



# ICERM

Institute for Computational and Experimental Research in Mathematics

## SEMESTER PROGRAM: SPRING 2015

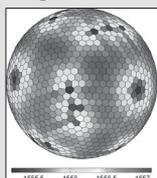
### Phase Transitions and Emergent Properties

February 2 - May 8, 2015

#### Organizing Committee:

Mark Bowick, *Syracuse University*  
Beatrice de Tiliere, *Université Pierre et Marie Curie, Paris*  
Richard Kenyon, *Brown University*  
Charles Radin, *University of Texas at Austin*  
Peter Winkler, *Dartmouth College*

#### Program Description:



Emergent phenomena are properties of a system of many components which are only evident or even meaningful for the collection as a whole. A typical example is a system of many molecules, whose bulk properties may change from those of a fluid to those of a solid in response to changes in temperature or pressure. The basic mathematical tool for understanding emergent phenomena is the variational principle, most often employed via entropy maximization. The difficulty of analyzing emergent phenomena, however, makes empirical work essential; computations generate conjectures and their results are often our best judge of the truth. The semester will concentrate on different aspects of current interest, including unusual settings such as complex networks and quasicrystals, the onset of emergence as small systems grow, and the emergence of structure and shape as limits in probabilistic models.

#### Workshops:

- Crystals, Quasicrystals and Random Networks  
*February 9-13, 2015*
- Small Clusters, Polymer Vesicles and Unusual Minima  
*March 16-20, 2015*
- Limit Shapes  
*April 13-17, 2015*



Program details:  
<http://icerm.brown.edu>

ICERM welcomes applications for long- and short-term visitors. Support for local expenses may be provided. Full consideration will be given to applications received by March 17, 2014. Decisions about online workshop applications are typically made 1-3 months before each program, as space and funding permit. ICERM encourages women and members of underrepresented minorities to apply.

**About ICERM:** The Institute for Computational and Experimental Research in Mathematics is a National Science Foundation Mathematics Institute at Brown University in Providence, Rhode Island. Its mission is to broaden the relationship between mathematics and computation.

