

Visualizing User Interactions with Simulation Tools

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HUBzero

Originally created by researchers at Purdue University in conjunction with the NSF-sponsored Network for Computational Nanotechnology to support nanoHUB.org, the HUBzero platform now supports dozens of hubs across a variety of disciplines.



40+ sites worldwide

NANO is HUGE

LARGEST NANOTECHNOLOGY ONLINE RESOURCE

500+

simulation tools

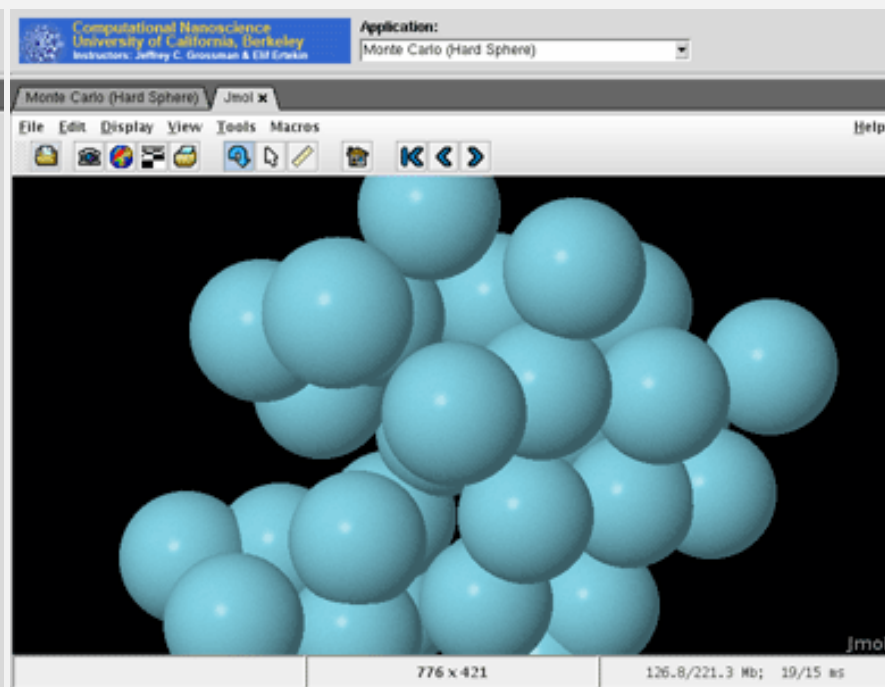
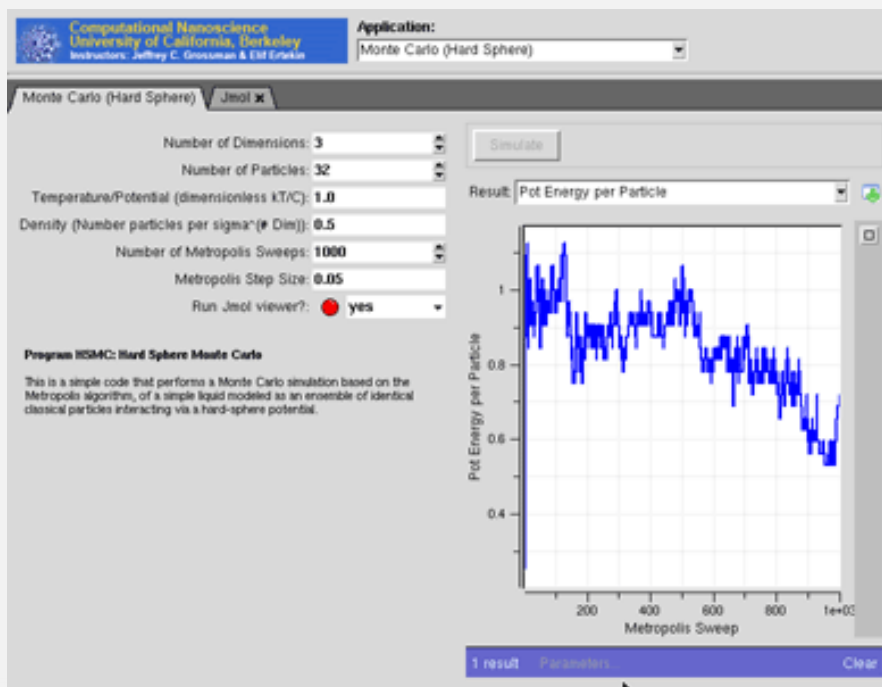
1.4M

users

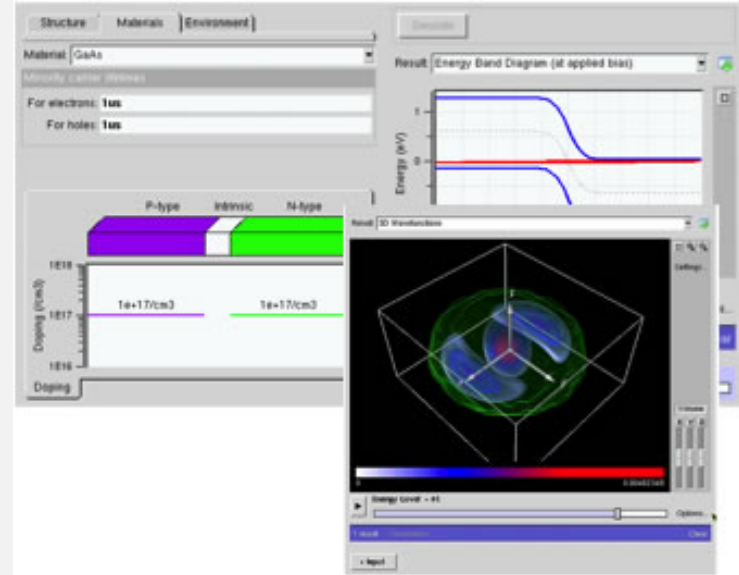
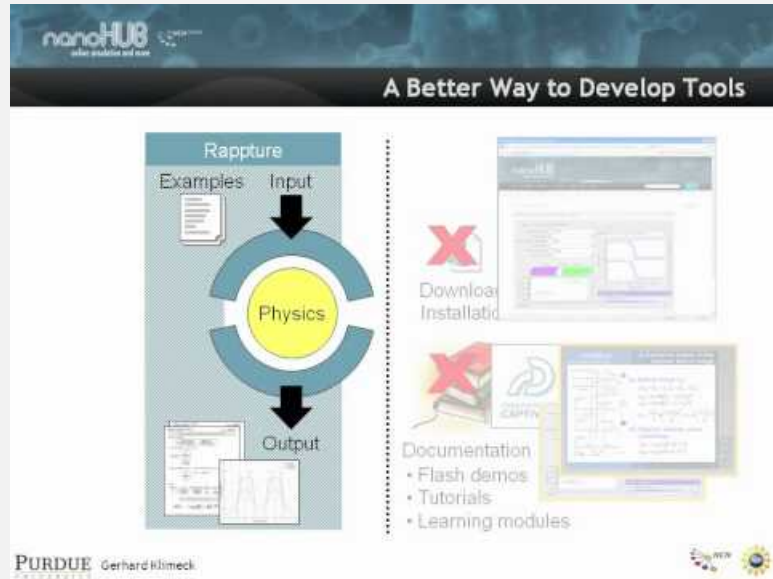
5500+

resources

Simulations & Modeling



Rappture – Rapid tool development



Rappture – Data description language

```
<run>
  <tool> ... </tool>
  <input> ... </input>
  <meta> ... </meta>
  <output> ... </output>
</run>
```

```
<number id="t">
  <about>
    <label>Gate Insulator Thickness</label>
    <description>Thickness of the insulator between gate and channel.</des<
  </about>
  <units>nm</units>
  <min>0nm</min>
  <max>1000nm</max>
  <default>1.5nm</default>
  <current>1.5nm</current>
</number>
```

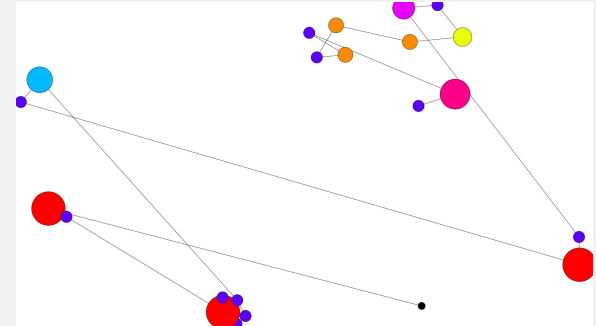
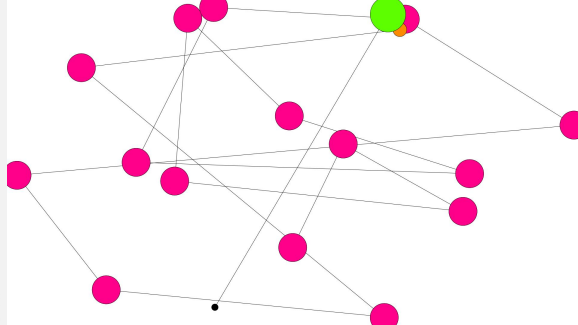
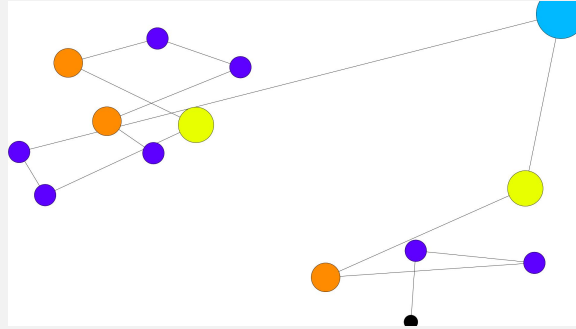
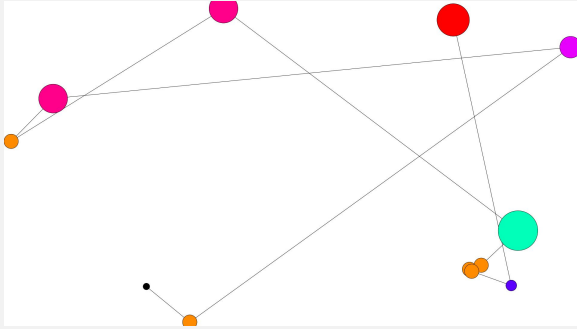
20+ types including

- Boolean
- Choice
- Curve
- Drawing
- Field
- Flow
- Mesh
- Image
- Integer
- Number
- PeriodicElement
- Phase
- Sequence

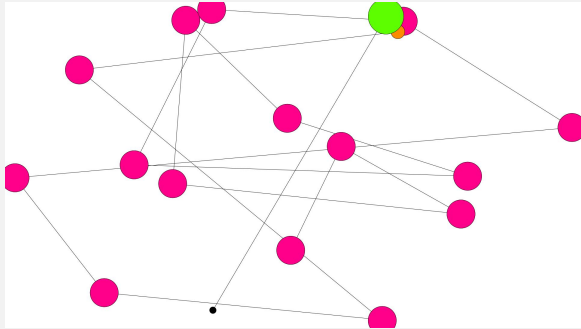
What can we learn from how our users interact with simulation tools?

- (1) What does behavior “look” like?
- (2) Can we automatically characterize this behavior?

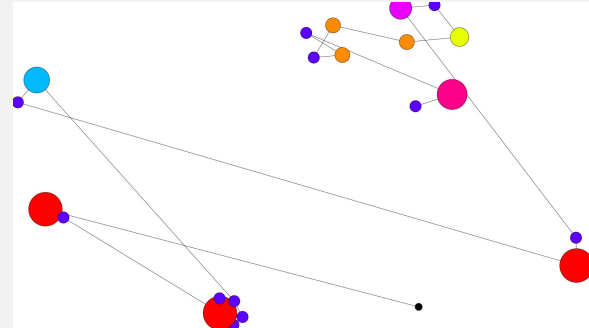
What does user behavior look like?



Searching and Wildcatting



Wildcatting

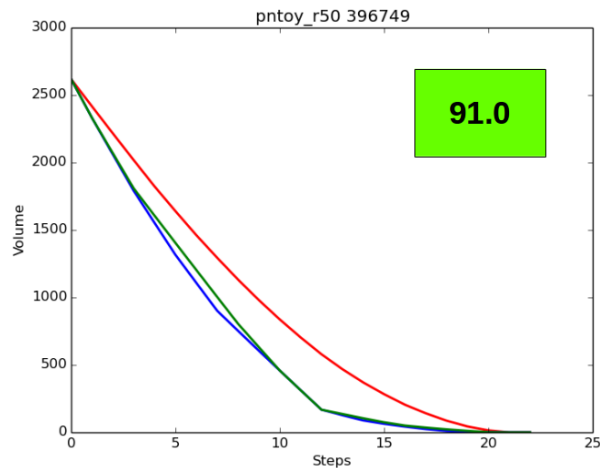
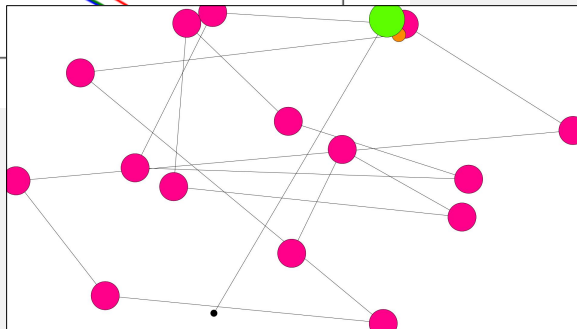
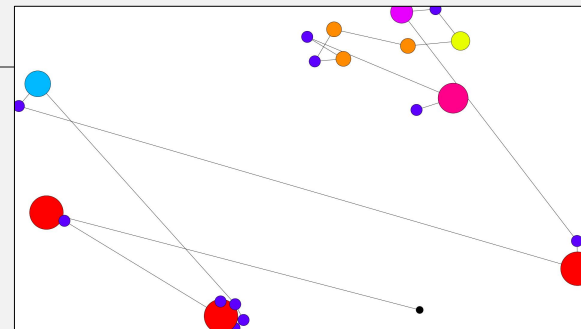
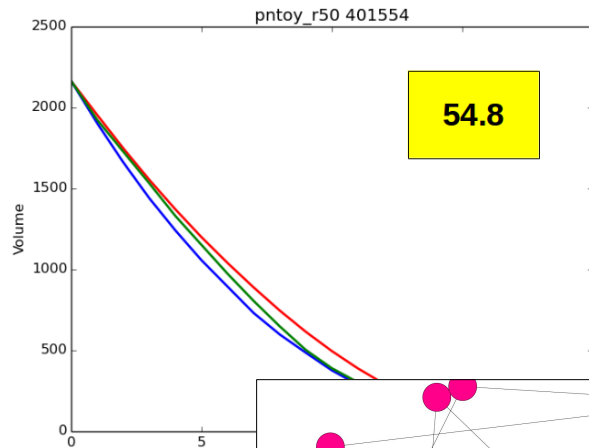


Searching



Characterizing User Behavior

“searchiness”



Potential Applications

Pedagogical – visualizing students' interactions and possible intervention based on degree of expected search vs. survey behavior.

How many trials / simulation invocations?
Progression through the parameter space?

Research – from observed behavior, we might be able to infer intent on the part of the investigator.

Recommender system that offers up next (possibly precomputed) points
"Cobbler and Elves" analogy where agents do compute ahead

Acknowledgments

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