Non standard hierarchical tilings
Talks
September 20 - September 22, 2012
University of Copenhagen, Denmark

Sep 20, 2012 Thursday

Speaker: Philip L. Bowers (Florida State University, USA)
Title: *Conformally regular tilings, reflective structures, and type.*
Abstract: This talk is a primer on the topics of the title. After a tutorial on the wide variety of conformally regular polygons and recognizing them “in nature”, we describe the even wider and bewildering variety of conformally regular tilings with a fixed combinatorial pattern. This leads to the question: What makes a conformally regular tiling interesting? Our answer is that the ones that possess a reflective structure are ones particularly worthy of further investigation. This is because of the beautiful combinatorial and conformal structure encoded in a single primitive triangle of the tiling, a feature unique to the single reflective tiling among the uncountably many distinct conformally regular tilings of a fixed combinatorial pattern. Along the way we introduce the type problem that arises in this world of conformal tilings and we end with a discussion of the new layer of intrigue added to the question of type by the introduction of local isomorphism.

Speaker: Ken Stephenson (University of Tennessee, USA)
Title: *Discrete conformal tiling: circle packing experiments.*
Abstract: This talk will illustrate the genesis of circle packing and describe its key themes: namely, (1) circle packings impose geometry on combinatorial structures, (2) that geometry is conformal in nature at the discrete level and converges to classical conformal geometry in the limit, and (3) circle packings are computable, so one has an experimental test bench which can find conformal geometry in novel situations. Of course, prime examples will be conformal tilings, so the mechanics of the process will be demonstrated in real-time using the software "CirclePack" and "scripts" for prepared experiments. These will be available before the conference for participants to try, and in turn, if anyone wants to propose some new situations to consider, I would be happy to get descriptions and/or data files in advance so I can prepare scripts. (At some point after the talk I expect to be able to demonstrate CirclePack one-on-one for anyone who is interested.)
Speaker: Maria Ramirez-Solano (University of Copenhagen, Denmark)
Title: Invariants for a conformal pentagonal tiling of the plane.

Speaker: Jean Renault (University of Orleans, France)
Title: C*-algebras of combinatorial tilings.

Sep 21, 2012 Friday

Speaker: Natalie Priebe Frank (Vassar College, USA)
Title: Fusion Rules.

Speaker: Lorenzo Sadun (University of Texas, USA)
Title: Tilings with infinite local complexity.

Speaker: Jean-Marc Gambaudo (CNRS, France)
Title: Stability of quasicrystals.
Abstract: Re-exploring works by Miekisz in the 90’s we describe several equivalent stability criteria for quasicrystals.

Speaker: Johannes Kellendonk (University of Lyon 1, France)
Title: Two new characterizations of Meyer sets.
Abstract: We explain that Meyer sets come close to being the Delone sets of finite local complexity which have a relatively dense set of topological eigenvalues. Their dynamical systems are topologically conjugate to Cantor bundles over tori with expansive canonical action.

Speaker: Mathieu Sablik (LATP, France)
Title: Local Rules for Computable Planar Tilings.
Abstract: A promising approach to obtain local rules for aperiodic tilings is the one opened by Leonid Levitov. He considered non-periodic planar tilings, that are digitizations of irrational vector spaces, and searched algebraic conditions on vector space parameters for the existence of local rules. This approach led to numerous results, but no complete characterization of aperiodic planar tilings has yet been obtained. The aim of this talk is to move a step forward in the above approach by enriching geometric methods with calculability, in the spirit of the first works on aperiodic tile sets.
The main result states that a planar tiling admits local rules if and only if it is a digitization of a vector space whose parameters are computable.

Speaker: Samuel Petite (University of Picardy, France)
Title: Some construction of aperiodic and repetitive hyperbolic tilings.
Abstract: Due to the lack of substitution, the standard construction of aperiodic and repetitive tilings do not extend in the hyperbolic space. We will present geometrical and effective examples by several authors of aperiodic tilings of the hyperbolic space. A rich family is the Toeplitz tilings. It can be realized when the isometry group of the ambient space is residually finite. The construction if free enough so that one can give example with prescribed ergodic property. For instance we will see that we can realize any Choquet simplex as the set of invariant probability measures of the associated tiling system.

Speaker: Hervé Oyono-Oyono (University of Lorraine - Metz, France)
Title: Gap labeling theorem for hyperbolic tilings.

Speaker: Arnaud Hilion (University of Aix-Marseille, France)
Title: Hyperbolic tilings and substitutions.

Speaker: Chaim Goodman-Strauss (University of Arkansas, USA)
Title: Aperiodic tilings in exotic geometries.