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Dr Chris Good BA, MA (Oxon), DPhil (Oxon)

Reader in Pure Mathematics
Director of Education

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About

Chris Good is a Reader in Pure Mathematics at the University of Birmingham. Chris is the author of some 40 research articles in general topology, set-theoretic topology, and topological dynamics. He regularly collaborates with mathematicians around the world, including colleagues from Canada, New Zealand, Oman, Poland and the US, as well as from Oxford.

He has supervised a number of graduate students and organised many conferences in Birmingham, Oxford and Cambridge.Chris has a long standing interest in teaching and was awarded the first Head of School's Excellence in Teaching Award. He has played a leading role in the development of the School's curricula and is currently an Academic Associate of the Higher Education Academy.

School web page: **web.mat.bham.ac.uk/C.Good/ (http://web.mat.bham.ac.uk/C.Good/)**

Qualifications

- DPhil in Mathematics (Oxon) 1992
- MA (Oxon) 1991
- BA in Mathematics (Oxon) 1988

Biography

Chris studied Mathematics at the Queen's College, University of Oxford, graduating with first class honours in 1988. He completed his DPhil whilst a Junior Research Fellow at Wadham College before joining the School of Mathematics at the University of Birmingham in 1995. He was promoted to Senior Lecturer in 2001 and Reader in 2012.

Chris' early research was in the construction of counterexamples (often using set-theoretic methods) especially around the Dowker space question and the behaviour of normality in product spaces. He also looked at the role of the Axiom of Choice in topology and has worked extensively on generalised metric spaces, in particular g-functions and monotonicity.

More recently he has become interested in dynamical systems, in particular symbolic dynamics and the structure of invariant sets, and abstract topological dynamics.When he is not doing mathematics, Chris loves to cook, bake bread, play rugby, read, listen to music and spend time with his family. He is interested in politics and the natural world.

Teaching

- Single Honours Mathematics (G100, G103, G141)
- Mathematics Majors: Mathematics with Business Management (G1N2); Mathematics with Engineering (J920); Mathematics with Philosphy (G1V5)
- Joint Honours Mathematics: Mathematics & Computer Science (GG14); Pure Mathematics & Computer Science (GGC4); Mathematics & Sport Science (GC17); Mathematics & Music (GW13); Mathematics & Philosophy (GV15)
- Theoretical Physics and Applied Mathematics (FG31)
- Mathematics Minors: French Studies and Mathematics (GR11); German Studies and Mathematics (GR12)
- Natural Sciences (CFG0, FCG0)

Chris has taught over 16 different modules at all levels, ranging from Foundation Year Mathematics to advanced topics in pure mathematics such as General Topology, Complex Analysis and Discrete Dynamics.

He has supervised a significant number of undergraduate projects as well as some undergraduate Summer research projects. He introduced the First Year Enquiry Based Learning module 'Developing Mathematical Reasoning' based on the influential Moore Method with the aid of a grant from the Educational Advancement Foundation.

Postgraduate supervision

Chris is keen to supervise students in either set-theoretic and general topology or discrete dynamical systems and topological dynamics. Previous and current graduate students:

- Lylah Haynes, PhD (2006): Monotonizations of countable paracompactness.

- Tom Parker, MPhil (2007): Sharkovskii's theorem and chaotic dynamical systems.
- Andrew Barwell, PhD (2011): ω-limit sets of discrete dynamical systems.
- Syahida binti Che Dzul-Kifli is currently looking at definitions of chaos.
- Amna Ahmed is currently looking at the structure of continuous and order preserving maps on the rational numbers.
- Kyriakos Papadopoulos is currently looking at characterizations of ordinals.

Research

RESEARCH THEMES

- Topological dynamics: Even simple looking functions, such as the logistic or quadratic map, when iterated can exhibit complex and chaotic behaviour. This behaviour can be studied from a topological point of view.
- Abstract dynamics: Let T be a function from the set X to itself. Abstract dynamics asks under what conditions a structure can be imposed on X with respect to which T has some meaning. For example, one might ask whether a particular abstract system T:X→X can be modelled as a continuous self-map of a compact Hausdorff space, so that there is a compact Hausdorff topology on X with respect to which T is continuous.
- The term generalized metric is a catch all for topological spaces that share some of the structures of metric spaces. The interrelationships between these structures form a rich and varied theory.

RESEARCH ACTIVITY
Recently Chris has been working on:

- The structure of ω-limit sets of tent maps and shifts of finite type using a mixture of analytic and symbolic techniques.
- The relationship between shadowing and expansivity of maps on compact metric spaces.
- The role of periodic points in chaos.
- Abstract dynamical systems modelled by compact Hausdorff spaces, separable metric spaces, the space of rational numbers and continua.
- Characterizations of ordinals.

Other activities

Chris is the Pure Mathematics consultant for the Higher Education Academy's Math, Stats and OR Network

Publications

For a complete list of Chris' publication please see his personal web page **web.mat.bham.ac.uk/C.Good/research/papers.html (http://web.mat.bham.ac.uk/C.Good/research/papers.html)**

Good, C., (1995), Large cardinals and small Dowker spaces, Proceedings of the American Mathematical Society, 123: 1, 263--272

Good, C. and Tree, I. J., (1995), Continuing horrors of topology without choice, Topology and its Applications, 63: 79--90

Good, C., Knight R. W. and Stares I. S., (2000), Monotone countable paracompactness, Topology Appl., 101: 281--298

Good, C., Knight R. W., (2006), Monotonically countably paracompact, collectionwise Hausdorff spaces and measurable cardinals, Proc. A.M.S., 134: 591--597

Good, C., Greenwood, S. R., Knight, R. W., MacIntyre, D. W., and Watson, W. S., (2006), Characterizing continuous functions on compact, Hausdorff spaces, Advances in Mathematics, 206: 695--728.

Good C., Knight, R. W. And Raines, B. E., (2006), Nonhyperbolic one-dimensional invariant sets with a countably infinite collection of inhomogeneities, Fundamenta Mathematicae, 192: 267--289

Good, C. and Haynes, L., (2007), Monotone versions of countable paracompactness , Topology Appl., 154: 734--740

Good, C., Kight, R. W. and Raines, B. E., (eds), (2009), Topology Appl. (Special Issue): A conference in honour of Peter Collins and Mike Reed, 156

Good, C. and Greenwood, S. R., (2010) Continuity in separable metrizable and Lindel\"of spaces, Proc. A.M.S., 138: 577--591

Barwell, A., D., Good, C., Knight, R. W. and Raines, B., E., (2010) A characterization of $\w$-limit sets of shifts of finite type and tent maps, Ergodic Theory and Dynamical. Systems, 30: 21--31

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