Studying randomness in nature.

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About me

• I grew up in Lincoln, NE.
• Best piece of advice given to me:

  “If you’re not sure what branch of science to go into, go into mathematics and decide later.” - Paul Crittenden (Now Assistant Professor of Mathematics at Jacksonville University)

• Bachelors of science in Mathematics from the University of Nebraska.
• Goals: To be a professor that researches and teaches material well for understanding, but also projects my enthusiasm for math and science as well as be an advocate.
Modeling Physics

- Mathematical Model
  - Approximation
- Validation
- Applications
- Experiments
Modeling Physics
Modeling Physics

Mathematical Model

Approximation

Experiments

Validation

Applications
Modeling Physics
Modeling Physics

- Mathematical Model
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- Applications

Diagram illustrating the process of modeling physics.
My problem

video
http://www.youtube.com/watch?v=Scykhj1V41s
Duhr and Braun PNAS (2006)

- 1,000 bp DNA, fluorescently tagged.

- Size of each DNA ≈ 50nm.

- The letters “DNA” heated with a laser by 2 K.

- DNA move into “DNA” when water temp is 20 C and out when 3 C.
• Want to systematically find small mass approximations
• Find other applications to these problems.
• Mathematically prove these results.
• These approximations are useful for small scale problems in biology (movement of viruses), physics (self assembly of small beads), and pharmaceuticals.