In this talk I shall sketch some results Oliver Riordan of Oxford and I have obtained on critical probabilities in percolation.

Recently, Scullard and Ziff noticed that a broad class of planar percolation models are self-dual under a simple condition which, in a parametrized version of such a model, reduces to a single equation. They stated that the solution of the resulting equation gave the critical point. However, just as in the classical case of bond percolation on the square lattice, noticing self-duality is simply the starting point: the mathematical difficulty is precisely showing that self-duality implies criticality. Riordan and I have managed to overcome this difficulty: we have shown that for a generalization of the models considered by Scullard and Ziff self-duality indeed implies criticality.

Related Links:
Pacific Institute for the Mathematical Sciences

[Video] The Critical Probability of Percolation: Percolation on Self-Dual Polygon Configurations

Béla Bollobás, University of Cambridge, University of Memphis, and Microsoft

Friday, February 18, 2011 - 2:30pm