

CURRICULUM VITAE

NIKOS FRANTZIKINAKIS

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BIOGRAPHICAL DATA

Birthplace: Heraklion, Greece.

Date of Birth: January 22, 1975.

EDUCATION

Stanford University, Stanford, USA, 2002.

Phd in Mathematics. Area: Ergodic Theory. Advisor: Yitzhak Katznelson.

Thesis Title: The structure of non-ergodic strongly stationary systems.

University of Crete, Heraklion, Greece, 1992-1996.

Bachelor of Science in Mathematics.

ACADEMIC POSITIONS

University of Crete, Heraklion, Greece, Full Professor, 2019-.

University of Crete, Heraklion, Greece, Associate Professor, 2014-2019.

University of Crete, Heraklion, Greece, Assistant Professor, 2009-2014.

University of Memphis, Memphis, USA, Assistant Professor, 2006-2009.

Institute for Advanced Study, Princeton, USA, 2005-2006 and Spring 2023 Member.

Pennsylvania State University, University Park, USA, 2002-2005.

Chowla Research Assistant Professor in Mathematics.

HONORS AND AWARDS

2024: Invited speaker, *9th European Congress of Mathematics*.

2023: *Frontier of Science Award* (joint with B. Host), International Congress in Basic Science.

2019: Plenary speaker for the *31st Journées Arithmétiques*.

RESEARCH GRANTS

Research Grant - ELIDEK HFRI-FM17-1684, (€ 175,000), 2020-2023, individual grant.

Research Grant - ELKE 4480, University of Crete, (€ 10,000), 2015-2017, individual grant.

Marie Curie IRG 248008 (€ 100,000), 2009-2013, individual grant.

NSF Grant, DMS 0701027 (\$ 104,822), 2006-2009, individual grant.

RESEARCH INTERESTS

Ergodic theory, analytic methods in number theory and combinatorics.

PUBLICATIONS

(All papers are available online at <http://www.math.uoc.gr/~nikosf/publications.html>)

1. **Partition regularity of Pythagorean pairs** (with O. Klurman, J. Moreira).
Preprint, arXiv:2309.10636.
2. **Furstenberg systems of pretentious and MRT multiplicative functions**
(with M. Lemanczyk, T. de la Rue). Preprint, arXiv:2304.03121.
3. **Degree lowering for ergodic averages along arithmetic progressions** (with B. Kuca).
To appear in *Journal d'Analyse Mathématique*, arXiv:2212.09819.
4. **Seminorm control for ergodic averages with commuting transformations along pairwise dependent polynomials** (with B. Kuca).
To appear in *Ergodic Theory and Dynamical Systems*, arXiv:2209.11033.
5. **Joint ergodicity for commuting transformations and applications to polynomial sequences**
(with B. Kuca). Preprint, arXiv:2207.12288.
6. **Multiple recurrence and convergence without commutativity** (with B. Host).
To appear in *Journal of the London Mathematical Society*, arXiv:2111.01518.
7. **Joint ergodicity of fractional powers of primes.**
Forum of Mathematics, Sigma, 10, (2022), e30.
8. **Joint ergodicity of sequences.**
To appear in *Advances in Mathematics*, arXiv:2102.09967.
9. **Furstenberg systems of Hardy field sequences and applications.**
Journal d'Analyse Mathématique, **147**, (2022), 333-372.
10. **Correlations of multiplicative functions along deterministic and independent sequences**
Transactions of the American Mathematical Society, **373**, no. 9, (2020), 6595-6620.
11. **Good weights for the Erdős discrepancy problem**
Discrete Analysis, 2020:8, 23 pp.
12. **Furstenberg systems of bounded multiplicative functions and applications** (with B. Host).
International Mathematics Research Notices, **2021**, no. 8, (2021), 6077-6107.
13. **The logarithmic Sarnak conjecture for ergodic weights** (with B. Host).
Annals of Mathematics, **187**, no. 3, (2018), 869-931.
14. **Ergodicity of the Liouville system implies the Chowla conjecture.**
Discrete Analysis, 2017:19, 41pp.
15. **An averaged Chowla and Elliott conjecture along independent polynomials.**
International Mathematics Research Notices, **2018**, no. 12, (2018), 3721-3743.
16. **Weighted multiple ergodic averages and correlation sequences** (with B. Host).
Ergodic Theory and Dynamical Systems, **38**, no. 1, (2018), 81-142.
17. **Under recurrence in the Khintchine recurrence theorem** (with M. Boshernitzan, M. Wierdl).
Israel Journal of Mathematics, **222**, (2017), 815-840.
18. **Multiple ergodic theorems for arithmetic sets** (with B. Host).
Transactions of the American Mathematical Society, **369**, (2017), 7085-7105.
19. **Higher order Fourier analysis of multiplicative functions and applications** (with B. Host).
Journal of the American Mathematical Society, **30**, (2017), 67-157.
20. **Some open problems on multiple ergodic averages.**
Bulletin of the Hellenic Mathematical Society, **60**, (2016), 41-90.
21. **Asymptotics of multilinear averages of multiplicative functions** (with B. Host).
Mathematical Proceedings of the Cambridge Philosophical Society, **161**, (2016), 87-101.

PUBLICATIONS (CONTINUED)

22. **Random differences in Szemerédi's theorem and related results** (with E. Lesigne, M. Wierdl). *Journal d'Analyse Mathématique*, **130**, (2016), 91-133.
23. **Multiple correlation sequences and nilsequences.** *Inventiones Mathematicae*, **202**, (2015), 875-892.
24. **Multiple recurrence for non-commuting transformations along rationally independent polynomials** (with P. Zorin-Kranich). *Ergodic Theory and Dynamical Systems*, **35**, (2015), 403-411.
25. **A multidimensional Szemerédi theorem for Hardy sequences of different growth.** *Transactions of the American Mathematical Society*, **367**, (2015), 5653-5692.
26. **The polynomial multidimensional Szemerédi theorem along shifted primes** (with B. Host, B. Kra). *Israel Journal of Mathematics*, **194**, (2013), 331-348.
27. **Random sequences and pointwise convergence of multiple ergodic averages** (with E. Lesigne, M. Wierdl). *Indiana University Mathematics Journal*, **61**, (2012), 585-617.
28. **Pointwise convergence for cubic and polynomial ergodic averages of non-commuting transformations** (with Q. Chu). *Ergodic Theory and Dynamical Systems*, **32**, (2012), 877-897.
29. **Ergodic averages of commuting transformations with distinct degree polynomial iterates** (with Q. Chu, B. Host). *Proceedings of the London Mathematical Society*, **102**, (2011), 801-842.
30. **Powers of sequences and convergence of ergodic means** (with M. Johnson, E. Lesigne, M. Wierdl). *Ergodic Theory and Dynamical Systems*, **30**, (2010), no. 5, 1431-1456.
31. **Multiple recurrence and convergence for Hardy sequences of polynomial growth.** *Journal d'Analyse Mathématique*, **112**, (2010), 79-135.
32. **Equidistribution of sparse sequences on nilmanifolds.** *Journal d'Analyse Mathématique*, **109**, (2009), 353-395.
33. **A Hardy field extension of Szemerédi's theorem** (with M. Wierdl). *Advances in Mathematics*, **222**, (2009), 1-43.
34. **Powers of sequences and recurrence** (with E. Lesigne, M. Wierdl). *Proceedings of the London Mathematical Society*, **98**, (2009) 504-530.
35. **Ergodic theory: Recurrence** (with R. McCutcheon). *Encyclopedia of Complexity and Systems Science*. Springer, (2009), Part 5, 3083-3095.
36. **Multiple ergodic averages for three polynomials and applications.** *Transactions of the American Mathematical Society*, **360**, (2008), 5435-5475.
37. **Multiple recurrence and convergence for sequences related to the prime numbers** (with B. Host, B. Kra). *J. Reine Angew. Math.*, **611**, (2007), 131-144.
38. **Uniformity in the polynomial Wiener-Wintner theorem.** *Ergodic Theory and Dynamical Systems*, **26**, Issue 4, (2006), 1061-1071.
39. **Ergodic averages for independent polynomials and applications** (with B. Kra). *Journal of the London Mathematical Society*, **74**, Issue 1, (2006), 131-142.
40. **On the degree of regularity of generalized van der Waerden triples** (with B. Landman, A. Robertson). *Advances in Applied Mathematics*, **37**, Issue 1, (2006), 124-128.
41. **Sets of k -recurrence but not $(k + 1)$ -recurrence** (with E. Lesigne, M. Wierdl). *Annales de l'Institut Fourier*, **56**, Issue 4, (2006), 839-849.
42. **Convergence of multiple ergodic averages for some commuting transformations** (with B. Kra). *Ergodic Theory and Dynamical Systems*, **25**, Issue 3, (2005), 799-809.
43. **Polynomial averages converge to the product of the integrals** (with B. Kra). *Israel Journal of Mathematics*, **148**, (2005), 267-276.
44. **The structure of strongly stationary systems.** *Journal d'Analyse Mathématique*, **93**, (2004), 359-388.
45. **Additive functions modulo a countable subgroup of \mathbb{R} .** *Colloquium Mathematicum*, **95**, Issue 1, (2003), 117-122.

PROFESSIONAL SERVICE

Refereed for the Journals: Advances in Mathematics, Algebra and Number Theory, American Journal of Mathematics, American Mathematical Monthly, Annals of Mathematics, Bulletin of the AMS, Bulletin of the London Mathematical Society, Compositio Mathematica, Contemporary Mathematics, Discrete Analysis, Discrete and Continuous Dynamical Systems, Duke Mathematical Journal, Ergodic Theory and Dynamical Systems, Fundamenta Mathematicae, Illinois Journal of Mathematics, Indagationes Mathematicae, International Journal of Number Theory, International Mathematics Research Notices, Inventiones Mathematicae, Israel Journal of Mathematics, Journal of the American Mathematical Society, Journal d'Analyse Mathématique, Journal of Number Theory, Monatshefte für Mathematik, Nonlinearity, Online Journal of Analytic Combinatorics, Proceedings of the American Mathematical Society, Proceedings of the London Mathematical Society, Quarterly Journal of Mathematics, Real Analysis Exchange, Studia Mathematica.

Organization of Scientific Meetings:

- 06/2023: Organized (with P. Candela, Y. Gutman, B. Szegedy) a conference “Nilpotent Structures in Topological Dynamics, Ergodic Theory, and Combinatorics, Bedlewo, Poland.
- 05/2016: Organized (with M. Kolountzakis, T. Mitsis, M. Papadimitrakis, A. Tertikas) the “15th Panhellenic Conference of Mathematical Analysis”, Crete, Greece.
<http://fourier.math.uoc.gr/pcma2016/>
- 07/2015: Organized (with B. Kra, J. Wolf) a conference “Ergodic Theory Meets Combinatorics”, Banff, Canada. <https://www.birs.ca/events/2015/5-day-workshops/15w5013>.
- 06/2013: Organized (with B. Kra) a conference “Ergodic Theory with Connections to Arithmetic”, Crete, Greece. <http://fourier.math.uoc.gr/~ergodic/>.
- 07/2012: Organized (with V. Bergelson, T. Tao, T. Ziegler) an advanced school (Arbeitsgemeinschaft) “Ergodic Theory and Combinatorial Number Theory”, Oberwolfach, Germany.
<http://www.mfo.de/occasion/1241>.
- 10/2006: Organized (with B. Kra, M. Wierdl) a special session in “Ergodic Theory” for the AMS sectional meeting in Cincinnati, USA.

Organization of Seminars:

- 2020-2022: Hellenic Mathematical Seminar, Joint with other Greek universities.
- 2012-2022: Analysis Seminar, University of Crete, Greece.
- 2006-2009: Ergodic Theory Seminar, University of Memphis, USA.
- 2002-2004: Dynamics and Geometry Seminar, Penn State University, USA.

Editorial Board:

- Transactions of the AMS (2023-)
- Memoirs of the AMS (2023-)
- Discrete Analysis (2020-)
- Bulletin of the Hellenic Mathematical Society (2016-)

Research Grant Panels Served:

- 2018-2022: Evaluator for EU HORIZON-MSCA-IF/PF
- 02/2008: Dynamical Systems NSF panel, Washington, USA.

TEACHING EXPERIENCE

University of Crete

2023-2024: Real Analysis, Fourier Analysis, Introduction to Ergodic theory.
2022-2023: Real Analysis, Measure Theory (Grad).
2021-2022: Calculus of a Single Variable, Functional Analysis (Grad).
2020-2021: Real Analysis, Functional Analysis, Probability Theory (Grad).
2019-2020: Analysis I, Analysis II.
2018-2019: Measure Theory (Grad), Analysis II.
2017-2018: Ergodic Theory (Grad), Calculus of a Single Variable, Stochastic Processes.
2016-2017: Calculus of a Single Variable.
2015-2016: Complex Analysis (Grad), Fourier Analysis, Analysis I.
2014-2015: Functional Analysis (Grad), Real Analysis, Calculus of a Single Variable.
2013-2014: Ergodic Theory (Grad), Probability II, Functional Analysis.
2012-2013: Probability Theory (Grad), Complex Analysis I, Analysis I.
2011-2012: Fourier Analysis, Analysis I, Calculus of a Single Variable.
2010-2011: Measure Theory (Grad), Real Analysis, Analysis II, Ergodic Theory (Grad).
2009-2010: Calculus I (TETY), Functional Analysis, Calculus of a Single Variable.

University of Memphis

2008-2009: Foundations of Mathematics, Calculus.
2007-2008: Complex Analysis (Grad), Calculus, Ergodic Ramsey Theory (Grad).
2006-2007: Introductory Algebra, Calculus, Abstract Algebra.

Pennsylvania State University

2004-2005: Matrix Algebra, Real Analysis & Ordinary Differential Equations.
2003-2004: Discrete Mathematics, Ergodic Theory (Grad).
2002-2003: Ordinary Differential Equations, Introduction to Real Analysis.

SUPERVISION OF PHD AND POSTDOCTORAL STUDENTS

Redmond McNamara, *University of Crete*, Postdoctoral student, 2023-.
Borys Kuca, *University of Crete*, Postdoctoral student, 2022-2023.
Konstantinos Tsinas, *University of Crete*, Phd student, 2020-.

INVITED TALKS

07/2024: *European Congress of Mathematics*, Invited Speaker, Seville.
07/2023: *International Congress of Basic Science*, Frontier of Science award talk, Beijing.
06/2023: *Conference "Zurich Dynamics"*, University of Zurich.
04/2023: *Northwestern University*, Dynamical Systems Seminar, Evanston.
03/2023: *University of Georgia*, Analysis Seminar, Online.
03/2023: *Institute for Advanced Study*, Conference in Dynamics and Discrete Analysis, Princeton.
02/2023: *Institute for Advanced Study*, Special Year Seminar, Princeton.
10/2022: *Clemson University*, Dynamical Systems Seminar, Online.
06/2022: *2nd Congress of Greek Mathematicians*, Athens.
04/2022: *Rutgers University*, Ergodic Theory and Analysis Seminar, Online.
03/2022: *AMS Sectional Meeting*, Ergodic Theory, Harmonic Analysis and Combinatorics, Online.
03/2022: *Workshop in memory of M. Boshernitzan*, Rice University, Houston.

INVITED TALKS (CONTINUED)

- 03/2022: *Workshop in memory of D. Gatzouras*, University of Athens.
- 06/2021: *Paris VI - Jussieu*, Paris Dynamics Seminar, Online.
- 04/2021: *University of Torun*, Ergodic Theory Seminar, Online.
- 12/2020: *Ohio State University*, Ergodic Theory Seminar, Online.
- 07/2020: *Webinar in Additive Combinatorics (WAC)*, UK, Online.
- 05/2020: *Northwestern University*, Virtual Seminar in Dynamics, Online.
- 01/2020: *University of Thessaloniki*, Analysis Seminar, Thessaloniki.
- 01/2020: *University of Cyprus*, Colloquium, Nicosia.
- 10/2019: *Conference "Dynamics, Geometry and Combinatorics"*, Bernoulli Center, Lausanne.
- 07/2019: *Conference "31st Journées Arithmétiques"*, Plenary Speaker, Istanbul.
- 05/2019: *Conference "Théorie Ergodique, Probabilités, et Interactions Journées"*, Tours.
- 12/2018: *Conference "Sarnak's Conjecture"*, American Institute of Mathematics, San Jose.
- 06/2018: *Conference "Ergodic Aspects of Modern Dynamics"*, Bedlewo.
- 05/2018: *Princeton University*, Colloquium, Princeton.
- 05/2018: *Conference "Probability in Number Theory"*, Montreal.
- 04/2018: *University College London*, Number Theory Seminar, London.
- 12/2017: *Conference "Mathematical Analysis in Athens"*, University of Athens, Athens.
- 09/2017: *Paris VI - Jussieu*, Ergodic Theory Seminar, Paris.
- 06/2017: *Conference "Modern Trends in the Ergodic Theory of Dynamical Systems"*, Rome.
- 05/2017: *Conference "Analysis Days"*, University of Crete, Heraklion.
- 04/2017: *Rice University*, Dynamical Systems Seminar, Houston.
- 04/2017: *Northwestern University*, Dynamical Systems Seminar, Evanston.
- 12/2016: *Conference "Ergodic Theory and Connections with Arithmetic and Combinatorics"*, Luminy.
- 07/2016: *Conference "Ergodic Theory and its Applications"*, University of Sydney, Sydney.
- 06/2016: *National Technical University of Athens*, Analysis Seminar, Athens.
- 05/2016: *Panhellenic Conference in Analysis*, University of Crete, Heraklion.
- 05/2016: *Conference "Randomness and Determinism in Number Theory"*, TU Wien.
- 11/2015: *Conference "Ergodic Theory and Dynamical Systems"*, IMPAN, Bedlewo.
- 06/2015: *Conference "Ergodic Theory and Combinatorics"*, University of Adger, Kristiansand.
- 05/2015: *Conference "Ergodic Theory and Applications in Probability"*, Ben Gurion University, Eilat.
- 05/2015: *Conference "Universal Functions"*, University of Crete, Heraklion.
- 09/2014: *Conference "New Horizons in Additive Combinatorics"*, CRM, Montreal.
- 07/2014: *Conference "Dynamics and Numbers"*, Max Planck Institute, Bonn.
- 07/2014: *Conference "Pseudorandomness in Number Theory"*, CIRM, Luminy.
- 05/2014: *Conference "Ergodic Theory and Dynamical Systems"*, Torun.
- 10/2013: *University of Cyprus*, Colloquium, Nicosia.
- 04/2013: *ETH Zurich*, Algebra and Combinatorics Seminar, Zurich.
- 06/2012: *Conference "Modern Trends in Dynamics"*, Uppsala.
- 04/2012: *Paris VI - Jussieu*, Ergodic Theory Seminar, Paris.
- 11/2011: *University of Athens*, Analysis Seminar, Athens.
- 11/2011: *Conference "Dynamics and Combinatorics"*, ESI, Vienna.
- 06/2011: *Conference "Measurable and Topological Dynamics"*, Huangshan City.
- 04/2011: *Conference "Trends in Dynamics"*, Northwestern University, Evanston.
- 10/2010: *Conference "Analysis for Young Researchers"*, University of Athens, Athens.
- 10/2010: *Conference "Spectral Theory of Dynamical Systems"*, Warsaw.

INVITED TALKS (CONTINUED)

- 09/2010: *University of Toronto*, Analysis Seminar, Toronto.
04/2010: *University of Athens*, Analysis Seminar, Athens.
05/2009: *University of Renne*, Ergodic Theory Seminar, Renne.
05/2009: *University Francois-Rabelais (Tours)*, Ergodic Theory Seminar, Tours.
05/2009: *Paris VI - Jussieu*, Ergodic Theory Seminar, Paris.
04/2009: *Ohio State University*, Ergodic and Probability Theory Seminar, Columbus.
03/2009: *AMS Sectional Mathematics Meeting, Special Session in "Ergodic Theory"*, Urbana-Champaign.
03/2009: *AMS Sectional Mathematics Meeting, Special Session in "Number Theory"*, Urbana-Champaign.
01/2009: *University of Memphis*, Ergodic Theory Seminar, Memphis.
08/2008: *Conference "Ergodic Theory and Additive Combinatorics"*, MSRI, Berkeley.
05/2008: *Northwestern University*, Dynamical Systems Seminar, Evanston.
04/2008: *Institute for Advanced Study*, Analysis Seminar, Princeton.
04/2008: *Conference "Additive Combinatorics and Harmonic Analysis"*, Fields Institute, Toronto.
03/2008: *"Erdős Conference"*, University of Memphis, Memphis.
01/2008: *University of Memphis*, Ergodic Theory Seminar, Memphis.
10/2007: *Conference "New Developments in Harmonic Analysis"*, University of Georgia, Athens.
10/2007: *AMS Sectional Mathematics Meeting, Special Session in "Ergodic Theory"*, Chicago.
05/2007: *California Institute of Technology*, Number Theory Seminar, Pasadena.
11/2006: *University of Memphis*, Ergodic Theory Seminar, Memphis.
10/2006: *Georgia Institute of Technology*, Analysis Seminar, Atlanta.
04/2006: *Conference "Additive Combinatorics"*, Montreal.
03/2006: *Institute for Advanced Study*, Analysis Seminar, Princeton.
12/2005: *CMS Joint Mathematics Meeting, Special Session in "Ergodic Theory"*, Victoria.
11/2005: *Conference "Dynamical Systems"*, Northwestern University, Evanston.
10/2005: *Institute for Advanced Study*, Analysis Seminar, Princeton.
05/2005: *Northwestern University*, Dynamics Seminar, Evanston.
05/2005: *University of California at Los Angeles*, Analysis Seminar, Los Angeles.
03/2005: *Conference "Dynamical Systems and Related Topics"*, University of Maryland, College Park.
03/2005: *University of Memphis*, Colloquium, Memphis.
02/2005: *Penn State University*, Dynamics Seminar, State College.
08/2004: *University of Crete (Greece)*, Analysis Seminar, Heraklion.
03/2004: *Conference "Dynamical Systems and Related Topics"*, University of Maryland, College Park.
02/2004: *Conference "Ergodic Theory"*, University of North Carolina, Chapel Hill.
01/2004: *AMS Joint Mathematics Meeting, Special Session in "Ergodic Theory"*, Phoenix.
12/2003: *Penn State University*, Dynamics Seminar, State College.
11/2003: *Ohio State University*, Ergodic Theory and Probability Seminar, Columbus.
01/2003: *Penn State University*, Dynamics Seminar, State College.
03/2002: *Conference "Dynamical Systems and Related Topics"*, University of Maryland, College Park.
02/2002: *Ohio State University*, Ergodic Theory and Probability Seminar, Columbus.