

NSF'S ICER INITIATIVE:
INTEGRATIVE COMPUTING EDUCATION & RESEARCH
WHITHER THE NORTHWEST?
<http://www.evergreen.edu/icer>

Welcome!

1. CS content changed radically....
2. No uniform agreement on the core...
3. Graduates lack a systems approach....
4. Dwindling pipeline....
5. US industry competitiveness threatened....

Trouble, right here, in River City!

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ICER NW Workshop

January 27-28, 2006, at Stanford

Eric Roberts & Judy Cushing

Lecia Barker	Dan Garcia	David Notkin	Tim Sheard
Robert Bryant	Judith Gersting	Jenny Orr	Larry Snyder
Margaret Burnett	Cindy Goral	Dave Patterson	Ellen Spertus
Kim Bruce	Eric Hamilton	Stuart Reges	Sharon Tuttle
Peter Denning	Cay Horstmann	Mehran Sahami	Brian Walter
Sarah Douglas	Kim Kihlstrom	Bobby Schnabel	Ken Yasuhara
Jim Fix	Clayton Lewis		Bryant York
Brett Fleisch		Karl Levitt	Sylvia Spengler
Mike Foster		Steve Mahaney	<u>Harriet G. Taylor</u>
Peter Freeman		Hari Narayanan	<u>Caroline Wardle</u>

Workshop Report : <http://www.evergreen.edu/icer>

Northeast: http://www-net.cs.umass.edu/nsf_icer_ne/

Midwest: <http://www.cse.ohio-state.edu/~lee/NSF/home.htm>

Southeast: <http://www.eng.unt.edu/ICERWorkshop/reports.html>

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CCSC Panel : Wither the Northwest? NSF Motivation – Sylvia Spengler, NSF

1. Improve the quality of computing education
Jenny Orr, Willamette
2. Attract more people
Rob Bryant, Gonzaga
3. Improve retention....
Sharon Tuttle, Humbolt State
4. Strengthen interdisciplinary connections....
Judy Cushing, Evergreen
5. Improve CS educational research
Ken Yasuhara, Univ. Washington

Discussion.....

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Strategic initiative #1: Jenny Orr, Willamette *Improving the Quality of Education*

- 1a. Create more effective repositories for curricular artifacts.
- 1b. Enlist the community to identify the top ten curricular artifacts in a year.
- 1c. Encourage curricular experimentation and innovation.
- 1d. Foster a community that focuses on educational research and assessment.

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Repositories and Top 10

- Many existing repositories
 - Scattered, hard to navigate, wrong granularity ...
- Goals
 - Centralize, searchable, peer reviewed, range of materials, user support, faculty recognition.
- Top 10 list
 - Community ballot. Improve quality & recognition.

Experimentation and innovation

- Organize curricula around great principles.
 - E.g. Peter Denning's article *Great Principles in Computing Curricula*.
- Organize curricula around theme of innovation.
- Encourage interdisciplinary collaboration.

Community and Assessment

- Experimentation alone is not enough.
- Bring together:
 - Computing educators trying new strategies.
 - Educators with expertise evaluating effective teaching strategies

Strategic initiative #2:

Rob Bryant, Gonzaga

Attract more people to the field

- 2a. Mount a vigorous campaign to change the popular image of computing.
- 2b. Convene focus groups to get a better sense of what students want.
- 2c. Increase outreach to high-school students, teachers, and counselors.
- 2d. Make outreach materials available to faculty.

Strategic initiative #3:
Sharon Tuttle, Humboldt State
Improve Retention in the Major

- 3a. Recast introductory courses so they become “a pump, not a filter”
- 3b. Make sure introductory students recognize that the field offers many opportunities
- 3c. Provide undergraduates with opportunities for research and teaching
- 3d. Increase opportunities for collaborative project work
- 3e. Encourage the formation of support groups for at-risk students

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3a. Recast introductory courses so they become “a pump, not a filter”

- Derived from the “reform calculus” movement
- Need to eliminate any “filter course” mentality left over from high-enrollment times
- To “pump” additional people into the field, intro course must address the interests of a broader audience

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3b. Make sure introductory students recognize that the field offers many opportunities

- Make sure students see how intro course skills will serve them both in college and in life
- Can no longer focus just on providing foundation for courses that follow

3c. Provide undergraduates with opportunities for research and teaching

- Give undergraduate students a sense of what more-advanced work in the field might feel like
- Provide opportunities to engage in research as an undergraduate
- Provide opportunities for undergraduates to serve as teaching assistants
- May encourage both retention and interest in graduate study

3d. Increase opportunities for collaborative project work

- Current emphasis on individual work may be isolating, especially for less-confident students
- Many strategies exist for enhancing individual interaction in computing courses
- Pair-programming is showing success with “at-risk” students at different levels of the curriculum
- Team projects dispel misconceptions that computing is a solitary rather than a social activity

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3e. Encourage the formation of support groups for at-risk students

- Goal: to make it easier for students to see themselves as belonging to the discipline, which has a strong influence on retention
- To avoid isolation, discouragement, especially in members of underrepresented groups
- Peer mentoring, coaching, and bridge programs that provide academic support can help
- ...but a “critical mass” might be needed for the social dimension

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Strategic initiative #4:
Judy Cushing, Evergreen
Strengthen Interdisciplinary Connections

The “image problem” – not just outside the Academy

- 4a. Offer service courses designed for students in other disciplines.
- 4b. Encourage faculty to develop meaningful collaborative activities across disciplines.
- 4c. Support development and distribution of interdisciplinary curricula & resources.

Strategic initiative #5:
Ken Yasuhara, U. Washington
Meet Human Infrastructure Needs
...Improve CS Educational Research....

Facing the growing crisis

- How do we implement the ICER strategic initiatives?
- How do we know we're succeeding?
- How can we move beyond "preaching to the choir"?
- How do you expect me to do this?!

Not SOL...*SoTL*!

Scholarship of Teaching and Learning

- teaching *as* research (not vs. research)
- basing claims on theory and evidence
- building on prior work
- collaborating with the social sciences...

CS ed. research helps you...

- Beyond popularity contests:
How is my teaching, really?
- Plug & Play or Crash & Burn:
Is teaching method X right for me?
- Becoming the change we want to see:
What kinds of support does SoTL in CS require?

...and your absent colleagues.

- “Crisis? What crisis?”
Ask CRA, HERI, ACM-W, AAUW!
- “Good teachers are born, not made.”
It’s not magic, it’s learnable!
- “Teaching method X is just a fad.”
Show them the evidence!

Get real!!

- CS ed. research by a few producers to present to informed consumers
- help from our ed. evaluator friends
- Engineering, math, and physics are doing it...why can't we?
 - the “other” ICER
 - Bootstrapping
- Does it have to be tenure suicide?

CCSC Panel: Wither the Northwest? ...Discussion....

1. NSF CPATH initiative:*
2. Do we really have a problem?
3. If so, is there anything that can be done?
4. Shall we ...*Act Locally*...? How? When?
5. Repositories....
6. ...

CCSC Panel: Wither the Northwest? ... Issues

1. How do we do assessment?
2. How do we collaborate across institutions – schedules, tools....
3. How do we share and perpetuate successes?
4. What IS the core? (the question is not the same as it was in the past- the context and the discipline changes...)
5. We need help with grant writing, especially since most of us don't have a 'track record' (we need to show we can complete the work).
6. Shouldn't CS be in the core curriculum, and part of the 'liberal arts'?

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CCSC Panel: Wither the Northwest? ... Outcomes

1. Email a Call for Participation to all CCSC attendees
2. Next year at CCSC:
 - Workshop on educational assessment (Ken? Carol?)
 - Grant writing workshop. Before (and after) 1/27.
 - Discussion of how to attract CS 'minors', and how to focus this.
 - Discussion of making CS part of the core curriculum
 - Award(s) for 'best' educational material?
3. What if:
we launched a series of complementary CPATH (or other) initiatives from CCSC NW, and helped each other be successful.
 - Game development (Jenny Orr)
 - Consortium of Colleges to Interface to high schools and K-12 (Rob Bryant)
 - Planning grant to do the regional collaboration
 - Outreach to underserved communities

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