set Theory, Measure theory, Topology, Transformation groups, Network science.

Education

1991-1993 **Post-Doc in Mathematics**, NORTH CAROLINA STATE UNIVERSITY.

1985-1991 **PhD in Mathematics**, AUBURN UNIVERSITY.

1981-1985 **BS in Mathematics**, UNIVERSITY OF HOUSTON.

Experience

Academic

2003-Present **Professor of Mathematics**, UNIVERSITY OF LOUISVILLE.

2018-2019 **FAPESP Research Professor of Mathematics**, UNIVERSITY OF SÃO PAULO, BRAZIL.

2017-2018 **Acting Head, Department of Mathematics**, ASHOKA UNIVERSITY, INDIA.

2016-2018 **Visitig Professor of Mathematics**, ASHOKA UNIVERSITY, INDIA.

2000-2001 **Fulbright Research Fellow to Hungary**, EÖTVÖS LORÁND UNIVERSITY. .

1998-2003 **Associate Professor of Mathematics**, UNIVERSITY OF LOUISVILLE.

1993-1998 **Assistant Professor of Mathematics**, UNIVERSITY OF LOUISVILLE.

1991-1993 **Post-Doctoral Fellow**, NORTH CAROLINA STATE UNIVERSITY.

Applied and Industrial

1997-2003 **Consultant**, CENTER FOR COMMUNICATIONS RESEARCH, INSTITUTE FOR DEFENSE ANALYSIS, NJ, CA. Worked on important communications problems of the Department of Defense of the United States.

Editorial Boards

1995-Present **Associate Editor**, JOURNAL OF APPLIED ANALYSIS.

2014-Present **Associate Editor**, EUROPEAN JOURNAL OF MATHEMATICS.

2011-2014 **Associate Editor**, CENTRAL EUROPEAN JOURNAL OF MATHEMATICS.

2002-2010 **Contributing Editor**, REAL ANALYSIS EXCHANGE.

Teaching

Basic Calculus Sequence, Linear Algebra, Differential Equations, Discrete Mathematics, Numerical Analysis, Probability Theory, Statistics, Combinatorics

Advanced Abstract Algebra, Real Analysis, Topology, Complex Analysis, Coding Theory, Chaos and Symbolic Dynamics, Dynamics of Networks, Agent Based Modeling

Others Taught at foreign institutes.

- 10 lectures on interactions between Analysis and Set theory, Banach Center, Poland.
- Intro to Descriptive Set Theory, University of Buenos Aires, Argentina (in Spanish).
- Measure vs Category, Naples, Italy (in Italian).
- Intro to Geometric Measure Theory, University of São Paulo, Ribeirão Preto.

PhD Thesis, Advising/Co-advising

Advising **S. White**, 2007, University of Louisville, USA.

THESIS TITLE: Properties of generic and almost every mappings in various nonlocally compact Polish abelian groups. Thesis (Ph.D.)—University of Louisville. 2007.

CURRENT POSITION: Associate Professor, Bellarmine University, USA.

Coadvising **M. Maiuriello**, 2022 University of Campania "Luigi VanVitelli", Caserta, Italy.

R. Balka, 2012, Eötvös Loránd University, Budapest, Hungary.

THESIS TITLE: Measure and Category in Real Analysis.

CURRENT POSITION: Premium Postdoctoral Research Fellow, Alfred Renyi Institute of Mathematics, Budapest, Hungary.

M. Kovan-Bakan, 2012, University of Pittsburgh, USA.

THESIS TITLE: Complexity of families of compact sets in \mathbf{R}^n .

CURRENT POSITION: Senior Data Scientist, Lyric, San Francisco, CA, USA.

Post-Doctoral Supervision

M. Wojcik 2010.

CURRENT POSITION: Data Scientist at Department for Work and Pensions (DWP) Sheffield, South Yorkshire, UK.

I. Trevor 2005-2006.

J. D. Mitchell 2003-2004. Professor of Mathematics, St. Andrews University, Scotland, UK.

Selected Awards and Honors

- 2018-2019 FAPESP Research Professor of Mathematics, São Paulo, Brazil.
- 1999-Present Regularly supported by INDAM grant of Italy for a period of 2 weeks to 2 months per year since 2007 to carry out research with various mathematicians in Naples, Palermo and Catania, Italy.
- 2011-Present Regularly supported for long visits (month or longer) at various institutions in Brazil such as Universidade Federal do Rio de Janeiro and Universidade de São Paulo, Universidade Federal da Santa Catarina to carry our research in Topological Dynamics with Professors Nilson Bernardes, Benito Pires, Marcelo Sobottka, Daniel Gonçalves
- 2008 Supported by NWO (Nederland Science Foundations) for 6 months to work on problems related to Erdős space with Professor Jan Dijkstra of Vrije Universiteit.
- 2007 Supported by London Math Society Scheme II grant for two months to work with Dr. James Mitchell on transformation groups.
- 2007 Supported by GNAMPA grant of Italia to teach a course on transformation groups to the PhD students.
- 2004 Research and Creativity award from the Arts and Sciences College, University of Louisville.
- 2000-2001 Fulbright Scholar to Hungary.
- 1998 Research In Pairs Grant (joint with Marek Balcerzak), Oberwolfach Institute, Germany.

Selected Invited/Plenary Talks

- 2023 Plenary Speaker, Summer Symposium in Real Analysis, Caserta, Italy
- 2023 Invited 3 one hour lectures, Winter School in Abstract Analysis, Czech Republic
- 2022 Inspiration in Real Analysis, Banach Center, Poland.
- 2022 A mini course on linear dynamics, Brazilian National Annual Meeting of Analysts (ENAMA), São Paulo, Brazil.
- 2022 55th Spring Topology and Dynamics Conference, Baylor University, USA.
- 2021 4 Days in Linear Dynamics, Caserta, Italy.
- 2021 CalTech, Logic Seminar.
- 2021 Cornell, Logic Seminar.
- 2019 EDAI, Monthly meeting on Dynamical Systems, Rio de Janeiro.
- 2019 Conference on Ordinary Differential Equations, São Carlos, Brazil
- 2018 Conference on Descriptive set theory and applications. Bernoulli Center, Lausanne, Switzerland
- 2017 Floripa Dynamical Systems and Tiling Conference, Florianopolis, Brazil, 2017
- 2017 Indian Statistical Institute- Calcutta, India
- 2016 Colloquium Talk, BITS Pilani, Hyderabad, India
- 2016 Colloquium Talk, IIT-Gandhi Nagar, India

- 2016 Summer Conference on Topology and its Applications, Leicester, UK
- 2016 EDAI, Rio-Carioca Seminar on Dynamical Systems.
- 2015 Dynamical, Arithmetic, Number Theory Conference, Porquerolles, France.
- 2013 Workshop on Descriptive Set Theory, Schrödinger Institute, Vienna, Austria.
- 2013 International Conference on Topology and Geometry, Matsue City, Japan.
- 2009 Summer Symposium on Real Analysis, Durant, OK.
- 2008 CIMPA-UNESCO Conference on Real Analysis and its Applications in Argentina.
- 2006 Set Theory and Analysis Conference, Torino, Italy.
- 2006 CARTEMI, biannual Measure Theory Conference, Ischia, Italia.
- 2005 Banach Center workshop on Set Theory and Analysis. Gave ten 1-hour talks.

Selected Visiting Positions

- Feb 2022 Caltech
- 2018 -2019 University of São Paulo, Ribeirão Preto, Brazil.
- 2016 -2018 Ashoka University, India.
- 2014, 2015 Luminy, France.
 - 2014 Tsukuba University, Japan.
 - 2013 Lille, France.
 - 2010 Universidad de Buenos Aires, Argentina.
 - 2008 Vrije Universiteit, Amsterdam.
 - 2007 Federico Secondo Universita', Napoli, Italia.
 - 2007 St. Andrews University, Scotland.
- 2000-2001 Eötvös Loránd University. Budapest, Hungary. Fulbright Researcher.
- 2000 Caltech.

Language Skills

English (Native), Spanish, Italian, Portuguese, Gujarati.

Publications

1. U. B. Darji, M. Elekes, K. Kalina, V. Kiss, Z. Vidnyánszky, *The structure of random automorphisms of the random graph*, Ann. Pure Appl. Logic **173** (2022), no. 9, Paper No. 103152.
2. E. D’Aniello, U. B. Darji, M. Maiuriello. *Shift-like operators on $L^p(X)$* . J. Math. Anal. Appl. **515** (2022), no. 1, Paper No. 126393, 13 pp
3. Bernardes, N. C. Jr.; Darji, U. B.; Vermersch, R. *Uniformly Positive Entropy of Induced Transformations*, Ergodic Theory Dynam. Systems **42** (2022), no. 1, 9-18.
4. E. D’Aniello, D. Bongiorno, U. B. Darji, L. DiPiazza; *Linear Dynamics induced by Odometers*. Proc. Amer. Math. Soc. **150** (2022), no. 7, 2823-2837.
5. Darji, U. B.; Pires, B.; *Chaos and frequent hypercyclicity for composition operators*. Proc. Edinb. Math. Soc. (2). **64** (2021) no. 3, 513-531.
6. E. D’Aniello, U. B. Darji, M. Maiuriello. *Generalized Hyperbolicity and Shadowing in L^p spaces*. J. Differential Equations **298** (2021), 68-94.

7. U. B. Darji, D. Gonçalves, M. Sobottka *Shadowing, Finite Order Shifts and Ultrametric Spaces*, Adv. Math. **385** (2021), Paper No. 107760,
8. U. B. Darji, M. Elekes, K. Kalina, V. Kiss, Z. Vidnyánszky, *The structure of random automorphisms of the rational numbers*, Fund. Math. **250**, no. 1, (2020), 1-20.
9. U. B. Darji, M. Elekes, K. Kalina, V. Kiss, Z. Vidnyánszky, *The structure of random homeomorphisms*, Israel J. Math. **237** no 1 (2020), 75-113.
10. Bernardes, N. C. Jr.; Darji, U. B.; Pires, B.; *Li-Yorke chaos for composition operators on L^p spaces*. Motash Math. **191** (2020) 13-35.
11. U. B. Darji, M. Elekes, K. Kalina, V. Kiss, Z. Vidnyánszky, *The structure of random automorphisms of countable structure*, Trans. Amer. Math. Soc. **371** (2019) no. 12, 8829-8848
12. Bayart, F.; Darji, U. B.; Pires, B.; *Topological transitivity and mixing of the composition operator on L^p spaces*. J. Math. Anal. Appl. **465** (2018) 125-139.
13. Biró, C.: Darji, U. B.; *Generating Infinite Random Graphs*. Proc. Edinb. Math. Soc. (2) **61** (2018), no. 3, 847-868.
14. N. C. Bernardes Jr., P. R. Cirilo, U. B. Darji, A. Messaoudi and E. R. Pujals, *Expansivity and Shadowing in Linear Dynamics*, J. Math. Anal. Appl. **461** (2018), no. 1, 796-816.
15. Basile, D; Darji, U.B.; *P-dominance and Borel sets*, Houston Journal of Mathematics, **43** no 1 (2017) 247-254.
16. Darji, U. B.; Matheron, E. *Some universality results for dynamical systems*, Proc. Amer. Math. Soc., **145** no 1 (2017) 251-265.
17. Darji, U. B.; Kato, H; *Chaos and Indecomposability*, Advances in Mathematics **304** (2017) 793-808.
18. Balka, R.; Darji, U. B.; Elekes, M.; *Bruckner-Garg-type results with respect to Haar null sets in $C[0, 1]$* Proc. Edinb. Math. Soc., **60** no 2 (2016), no. 1, 17-30.
19. Balka, R.; Darji, U. B.; Elekes, M.; *Hausdorff and packing dimension of fibers and graphs of prevalent continuous maps*. Advances in Mathematics **293** (2016) 221-274.
20. Darji, U. B.; Swanson, D.; *A note on the generic nature of Pringsheim functions*. Adv. Pure Appl. Math. **7** (2016), no. 4, 231-236.
21. Bongiorno, D.; Darji, U. B.; Di Piazza, L. Rolewicz-type chaotic operators. J. Math. Anal. Appl. **431** (2015), no. 1, 518-528.
22. Darji, U. B.; Di Piazza, L. *Lineability of non-differentiable Pettis primitives*. Monatsh. Math. **177** (2015), no. 3, 345-362.
23. Darji, U. B.; *On Haar meager sets*. Topology Appl. **160** (2013), no. 18, 2396-2400.
24. Cabrelli, C.; Darji, U.; Molter, U., *Visible and Invisible sets*, Excursions in Applied and Numerical Harmonic Analysis, Volume 2, (2013), The February Fourier Talks at the Norbert Wiener Center.
25. Bernardes, Jr., N; Darji, U; *Graph-theoretic Structure of maps of the Cantor Space*, Adv. Math. **231** (2012), no. 3-4, 1655-1680.
26. Darji, U. B.; Seif, S. W.; *A note on decidability of cellularity*, Journal of Cellular Automata, **7** (2012), 509-514.
27. D'Aniello, E.; Darji, U. B.; *Chaos among the self map of the Cantor Space*, J. Math. Anal. Appl. **381** (2011), no. 2, 781-788.
28. Darji, U. B.; Mitchell, J. D. ; *Approximation of automorphisms of the rationals and the random graph*. J. Group Theory, **14**, (2011), no 2, 361-388.
29. Darji, U. B.; White, S. C.; *Haar ambivalent sets in the space of continuous functions*. Acta Math. Hungar. **126** (2010), no. 3, 230-240.
30. Darji, Udayan B.; Evans, Michael J. *Functions not first-return integrable*. J. Math. Anal. Appl.

- 347** (2008), no. 2, 381-390.
31. D'Aniello, E. ; Darji, U. B. ; Steele, T. H.; *Ubiquity of odometers in topological dynamical systems*. Topology and its Applications **156** (2008) 240-245.
 32. Darji, U. B.; Mitchell, J. D. *Highly transitive subgroups of the symmetric group on the natural numbers*. Colloq. Math. **112** (2008), no. 1, 163–173.
 33. D'Aniello, Emma; Darji, Udayan B. *Smooth images of the irrationals*. Real Anal. Exchange **32** (2006/07), no. 1, 19-28.
 34. Camerlo, Riccardo; Darji, Udayan B.; Marcone, Alberto *Classification problems in continuum theory*. Trans. Amer. Math. Soc. **357** (2005), no. 11, 4301–4328.
 35. Buczolich, Zoltán; Darji, Udayan B. *Pseudoarcs, pseudocircles, Lakes of Wada and generic maps on S^2* . Topology Appl. **150** (2005), no. 1-3, 223–254.
 36. Csörnyei, Marianna; Darji, Udayan B.; Evans, Michael J.; Humke, Paul D. *First-return integrals*. J. Math. Anal. Appl. **305** (2005), no. 2, 546–559.
 37. Darji, Udayan B. *Fiber structure of functions from various viewpoints*. Real Anal. Exchange 2004, 28th Summer Symposium Conference, 9–14.
 38. Darji, Udayan B.; Marcone, Alberto *Complexity of curves*. Fund. Math. **182** (2004), no. 1, 79–93.
 39. Darji, Udayan B.; Keleti, Tamás *Covering \mathbf{R} with translates of a compact set*. Proc. Amer. Math. Soc. **131** (2003), no. 8, 2598–2596.
 40. Camerlo, Riccardo; Darji, Udayan B. *Construction of Borel inseparable coanalytic sets*. Real Anal. Exchange **28** (2002/03), no. 1, 163–180.
 41. Darji, Udayan B.; Freiling, Chris; Mauldin, R. Daniel *Some comments on infinite Boolean functions*. Colloq. Math. **94** (2002), no. 2, 235–241.
 42. Darji, Udayan B.; Evans, Michael J. *A first return examination of the Lebesgue integral*. Real Anal. Exchange **27** (2001/02), no. 2, 573–581.
 43. D'Aniello, E.; Darji, U. B. *C^m functions, Hausdorff measures, and analytic sets*. Advances in Mathematics, **164** (2001) 117-143.
 44. Bongiorno, B.; Darji, U. B.; Pfeffer, W. *On indefinite BV-integrals*. Comment. Math. Univ. Carolin. **41** (2000), no. 4, 843–853.
 45. Balcerzak, M.; Darji, U. B. *Some examples of true $F_{\sigma\delta}$ sets*. Colloq. Math. **86** (2000), no. 2, 203–207.
 46. Darji, U. B. *Complexity of hereditarily decomposable continua*. Topology and Its Applications **103** (2000) no. 3, 243-248.
 47. D'Aniello, E.; Darji, U. B. *On the existence of C^1 functions with perfect level sets*, Z. Anal. Anwendungen, **19** (2000), no 1, 847-852.
 48. Darji, U. B. *Two general extension theorems*. Acta Math. Hungar. **83** (1999), no. 1-2, 97–106.
 49. Darji, Udayan B.; Morayne, Michal *Level sets of a typical C^n function*. Proc. Amer. Math. Soc. **127** (1999), no. 10, 2917–2922.
 50. Brown, Jack B.; Darji, Udayan B.; Larsen, Eric P. *Nowhere monotone functions and functions of nonmonotonic type*. Proc. Amer. Math. Soc. **127** (1999), no. 1, 173–182.
 51. Buczolich, Z.; Darji, U. B.; O'Malley, R. J. *Irrational rotations and differentiability*. Acta Math. Hungar. **78** (1998), no. 4, 305–313.
 52. Darji, Udayan B.; Evans, Michael J.; Freiling, Chris; O'Malley, Richard J. *Fine properties of Baire one functions*. Fund. Math. **155** (1998), no. 2, 177–188.
 53. Darji, Udayan B. *Countable decomposition of derivatives and Baire 1 functions*. J. Appl. Anal. **2** (1996), no. 2, 119–124.

54. Darji, Udayan B.; Evans, Michael J.; Humke, Paul D. *First return approachability*. J. Math. Anal. Appl. **199** (1996), no. 2, 545–557.
55. Darji, U. B.; Evans, M. J.; O'Malley, R. J. *First return path systems: differentiability, continuity, and orderings*. Acta Math. Hungar. **66** (1995), no. 1-2, 83–103.
56. Darji, Udayan B.; Evans, Michael J. *Recovering Baire 1 functions*. Mathematika **42** (1995), no. 1, 43–48.
57. Darji, Udayan B.; Evans, Michael J. *Path differentiation: further unification*. Fund. Math. **146** (1995), no. 3, 267–282.
58. Darji, Udayan B. *Limits of differentiable functions*. Proc. Amer. Math. Soc. **124** (1996), no. 1, 129–134.
59. Darji, Udayan B.; Humke, Paul D. *Every bounded function is the sum of three almost continuous bounded functions*. Real Anal. Exchange **20** (1994/95), no. 1, 367–369.
60. Darji, Udayan B.; Evans, Michael J.; O'Malley, Richard J. *Universally first return continuous functions*. Proc. Amer. Math. Soc. **123** (1995), no. 9, 2677–2685.
61. Darji, Udayan B. *Coanalytic sets and symmetric behavior in functions*. J. Math. Anal. Appl. **184** (1994), no. 3, 485–490.
62. Darji, Udayan B.; Evans, Michael J.; O'Malley, Richard J. *Condition \mathcal{B} and Baire 1 generalized derivatives*. Proc. Amer. Math. Soc. **123** (1995), no. 6, 1727–1736.
63. Darji, Udayan B.; Evans, Michael J.; O'Malley, Richard J. *Some interesting small subclasses of the Darboux Baire 1 functions*. Real Anal. Exchange **19** (1993/94), no. 1, 328–331.
64. Darji, Udayan B.; Evans, Michael J.; O'Malley, Richard J. *A first return characterization for Baire-one functions*. Real Anal. Exchange **19** (1993/94), no. 2, 510–515.
65. Darji, Udayan B. *A Sierpiński-Zygmund function which has a perfect road at each point*. Colloq. Math. **64** (1993), no. 2, 159–162.
66. Darji, Udayan B. *Uniformly completely Ramsey sets*. Colloq. Math. **64** (1993), no. 2, 163–171.
67. Darji, Udayan B. *Symmetric behavior in functions*. Proc. Amer. Math. Soc. **119**] (1993), no. 3, 915–923.
68. Darji, Udayan B. *Symmetric functions*, **118** (1993), no. 4, 1151–1158.