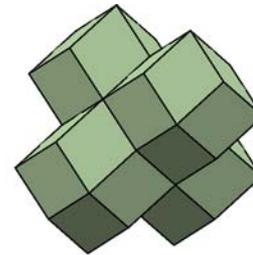


Cells and Boundaries All Around Us

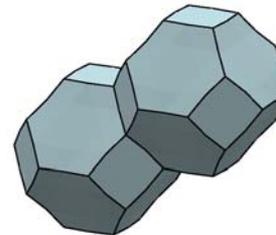
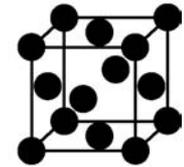
Randall D. Kamien, University of Pennsylvania, DMR Award #01-29804

The self-assembly of macromolecules and colloids has become an essential aspect of the emerging field of nanotechnology. Through the precise control and design of crystalline superstructures it will be possible to design **molecular sieves**, **advanced photonic materials** and **microreactors**. Using well-studied geometric quantities which depend on the lattices under consideration we can predict new phases of diblock copolymers.

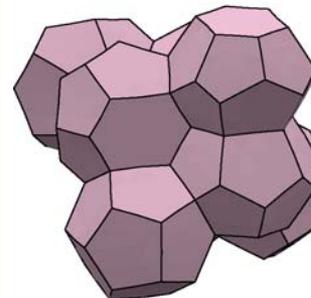
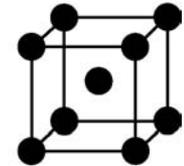
We have successfully merged the mathematics of **area-minimizing surfaces** and **sphere-packing**, **thermodynamics**, and **molecular engineering** with the goal of rational design and control of macroscopic structures.



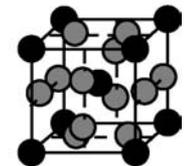
FCC



BCC



A15



Grason, DiDonna and Kamien, PRL **91** (2003) 058304



Cells and Boundaries All Around Us

Randall D. Kamien, University of Pennsylvania, DMR Award #01-29804

Educational:

3 graduate students:

- William Kung, *Ph.D. 2004 (expected)*
- Gregory Grason, *Ph.D. 2005 (expected)*
- Yehuda Snir, *Ph.D. 2006 (expected)*

4 post-doctoral associates:

- Primoz Zihlerl (2000-2002)
- Brian DiDonna (2002-2005) - *shared*
- Andy Lau (2002-2005) - *shared*

Public Lectures:

- Two appearances on "The Science of Philadelphia", Philadelphia School District, on food and materials science
- Lecture to High School Teachers through Materials Laboratory

Organizer and Lecturer in 2002 Boulder School on Condensed Matter and Materials Physics.



Lecture to Penn Summer Science Academy

