Mathematics Department
Princeton University – Fine Hall
Washington Road
Princeton, NJ 08544-1000

Phone: (609)258-6454
Email: jonfick@princeton.edu

Education

PhD in Mathematics, Rice University, Advisor: William A. Veech, 2011.
BS in Computer Science & Mathematics, University of Texas at Dallas, 2006.

Employment

Senior Lecturer, Princeton University, 2023 – present.
Associate Research Scholar, Princeton University, 2017 – 2023.
Senior Lecturer, Princeton University, 2015 – 2017.
Instructor, Princeton University, 2011 – 2015.

Industry Experience (Last Update: 2018-01-11[†])

Consulting Research Staff Member, 2016 – present.
Institute for Defense Analyses - Center for Computing Sciences
Full time researcher during SCAMP 2016, June – August 2016.
Full time researcher during SCAMP 2017, June – August 2017.
Clearance: SCI with polygraph
Internal Publications:
2 papers from SCAMP 2016
1 paper from SCAMP 2017
1 additional paper
1 paper in progress
[†]Updates to this section must undergo a review process.

Research Interests

Interval Exchange Transformations, Rauzy Classes, the Teichmüller Geodesic Flow, Symbolic Dynamics and Low-Complexity Systems.

Publications

Self-Inverses In Rauzy Classes, PhD thesis, Rice University.

Self-Inverses, Lagrangian Permutations and Minimal Interval Exchange Transformations with Many Ergodic Measures, Communications in Contemporary Mathematics, 16(01):1350019, 2014.

Topological mixing for some residual sets of interval exchange transformations, joint with Jon Chaika, Communications in Mathematical Physics, 333(1):483-503, 2015.

A Combinatorial Proof of the Kontsevich-Zorich-Boissy Classification of Rauzy Classes, Discrete and Continuous Dynamical Systems - series A, 36(4):1983–2025, 2016.

On the Number of Ergodic Measures for Minimal Shifts with Eventually Constant Complexity Growth, joint with Michael Damron, Ergodic Theory and Dynamical Systems, 37(7):2099–2130, 2017.

On Rauzy Induction: An Answer to Bufetov's General Question, Bulletin de la Société Mathématique de France, 145(4): 603–621, 2017.

The Number of Ergodic Measures for Transitive Subshifts Under the Regular Bispecial Condition, joint with Michael Damron, Ergodic Theory and Dynamical Systems, 42(1): 86–140, 2022.

Decoding Rauzy Induction: An Effective Answer to Bufetov's Question, Discrete and Continuous Dynamical Systems, 43(12): 4193–4222, 2023.

Preprints

Bounding Partial Rigidity in Rank-One Systems, with Kelly Yancey (in preparation).

On the Number of Generic Measures for Point-Transitive Shifts with Linear Complexity Growth (in preparation).

Labeled and Non-labeled Extended Rauzy Classes, available on arXiv.

Awards

Junior Faculty Teaching Award, Princeton Mathematics Department, 2020.

250$^{\text{th}}$ Anniversary Fund for Innovation in Undergraduate Education, Princeton University, 2017.

250$^{\text{th}}$ Anniversary Fund for Innovation in Undergraduate Education, Princeton University, 2016.

Junior Faculty Teaching Award, Princeton Mathematics Department, 2013.

Departmental Service

Department curriculum committee, Fall 2022–present.

Acting assistant co-director of undergraduate studies, 2022–2023 AY.

Course head, co-designer and co-administrator of *MAT (I)NFO* orientation, Falls 2019 – 2023.

Grading Standards Review Committee, Spring 2021.

Canvas Learning Management System early adopter liaison, Spring 2020.

Advisor for undergraduate research in game theory, Summer 2018.
Co-designer and co-administrator of the *Calculus Placement Exam*, `edge.edx.org`, Fall 2017 – Spring 2019.
Co-designer and co-administrator of the *Exam Archive Website*, `exams.math.princeton.edu`, 2016 – present.
Assistant advisor to undergraduate majors, 2015 – 2017.
Junior Faculty Teaching Award Committee, 2015 & 2016.
Organizer & Co-chair, Ergodic Theory and Statistical Mechanics Seminar, Princeton University, Spring 2012 – 2020.

University Service

Head of SIFP/FSI Math Table, Spring 2022.
Faculty Advisor for New College West (formerly First College and Wilson College), 2019 – present.
Co-head and co-designer of Freshman Scholars Connect & Solve, Summer 2019.
Summer Institute on Equity in the Academic Experience participant, Georgetown University, Summer 2019.
Learning Management System Evaluations Project member, Spring 2019.

Academic Service

Referee: Annales de l'Institut Fourier, Discrete and Continuous Dynamical Systems, Ergodic Theory and Dynamical Systems, Illinois Journal of Mathematics, Israel Journal of Mathematics, Journal d'Analyse Mathematique, Journal of the European Mathematical Society, Journal of the London Mathematical Society, Journal of Modern Dynamics, Monatshefte fuer Mathematik, Real Analysis Exchange
Mathematical Reviews for MathSciNet, 2016 – 2019.

Recently Attended Conferences (2015–present)

American Mathematical Society 2024 Fall Eastern Sectional Meeting, University at Albany, New York, Fall 2024.[I]
Low Complexity Dynamical Systems, Brin Mathematics Research Center, University of Maryland, Fall 2023.[I]
Ergodic Theory and its Connections: A Conference in Honor of the Legacy of Michael Boshernitzan, Rice University, Spring 2022.
Expanding Dynamics IX, Winter 2021.[IR]
Algebraic and Combinatorial Invariants of Subshifts and Tilings, Centre International de Rencontres Mathématiques, Winter 2021.[IR]
Workshop on Dynamical Systems and Related Topics, University of Maryland, Spring 2018.[I]
Combinatorics on Words, Centre International de Rencontres Mathématiques, Spring 2016.[I]
AMS Spring Southeastern Sectional Meeting, Spring 2016.[I]
Rocky Mountain Dynamical Systems Conference, Summer 2015.

[I]Invited Speaker. [P]Participated in Poster Session. [R]Remote Attendance.

Recent Invited Lectures (2015–present)

Rigidity in Rank-One Systems: Part 1,
University at Albany, New York, October 19 2024.
Generic Measures for recurrent subshifts with strictly linear complexity,
Brin Mathematics Research Center, University of Maryland, October 4 2023.
Bounding Partial Rigidity in Rank-One Systems,
Expanding Dynamics IX, February 23 2021.
Number of Ergodic and Generic Measures for Minimal Subshifts,
Centre International de Rencontres Mathématiques, January 12 2021.
Symbolic Dynamics for Interval Exchange Transformations,
Laboratoire de combinatoire et d'informatique mathématique de l'UQAM, May 25 2018.
Bounding Measures for Low Complexity Subshifts,
University of Maryland, April 5 2018.
Ergodic Measures for (sub)shifts with eventually constant complexity growth,
University of Texas at Dallas, April 22 2016, Centre International de Rencontres Mathématiques, March 17 2016, Georgia Institute of Technology, November 6 2015 and University of Maryland, September 10 2015.
Bufetov's question on Rauzy induction and self-similar interval exchange transformations,
Fédération de Recherche des Unités de Mathématiques de Marseille, March 18, 2016.
The number of ergodic measures for minimal shifts of low complexity II - shifts related to interval exchange transformations,
AMS Spring Southeastern Sectional Meeting, March 5 2016.
Interval Exchange Transformations and Similar Shifts,
University of North Texas, November 2 2015.
Boshernitzan's Bound for Shifts with Eventually Constant Growth,
Northwestern University, May 12 2015.
A Bound of Boshernitzan,
University of Utah, April 22 2015, Graduate Center of City University of New York, April 17 2015 and Rice University, March 17 2015.
On Rauzy Induction: A Quantitative Answer to Bufetov's Question,
Penn State University, February 2 2015.

Teaching Experience

Undergraduate Advising (Princeton University)

Judah Koslowe, Class of 2022.
2021 Summer Reading Course on Automatic Sequences.
Ryan Arbon, Class of 2021.
2020 Summer Reading Course on Dynamical Systems.
Joy Hii, Class of 2019.
Designing a smarter online learning system for MAT 103: Calculus I, senior thesis.
Casandra Monroe, Class of 2018.
Mellon Mays Fellowship advisor.
Billy Fang, Class of 2015.
Criteria for Unique Ergodicity of Symbolic Dynamical Systems, senior thesis.
Russell Jack Jenkins, Class of 2015.
Bufetov's Question for General Products, senior thesis.
George Kerchev, Class of 2014.
On the asymptotic behavior of functions arising from the Ising model, senior thesis.
Jane Wang, Class of 2014.
Almost strong mixing group actions in topological dynamics, senior thesis.

Courses (Princeton University)

Calculus I, Falls 2011, 2012$^{\mathbf{H}}$, 2014$^{\mathbf{H}}$, 2015$^{\mathbf{H}}$, 2016$^{\mathbf{H}}$, 2017$^{\mathbf{H}}$, 2018$^{\mathbf{H}}$, 2024$^{\mathbf{H}}$, Spring 2024$^{\mathbf{H}}$.
Multivariable Calculus, Falls 2022$^{\mathbf{H}}$, 2023$^{\mathbf{H}}$, Spring 2023$^{\mathbf{H}}$.
Calculus II, Falls 2019$^{\mathbf{H}}$, 2020$^{\mathbf{H}}$, 2021$^{\mathbf{H}}$, Springs 2017$^{\mathbf{H}}$, 2019, Summers 2019$^{\mathbf{H}}$, 2020$^{\mathbf{S}}$, 2021$^{\mathbf{H}}$, 2022$^{\mathbf{H}}$.
Theory of Games, Springs 2016$^{\mathbf{S}}$, 2017$^{\mathbf{S}}$, 2018$^{\mathbf{S}}$, 2019$^{\mathbf{S}}$, 2021$^{\mathbf{S}}$, 2022$^{\mathbf{S}}$, 2025$^{\mathbf{S}}$.
Problem Solving in Mathematics$^{\mathbf{D}}$, Summers 2012$^{\mathbf{H}}$, 2013$^{\mathbf{H}}$, 2014$^{\mathbf{H}}$.
Analysis in a Single Variable, Spring 2014$^{\mathbf{S}}$.
Junior Seminar: Ergodic and Dynamic Properties of Shift Spaces$^{\mathbf{D}}$, Spring 2014.
Complex Analysis with Applications, Fall 2013$^{\mathbf{S}}$.
Analysis I: Fourier Series and Partial Differential Equations, Spring 2013$^{\mathbf{S}}$.
Advanced Linear Algebra with Applications, Spring 2012.
$^{\mathbf{D}}$Designed course. $^{\mathbf{H}}$Course head. $^{\mathbf{S}}$Sole instructor.