

IMIA Operator Algebra Seminar
University of Wollongong

Title: Tiling dynamical systems as an introduction to Smale spaces

Speaker: Michael Whittaker (University of Wollongong)

Time and Dates: 3:30pm, Tuesday May 3, 2011

Location: Room 1.G01

Abstract: A tiling of the plane refers to a covering of the Euclidean plane by translates of a finite set of polygons that only intersect on their borders. A tiling T is said to be aperiodic if there is no non-zero vector $x \in \mathbb{R}^2$ such that $T + x = T$. One way to construct aperiodic tilings is by substitution; the most famous substitution tiling being the Penrose tiling.

Given an aperiodic substitution tiling T , satisfying mild conditions, a dynamical system can be constructed that is locally the product of a disk and a Cantor set. Anderson and Putnam found a relationship between this dynamical system and the theory of hyperbolic dynamical systems known as Smale spaces. Smale spaces were first introduced by David Ruelle as a purely topological description of the basic sets of Stephen Smale's Axiom A diffeomorphisms on a compact manifold.

In this talk I will use a dynamical system constructed from an aperiodic substitution tiling as an introduction to Smale spaces. No prior knowledge of dynamical systems will be required. Down the track I will show how this dynamical system gives rise to various C^* -algebras but in this talk I will focus completely on the topological dynamics.