

Professional CV

Department of Mathematics
University of Arkansas
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Nationality: British

Research Interests

- Aperiodic Tilings and Discrete Geometry, especially relating to substitutions.
The links between the combinatorics and geometry of substitutions and their number theoretic properties.
- Genomic signatures, that use subword frequencies of DNA strings to determine species and relatedness.
- Computer Visualisation of Mathematics.
- Mathematical Art

Education

1990 – 1995 Malvern College, Worcs, UK
1996 – 2000 MMath (1st Class), University of Warwick, UK
Final Year Project: Phased Array Antenna with Quasi-periodically spaced elements
Advisor: Dr J S W Lamb
2000 – 2004 PhD, Imperial College, London, UK
Thesis Title: On Canonical substitution tilings
Supervisor: Dr J S W Lamb

Employment History

2004 – 2006 Postdoctoral Research Assistant
Queen Mary, University of London
Working with Dr O Jenkinson on Ergodic optimisation.
2006 – 2009 EPSRC Postdoctoral Fellowship in Mathematical Sciences
Imperial College London
2009 – 2009 Research Assistant
Open University
2009 – 2010 Teaching Fellow
University of Leicester
2010 – Present Visiting Professor
University of Arkansas

Grants

2000 EPSRC Doctoral Training Grant
2004 JSPS Postdoctoral Fellowship for Foreign Researchers £5000
2005 EPSRC Postdoctoral Fellowship in Mathematical Sciences: EP/H004866/1 £123,295
2009 EPSRC Public Engagement Grant: EP/H004866/1 £20,000
PI Uwe Grimm
2010 LMS Small Education Grant £600
2010 Royal Society Travel Grant £663

Professional Memberships

American Mathematical Society, London Mathematical Society, British Interactive Group

Publications

Published

- P ARNOUX, E O HARRISS, S ITO, and M FURUKADO. Algebraic numbers and group automorphisms. *Accepted, Transactions of the AMS*.
- E O HARRISS and O JENKINSON. Flattening functions on flowers. *Ergodic Theory Dynam. Systems*, 27(6):1865–1886, 2007.
- EDMUND HARRISS and WILFRID HODGES. Logic for Mathematical Writing. *Logic Jnl IGPL*, 15(4):313–320, 2007.
- E. O. HARRISS. Non-periodic rhomb substitution tilings that admit order n rotational symmetry. *Discrete Comput. Geom.*, 34(3):523–536, 2005.
- E O HARRISS and J S W LAMB. Canonical substitution tilings of Ammann-Beenker type. *Theoret. Comput. Sci.*, 319(1-3):241–279, 2004.
- E O HARRISS. *On Canonical Substitution Tilings*. PhD thesis, Imperial College London, 2004.
- E O HARRISS. How do shapes fill space? *iSquared Magazine*, 8, Summer 2009.
- E O HARRISS. How do shapes fill space? *BIG newsletter*, 10, July 2009.
- E O HARRISS. Constructing substitution rules. In V Berthé, D Damanik, and D Lenz, editors, *Proc. Oberwolfach Mini-Workshop: The Pisot Conjecture - From Substitution Dynamical Systems to Rauzy Fractals and Meyer Sets*, number 13/2009, pages 33–38. Mathematisches Forschungsinstitut Oberwolfach, 2009.
- E O HARRISS. The responsibilities of mathematicians. *Mathematics Today*, December 2008.
- E O HARRISS. Images of the ammann-beenker tiling. In R Sarhangil and J Barrallo, editors, *Bridges Donostia*, pages 377–378. Tarquin publications, 2007.
- M FIELD. Bridges london, 2006. *Notices Amer. Math. Soc.*, 54(6), 2007. Containing my image: Ammann Scaling

In preparation

- S AKIYAMA and E O HARRISS. Pentagon exchange dynamics. *In Preparation*.
- E O HARRISS and J S W LAMB. A survey of tilings of penrose type. *In Preparation*.
- E O HARRISS and D FRETTLÖH. Worms in parallelogram tilings. *In Preparation*.
- E O HARRISS and J S W LAMB. Tilings of penrose type. *In Preparation*.

Art Works and Shows

- 2005** Bridges London, UK
- 2006** Bridges Don Ostia, Spain
- 2007** Bridges Leeuwarden, Netherlands
- 2008** Blyth Gallery, Imperial College London
Arscie exhibition of art and science
My contribution: *Surfaces in 3 and 4 dimensions* now in the Common Room of the Mathematics Department, Imperial College London
- 2009** Constructive and Modular Art
Studio exhibition at the studio of Peter Lowe.
- 2009** Vestmanneajyar, Iceland
Sculpture System 5, built by local children.
- 2010** Jam Jar Collective, Leeds, UK
Sculpture System 5, built by participants at the 2010 Maker Faire in Newcastle
- 2010** Imperial College London
Wall designs for Mathematics Learning Centre

Academic Visitors

- 2007 Feb 17 – Feb 21** D Frettlöh, Universität Bielefeld, Germany
- 2007 Aug 28 – Sep 3** S Akiyama, University of Niigata, Japan

Academic Visits

- 2001** Jun 10 – 24 Czech Technical University, Prague
- 2002** Oct 4 – Nov 30 J-P Allouche, LRI, Université Paris-Sud, France
Nov 11 – 18 V Berthé, LIRM, Université Montpellier II, France
- 2003** Jan 4 – Mar 10 IMPA, Rio de Janeiro, Brazil
Dec 13 – 18 L Sadun, University of Texas at Austin, USA
- 2004** Feb 20 – 27 C Goodman-Strauss, University of Arkansas, USA
Mar 27 – Apr 28 S Ito, University of Kanazawa, Japan
Apr 28 – May 29 S Akiyama, University of Niigata, Japan
- 2005** Jun 5 – 9 L Zamboni, University of North Texas, Denton, USA
Jun 14 – 19 C Goodman-Strauss, University of Arkansas, USA
Aug 16 – Aug 20 J H Conway, Princeton University, USA
Nov 6 – Nov 12 D Frettlöh, Universität Bielefeld, Germany
- 2006** Sep 28 – Dec 3 Purdue University, Lafayette, IN, USA
Oct 25 – Nov 5 M Barge, University of Montana, Bozeman, USA
Nov 11 – 18 C Goodman-Strauss, University of Arkansas, USA
- 2007** Feb 16 – Mar 2 J S W Lamb, MSRI, Berkeley, CA, USA

	Mar 5 – 9	M Field, University of Houston, TX, USA
	Sep 4 – 10	C Goodman-Strauss, University of Arkansas, USA
	Sep 11 – 30	S Ito, University of Kanazawa, Japan
	Oct 1 – 5	S Akiyama, University of Niigata, Japan
2008	Oct 15 – Nov 14	IML, Marseille, France
	Dec 1 – Dec 4	D Frettlöh, Universität Bielefeld, Germany
2009	Jan 9 – Jan 19	S Edwards, Department of Organismic and Evolutionary Biology, Harvard, MA, USA
	Jan 20 – Jan 25	E Robinson, George Washington University, DC, USA
	Jan 27 – Feb 23	S Ito, Kanazawa Univeristiy, Japan
	Feb 2 – Feb 9	S Akiyama, Niigata Univeristiy, Japan
	Sept 15 – Sept 19	P Arnoux, Marseilles, France
2010	June 14 – June 17	J-M Gambaudo, Laboratoire J.A. Dieudonné, Université de Nice Sophia-Antipolis
	June 18 – June 29	S Akiyama, Niigata University, Japan
	June 30 – July 11	J Luo, Sun Yat Sen University, Guangzhou, China
	July 19 – July 22	J Kari, University of Turku, Finland

Outreach and Media Experience

2005 Mar – Present	Maintainer: Tilings Encyclopedia, an online reference for substitution tilings http://tilings.math.uni-bielefeld.de/
2010 June 8 – 9	How to talk Maths in Public, University of Manchester Invited Speaker: Building Mathematics
2010 May 27	Northfields Primary School Organiser/Presenter: Building Mathematics Day
2010 Mar 13 – 14	Maker Faire at Life, Newcastle Organiser: Exhibit ‘Building Mathematics’
2010 Feb 27	Brighton Science Festival Organiser: Exhibit ‘How do shapes fill space?’
2010 Feb 2	University of Leicester Organiser: Talking to Teachers Mathematics Meeting
2009 Jun 30 – Jul 4	Royal Society Summer Science Exhibition Organiser: Exhibit ‘How do shapes fill space?’ EPSRC grant: EP/H004866/1
2008 Sep 10 – Sep 13	World Knowledge Dialogue Symposium, Switzerland Young Scientist Bursary
2008 Jun 4	Royal Society, London, UK Media Communication Skills Course
2006 Mar 13	House of Commons, London Annual Presentations by Britain’s Top Younger Scientists, Engineers and Technologists

Teaching Experience

2010 Aug – Dec	University of Arkansas Lecturer: Mathematical Thought Investigation and individual project course inspiring non-mathematicians with mathematical thinking.
2010 Aug – Dec	University of Arkansas Lecturer: Differential Equations
2010 Jan – Apr	University of Leicester Lecturer: Communicating Maths 3rd/4th year course looking at how to communicate maths from teaching, to press releases to online tools.
2009 Sept – Dec	University of Leicester Lecturer: Building Geometry: Stream of Mathematical Investigations course Investigation style course where the students develop material on Geometry including the regular polytopes and hyperbolic geometry.
2009 Sept – Dec	University of Leicester Lecturer: Pure Maths at Work First Year course in mathematical thought
2007 Sep – Dec	Imperial College London Lecturer: MA3/4AP45 Tilings and Patterns Third/Fourth year mathematics course
2006 Jan – Mar	Queen Mary, University of London Teaching Assistant: Logic 1: Mathematical Writing

- 2005 Sep – Nov** Queen Mary, University of London
Participant in Thinking Writing: Strategies for improving writing through course and departmental teaching
Prof. David Russell
- 2005 Jan – Mar** Queen Mary, University of London
Teaching Assistant: Logic 1: Mathematical Writing

Computer Experience

- Packages: Mathematica, Adobe Illustrator, Adobe Photoshop, Blender, Rhino, Grasshopper, Drupal
- Languages: C, C++, LaTeX, php, Python

Other Experience

- 2010 Feb – Present** London Mathematical Society
Ad Hoc committee on Membership
- 2005 Jun – Present** Reviewer for Mathematical Reviews (of the AMS)
- 2008 Jul 30 – Aug 8** Imperial College London
Organiser (with J S W Lamb): Workshop on Computational and Combinatorial Aspects of Tilings
EPSRC grant: EP/G00871X
- 2007 Mar 2–4** Davidson College, NC, USA
Organiser (with C Goodman-Strauss and K Mann): Special Session on Computational and Combinatorial Aspects of Tiling and Substitutions, AMS Spring Southeastern Section Meeting
- 2001 Sep – 2003 Jun** Imperial College
Co-organiser: Mathematics Postgraduate Seminar

Seminars and Invited Talks

- 2001** Oct 23 Mathematics Postgraduate Seminar, Imperial College, London, UK
Quasi-crystals, aperiodic tilings and long-range order
- 2002** Aug 5 Aperiodic Order, Dynamical Systems, Operator Algebras and Topology
Poster: Canonical Substitution Tilings: The 4-2 Case
- Oct 24 Séminaire LIX-LRI, Université Paris-sud, France
Non-periodic tilings, substitutions and Sturmian words
- Nov 26 Séminaire général, Laboratoire d'informatique, Université de Marne la Vallée, Paris, France
Non-periodic tilings, substitutions and Sturmian words
- Nov 28 Séminaires de Dynamique, Université Paris-sud, France
Quasi-crystals, Substitutions and Non-periodic Tiling
- 2003** Jun 25 Groupe d'Etude sur la Numeration, Luminy, France
Substitution tilings of the Ammann-Beenker type
- Nov 25 Dynamical Systems Seminar, Queen Mary, University of London UK
Canonical Substitution Tilings
- Dec 3 LDSG Workshop on "Tilings and Symbolic Dynamics"
Canonical Substitution Tilings
- Dec 16 University of Texas at Austin, USA
Canonical Substitution Tilings
- 2004** Feb 25 University of Arkansas, Fayetteville, USA
Canonical Substitution Tilings
- Mar 11 Workshop on Beta-numeration, generalised substitutions and tilings
Substitution rules with more than two letters and simple projection structure
- May 25 Mathematics Seminar, Nara Women's University, Nara, Japan
Canonical Substitution Tilings
- Jul 6 Workshop on generalised substitutions
Non-PV morphisms and tilings of the plane
- Oct 20 Dynamics Seminar, University of Manchester
Some Aspects of the Penrose Tiling
- Nov 15 QMUL, Pure Maths Seminar
Regular Polytopes (with models and pictures)
- 2005** Mar 15 Numeration, Tilings, Substitutions
Understanding the Penrose tiling and other Canonical Substitution Tilings
- Aug 11 Summer School in Aperiodic Order
Understanding Canonical Substitution Tilings
- Oct 13 Pure Mathematics Colloquium, University of Leicester
Some Aspects of the Penrose Tiling
- Nov 9 Seminar Mathematik, Universität Bielefeld
Characterisation of substitutions for canonical projection tilings

	Dec 14	Workshop on Geometric Dynamics with Singularities Nonperiodic substitution tilings with polytope projection structure
2006	Mar 8	Generalized, substitutions, tilings and numeration Introducing the Encyclopedia of Substitution Rules
	Mar 24	Pure Mathematics Seminar, University of Liverpool Some aspects of the Penrose tiling.
	Mar 29	Wednesday Postgraduate Seminar, University of Birmingham Aperiodic Tilings
	Sep 26	Analysis Seminar, University of Purdue, IN, USA Some aspects of the Penrose tiling
	Oct 26	Mathematics Seminar, University of Montana, Bozeman, USA Canonical Substitution Tilings
2007	Mar 3	Special Session on Computational and Combinatorial Aspects of Tiling and Substitutions, AMS Spring Southeastern Section Meeting, Davidson, NC, USA Aspects of the Penrose Tiling
	Sept 27	Tilings and Beta Numerations, University of Kanazawa, Japan Constructing Pinwheel Tilings
2008	Mar 11	Ergodic Theory and Dynamical Systems Seminar, University of Warwick Rauzy Fractals from PV (Pisot) to Non-PV
	Apr 24	Geometry and Topology Seminar, University of Warwick Some aspects of the Penrose tiling
	Nov 4	ERNEST Seminar, IML, Marseille Some aspects of the Penrose tiling
	Nov 7	Baby-Teich Seminar, Marseille How to construct substitution rules
	Nov 19	Dynamics Seminar, University of Manchester Rauzy Fractals from PV (Pisot) to Non-PV
	Dec 3	Seminar Mathematik, Universität Bielefeld Rauzy Fractals from PV (Pisot) to Non-PV
2009	Jan 16	Museum of Comparative Zoology, Harvard, MA, USA Self-similar puzzles
	Jan 19	Brown University, RI, USA Some aspects of the Penrose tiling
	Jan 22	George Washington University Some aspects of the Penrose tiling
	Jan 23	George Washington University Rauzy Fractals from PV (Pisot) to Non-PV
	Feb 1	Ergodic Theory and Number Theory, Kanazawa University, Japan Prime Factorisation and Labelled Substitution Rules
	Feb 5	Niigata University, Japan Self-Similar Puzzles
	Apr 16	Icelandic Mathematical Society Aspects of the Penrose Tiling
	Apr 17	Reykjavík University Rauzy Fractals from PV to non-PV
2010	May 24	Pure Maths Colloquium, University of Durham Mysteries of Aperiodic Tilings
	May 24	Laboratoire J.A. Dieudonné, Université de Nice Sophia-Antipolis Mysteries of Aperiodic Tilings Recorded: http://podcast.unice.fr/Podcasts/2010-06-17/Edmund_Harriss_4-ipod.m4v
	June 21	Mathematics of Quasi-Periodic Order, RIMS, Kyoto University, Japan Finding Matching Rules
	June 24	Niigata University, Japan Tilings, Puzzles and the limits of mathematics
	July 6	Substitutive Tiling and Fractal Geometry, Sun Yat Sen University, Guangzhou, China Finding Matching Rules
	July 21	University of Turku, Finland The Mysteries of Aperiodic Tiling

Popular Talks

2007	May 8	Maths-Art Seminar, London Knowledge Lab Aspects of the Penrose Tiling
	July 27	Bridges Donostia, The University of The Basque Country, Spain Images of the Ammann-Beenker Tiling
2008	Nov 26	Open Scientific Discussion, Dept. of Engineering, University of Bristol Self-similar Puzzles

2009	Oct 21	Scientific Society, University of Oxford How do shapes fill space?
	Nov 14	FSCONS, Gothenburg, Sweden Street Maths
	Nov 24	Café Scientifique, Portsmouth, UK How do shapes fill space?
2010	Apr 22	Mathematics Masterclass, University of Leicester Building Geometry
	June 10	IMA Branch meeting The Mysteries of Aperiodic Tiling
	June 12	Rugby Group Meeting, Uppingham Building Geometry

Recent Conferences Attended

2000	Jul 4 – 8	Aperiodic 2000 Nijmegen, The Netherlands
2002	Aug 4 – 8	Aperiodic Order, Dynamical Systems, Operator Algebras and Topology Victoria, BC, Canada
2003	Jun 23 – 25	Groupe d'Etude sur la Numeration CIRM, Luminy, France
	Dec 3	LDSG Workshop on "Tilings and Symbolic Dynamics" Imperial College London, UK
2004	Mar 8 – 12	Workshop on Beta-numeration, generalised substitutions and tilings CIRM, Luminy, France
	Jul 5 – 14	Workshop on Generalised substitutions LIRM, Université Montpellier II, France
2005	Mar 14 – 18	Numeration, Tilings, Substitutions Université Joseph Fourier, Grenoble, France
	Aug 8 – 13	Summer School in Aperiodic Order University of Victoria, Victoria, Canada
	Dec 13 – 16	Workshop on Geometric Dynamics with Singularities University of Exeter, Exeter, UK
2006	Mar 6 – 10	Generalized, substitutions, tilings and numeration Université Joseph Fourier, Grenoble, France
	Aug 4 – 9	Bridges London London Knowledge Lab and Institute for Education, London, UK
2007	Mar 2–4	Special Session on Computational and Combinatorial Aspects of Tiling and Substitutions AMS Spring Southeastern Section Meeting Davidson, NC, USA
	June 10 – 16	Generalized substitutions, tilings and numeration Ile de Porquerolles, France
	July 24 – 27	Bridges Donostia The University of The Basque Country, San Sebastian (Donostia), Spain
2008	July 24 – July 28	Bridges Leeuwarden CHN University, Leeuwarden, Netherlands
	July 30 – Aug 8	Computational and Combinatorial aspects of Tilings Imperial College London, UK
	Sep 10 – Sep 13	World Knowledge Dialogue Symposium Crans Montana, Switzerland
2009	Sept 7 – Sep 11	Tiling Workshop University of Leicester, UK
	Nov 13 – Nov 15	FSCONS, Free Society and Nordic conference Chalmers University, Gothenburg, Sweden
2010	Feb 15 – Feb 19	Math-Info 2010: Multi-dimensional Subshifts and Tilings CIRM, Marseilles, France
	June 21 – June 23	Mathematics of Quasiperiodic Order RIMS, Kyoto University, Japan
	July 4 – July 11	Substitutive Tiling and Fractal Geometry Sun Yat Sen University, Guangzhou, China