

Dr. Dan Rust

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Education

- **Ph.D. in Mathematics** **Leicester, UK**
University of Leicester 2012 – 2016
 - **Supervisor:** Prof. Alex Clark
 - **MMath** **Manchester, UK**
University of Manchester 2008 – 2012
 - Master of mathematics with first class honours
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Positions

- **Postdoctoral Research Associate** **Bielefeld, Germany**
Faculty of Mathematics, Bielefeld University, Group of Prof. Michael Baake Apr 2016 – present
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Publications

- **Published**
 - Shifts of finite type and random substitutions (with Philipp Gohlke and Timo Spindeler)
Discrete & Continuous Dynamical Systems (2018) - In print
 - Dynamical systems arising from random substitutions (with Timo Spindeler)
Indagationes Mathematicae **29**(4), 1131–1155 (2018)
 - Beyond primitivity for one-dimensional substitution subshifts and tiling spaces (with Gregory R. Maloney)
Ergodic Theory and Dynamical systems **38**(3), 1086–1117 (2018)
 - Computations for symbolic substitutions (with Scott Balchin)
Journal of Integer Sequences **20**, Article 17.4.1 (2017)
 - An uncountable set of tiling spaces with distinct cohomology
Topology and its Applications **205**, 58–81 (2016)
 - **Preprints**
 - A modification of Wythoff's Nim (with Robbert Fokkink)
arxiv: 1904.08339 (2019)
 - Periodic points in random substitution subshifts
arxiv: 1808.05934 (2018)
 - **In Preparation**
 - Extended symmetries of algebraic subshifts (with Robbert Fokkink and Reem Yassawi)
 - Topological mixing for random substitutions (with Eden Delight P. Miro and Gwendolyn Tadeo)
 - Automorphism groups of random substitution subshifts (with Robbert Fokkink and Gwendolyn Tadeo)
 - Substitution subshifts over infinite alphabets (with Neil Manibo)
 - Codimension-one cut-and-project tilings and ordered cohomology (with Jamie Walton)
 - **Thesis**
 - Cohomology of tiling spaces: beyond primitive substitutions (2016)
Supervised by Prof. Alex Clark, University of Leicester
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Invited Talks

- **Expansions and Substitutions** **Utrecht, Netherlands**
May, 2019
Utrecht University
 - Beyond primitivity for substitutions
- **Open University Mathematics Departmental Seminar** (invited by Uwe Grimm) **Milton Keynes, UK**
Nov, 2018
Open University
 - Aperiodic tilings and ordered cohomology
- **Swansea Topology and Geometry Seminar** (invited by Jeff Giansiracua) **Swansea, UK**
Nov, 2018
Swansea University
 - Aperiodic tilings and ordered cohomology
- **Workshop on the spectral analysis of subshifts** **Amiens, France**
Jun, 2018
Universities of Picardie Jules Verne
 - Recent progress on the dynamics of random substitutions
- **Spectral Structures and Topological Methods in Mathematical Quasicrystals** **Oberwolfach, Germany**
Oct, 2017
Mathematisches Forschungsinstitut Oberwolfach
 - Recent progress and open problems in random substitution
- **Aperiodic Patterns in Crystals, Numbers and Symbols** **Leiden, Netherlands**
Jun, 2017
Lorentz Center@Oort, Leiden University
 - Random substitutions
- **Workshop on Aperiodic Order: Enumeration Problems, Dynamics, and Topology** **Bielefeld, Germany**
May, 2017
Bielefeld University
 - Topological entropy of random substitution subshifts
- **Birmingham Topology and Dynamics Seminar** (invited by Chris Good) **Birmingham, UK**
Apr, 2017
Birmingham University
 - The Strange Topology of Aperiodic Tilings (and their cohomology)
- **51st Spring Topology and Dynamical Systems Conference** **Jersey City, NJ, USA**
Mar, 2017
New Jersey City University
 - Declined
- **Jena Dynamical Systems & Mathematical Physics seminar** (invited by Daniel Lenz) **Jena, Germany**
Nov, 2016
Friedrich-Schiller-Universität
 - Ordered cohomology and co-dimension one cut and project sets
- **30th Summer Conference on Topology and its Applications** **Galway, Ireland**
Jun, 2015
National University of Ireland
 - Uncountable collections of cohomology groups for tiling spaces
- **Workshop on Aperiodic Order** **Leicester, UK**
Jan, 2015
University of Leicester
 - Barge–Diamond approximants for multi-substitution tiling spaces

Contributed Talks and Seminars

- **Workshop on Topology in Dynamics** **Leicester, UK**
Apr, 2017
University of Leicester
 - Dynamics of stochastic substitution subshifts
- **19th Galway Topology Colloquium** **Leicester, UK**
Aug, 2016
University of Leicester
 - Elevator pitch session—an introduction to my research

- **Dynamical Systems for Aperiodicity** **Lyon, France**
Université Claude Bernard Lyon 1 *Jan, 2016*
 - Non-minimal Substitution Tiling Spaces and Cohomology
- **Young Topologists' Meeting** **Ecublens, Switzerland**
EPFL *Jul, 2015*
 - The strange topology of aperiodic tilings and their cohomology
- **The 18th Galway Colloquium** **Galway, Ireland**
National University of Ireland *Jun, 2015*
 - What do I study? What questions am I thinking about?
- **Internal Ph.D. Student Seminar** **Leicester, UK**
University of Leicester *2013 – 2015*
 - The hairy business of braids and fiber bundles
 - Braid groups on surfaces
 - Topological quantum field theories and their applications in knot theory
 - TQFTs and Frobenius algebras
 - Knot theory and Khovanov homology
 - The new world order(ed groups): symbolic dynamics and substitutions
 - Grout: A program for calculating topological invariants of letter substitutions
 - Seifert surfaces and the fundamental theorem of knot theory

Chaired Sessions

- **19th Galway Topology Colloquium** **Leicester, UK**
University of Leicester *Aug, 2016*
 - Elevator Pitch Session
- **Arbeitsgemeinschaft: Mathematical Quasicrystals** **Oberwolfach, Germany**
MFO, Oberwolfach Research Institute for Mathematics *Oct, 2015*
 - Diffraction I & Diffraction II

Teaching

- **Lecturer**
 - Mathematics for Natural Sciences II — Summer semester 2019
 - Mathematics for Natural Sciences I — Winter semester 2018
 - Ergodic Theory — Summer semester 2018
 - Optimisation for Economics — Winter semester 2017
- **Tutor**
 - Elementary Number Theory — Summer semester 2017
 - Optimisation for Economics — Winter semester 2016
- **Teaching Assistant** 2012 – 2016
 - Linear Algebra
 - Calculus and Analysis
 - Abstract Algebra
 - Coding Theory
 - Set Theory
 - Markov Chains
- **Certification** 2012
 - Higher Education Academy STEM (Maths, Stats & OR): Teaching Skills Workshop for Postgraduates who Teach

Students

- **Gwendolyn Tadeo** (co-supervised with Dr. Eden Delight P. Miro) Ph.D. 2017 – *present*
Ateneo de Manila University, the Philippines
Ph.D. Project title: Mixing properties of Random Substitutions
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Grants and Funding Awarded

- **The Netherlands Organisation for Scientific Research (NWO)**
Visitor's Travel Grant
TU Delft, the Netherlands, March–May 2019, (ca. €1850)
 - **London Mathematical Society**
Conference Grant - Scheme 1
Model Sets and Aperiodic Order, Durham, 2018, (ca. £4500)
 - **Bielefeld University**
Conference supplementary funding
Model Sets and Aperiodic Order, Durham, 2018, (ca. €10,000)
 - **London Mathematical Society**
Postgraduate Research Conference Grant - Scheme 8
19th Galway Topology Colloquium, Leicester, 2016, (ca. £4000)
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Department and Community Involvement

- Member of SFB 1283 (Collaborative Research Center) – Taming uncertainty and profiting from randomness and low regularity in analysis, stochastics and their applications, Bielefeld University
 - Organiser and grant applicant for the Model Sets and Aperiodic Order conference in Durham, 2018
 - Organiser for the Mini-Workshop on Diffraction Measures of Aperiodic Structures in Bielefeld, 2018
 - Co-founder and Organiser of the SYMBoL seminar series at Bielefeld University
 - Organiser of the weekly postgraduate seminar on tilings and aperiodic order at Bielefeld University
 - Local organiser and principal grant applicant for the 19th Galway Topology Colloquium
 - Local assistant and website designer for the 31st Summer Conference on Topology and its Applications
 - Founder and previous organiser of the University of Leicester mathematics Ph.D. student internal seminar
 - President of the University of Leicester Postgraduate Maths Society 2014–2015
 - Associate member of the London Mathematical Society
 - Regular attendee of the Transpennine Topology Triangle meetings
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Personal

Nationality: British citizen

Date of birth: 24 December 1989

References

Prof. Michael Baake: Faculty of Mathematics
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