CAREER: Modeling and Analyzing High-Dimensional Molecular Assembly: Quantifying the Impact of Allergen Structure

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Program Information Integration and Informatics (III)
Grant IIS-1553266
Antibody Assembly

- Receptors are integrated into membrane (Plane)
- Membrane is fluid
- Receptors move rotationally and laterally
- Binding produces aggregates which stimulate mast cells / basophils
- Degranulation releases histamine, leukotrienes, cytokines, etc.

http://www.biology.arizona.edu/
The problem Being Addressed

A key component remains poorly understood: The role of molecular structure in aggregate formation
My Plan

Short term goal: methods for studying antibody assembly

Long term goal: general methods for assembly systems

Figure 2: The proposed methods, when assembled together, will produce a synergistic solution to research and education on tunable-resolution, computationally efficient, generic methods for structurally modeling molecular assembly.
## My Working with NSF Timeline

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Summer</th>
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<tr>
<td>2010-2011</td>
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Six Months Later… Funded CAREER!
What Made it a Successful Proposal

- Within the first 2.5 pages:
  - The importance of the problem
  - The question that I am aiming to answer
  - Why previous approaches are unsuccessful for this problem
  - Why am I the person to solve this problem
  - What are my methods to solve this problem
  - *Integrate the teaching/outreach*

- Within the body:
  - Technical details
  - Relate to state of the art

Understandable by general domain experts

Approvable by experts
What Made it a Successful CAREER Proposal

• Tight integration of teaching/outreach to research

• Emphasis on
  – Local resources
  – My passion
  – My expertise in research and teaching/outreach

• Long-term potential

• Trust in me and my abilities, my background work, and my resources
Winter 2011 – Write first NIH proposal

- Spring 2011 – Start Faculty Position
- Spring 2011 – NIH proposal funded!
- Fall 2011 – Submit first NSF Core program proposal
- Spring 2012 – First NSF proposal rejected
- Summer 2012 – Use comments and put together amazing NSF CAREER proposal
- Fall 2012 – NSF CAREER proposal rejected
- Fall 2012 – Use comments and put together amazing NSF Core program proposal
- Winter 2012 – Talk to NSF Program Manager
- Spring/Fall 2013 – Serve on multiple panels!
- Summer 2014 – Submit NSF CAREER
- Winter 2014 – CAREER funded
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<td>Postdoc</td>
<td>Write NIH proposal</td>
<td>NIH proposal funded</td>
<td>publish</td>
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<td>(rough draft)</td>
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