**British Singularity Day**

**Leeds, 29 November 2012**

Programme

12:30-13:30 Lunch. Level 9 of Mathematics Building

13:30-14:30  Peter Giblin (Liverpool)

*Views of Illuminated Surfaces* (with Jim Damon and Gareth Haslinger)

14:40-15:40  Mark Spivakovsky (Toulouse)

*An introduction to the Pierce-Birkhoff conjecture*

15:40-16:10 Tea and Coffee. Level 9 of Mathematics Building

16:10-17:10  Oleg Karpenkov (Liverpool)

*Toric singularities of surfaces and lattice trigonometry*

Venues: The talks will be in MALL1 of the Mathematics Building. Lunch and tea/coffee will be in the Level 9 meeting area. Details on how to get to the School of Maths can be found at [http://www.maths.leeds.ac.uk/home/visit-us.html](https://owa.liv.ac.uk/owa/redir.aspx?C=mGxT5Ci6nkidhXyjoFpyo8jKbQXO89EI4g-997VpUtNvveEuqCBmSFlnwydJW_f-oAiNb-6ImTc.&URL=http%3a%2f%2fwww.maths.leeds.ac.uk%2fhome%2fvisit-us.html)

The LMS Scheme 3 grant 31127 will pay reasonable travel expenses for participants from within the UK. Graduate students are especially welcome. The meeting is also supported by the School of Mathematics of the Leeds University.

**ABSTRACTS**

**Peter Giblin**

In a series of papers the authors have analysed views of surfaces illuminated by a single stable light source, taking into account features such as shade curves, cast shadows, surfaces markings, creases, corners and apparent contours. I shall describe a couple of examples showing how the necessary classifications are carried out. In many cases topological equivalence is needed to obtain a list which corresponds with what is seen when an observer moves along a trajectory past an illuminated surface.

**Mark Spivakovsky**

A continuous function f: R^n -🡪 R is said to be piecewise polynomial if it is represented by a finite collection of polynomials f\_1,...,f\_r in n variables, in other words, if for each x in R^n we have f(x)=f\_j(x) for some j=1,...,r.

The Pierce-Birkhoff conjecture asks whether each piecewise polynomial function can be obtained from polynomials by iterating the operations of maximum and minimum. Precisely, the conjecture asks whether for each piecewise polynomial function f there exists a finite collection f\_{ij} of polynomials such that f=max\_i min\_j f\_{ij}. In this talk we will give an introduction to the Pierce-Birkhoff conjecture and the notion of the real spectrum of a ring. We will discuss connections with valuation theory and interepret the Pierce-Birkhoff conjecture as a local question about contact of two singular curves in the Euclidean space.

**Oleg Karpenkov**

In this talk we introduce lattice trigonometric functions of angles in lattice geometry. Using these functions we show a necessary and sufficient condition for three angles to be the angles of some lattice triangle in terms of lattice tangents. This condition is translated to the global relation on singularities of toric surfaces, establishing the criterion for a triple of singularities to be on a toric surface whose Euler characteristic equals three. Further we discuss the relations on singularities for toric surfaces of greater Euler characteristic.