Network for Computational Nanotechnology (NCN)

nanoHUB.org: Future Cyberinfrastructure serving over 125,000 users today

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Moore’s Law for Other Disciplines?

Nano Initiatives
- Electronics
- Materials
- Photonics
- Mechanics
- Bio/Medicine
It Happens Here

Over 170 tools online!
Over 2,100 Resources!

- Over 2,100 resources
- 170 tools
- 43 courses
- 1,557 seminars and teaching materials

World-Wide Community

- 125,000 users worldwide

- As much traffic as www.purdue.edu
- Users at all Top 50 US Engr Schools
- 19% of all .edu domains
- 116 classes at 76 institutions in 2009
- 8,300 users ran 344,000 simulations
A course on nanophotonics

Tool Powered Curricula

“make abstract concepts more concrete”
Use in the classroom

In the year 2009:
116 classes; 76 institutions; 23 countries

nanoHUB on iTunes U

Exclusive - Apple VP OK’ed - one of 68 orgs
nanoHUB on iTunes U

Nov 2009 start
350 content items today
55,000 downloads
~10,000 downloads/month

Wikipedia Contributions

16 animations deployed Jan 2010 on ~30 pages
Brings 2,000 visitors for 3,300 visits monthly
Research Impact

Device Size

nanoscale structures

Billions of nano structures

Years

Transistors

Research

Photonics

Mechanics

Bio/Medicine

Electronics

Materials

Research: Publish or Perish

575 nanoHUB Citations

M. Lundstrom

1000

nanoHUB

37

N. Luisier

10

6

1

10

100

1000

Papers

Secondary Citations

575 nanoHUB citations
>3,200 secondary citations
h-index: 27
Any Science Gateway’s Dream
Why is it so hard?
Any Science Gateway’s Dream
There are worlds between...

“Valley of Death”

5 Criteria
for Successful
Science Gateways
1: Outstanding Science

“Stuff the world wants”

Leveraged Research

$5.1M

2: Commitment to Dissemination

“faculty that want to give it away”

46 faculty

+ 6 site leads

106 grad students
3: Technology for Dissemination

Typical Dissemination Paths

Problems:
- REALLY LONG stove pipe
- Web content: afterthought ➔ usually stale
- Data shared by email
- Tools spread by hiring

Customers

Knowledge

Information

Tools

Research Team

Sim. Tools

Instruments

Data

Mod & Simulation

Experiments

Theory

Courses

Textbooks

IP

Publication

Seminar

Web Content

Peers

Local Students

Remote Students
3: Technology for Dissemination

“simple and utterly dependable”

Basic Research; Invention
$1M/year operation and bridge building

Applied Research; Innovation

“Valley of Death”
A Year in the life of nanoHUB

Feb 2007: 1 hub
Feb 2008: 5 hubs
Feb 2009: 8 hubs
Feb 2010: 21 hubs

Each hub has its own funding stream
Outside institutions:
EPA, NYSTAR, Rice
April 13-14, 2010
Indianapolis, IN

102 Participants
33 Institutions

Invited Speakers:
• Rajinder Khosla
• Mark Lundstrom
• Jennifer Schopf
• John Smith

Hands-On Tutorials
Panel of Hub Owners

4: Tech Transfer Processes
“dedicated technical site leads”

Content Creation and Support
$2.2M

“Valley of Death”
5: Open Assessment / Incentives
“gather, understand, disseminate stats”

Access, Use, Impact

Vision in 2002: What will NCN’s legacy be?

- Key contributions to nanoscience and nanotechnology
- Pervasively used software
- Innovations in education
- Students and faculty who become leaders in nanotechnology
- Major, international resource, nanoHUB.org
- Cyberinfrastructure: technology and practices

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