

## Site Visit for “Georgia Computes!”

NSF BPC Alliance

December 5, 2008

### What we do

Seeking to impact the computing education pipeline across the entire state:

- *K-12*: We run YWCA and Girl Scouts workshops and summer camps. We teach high school teachers how to teach CS up to AP classes. We teach other *University System of Georgia (USG)* computing departments how to run summer camps, and offer them seed funding.
- *Undergraduate*: We teach USG faculty how to offer high-retention curricula, then evaluate uptake of the curricula and the impact of the curricula. We look for reasons why students do not take CS classes. We use undergraduates as leaders and mentors, and in high school classes as STEP fellows.
- *Graduate*: We use graduate students as leaders, mentors, material developers, and evaluators. We track CS graduate enrollment in Georgia.

### *Our numbers:*

#### Participation in Georgia Computes! activities

	Pipeline	Years	Num
YWCA Workshops	K-12	2006-2007	30
		2007-2008	40
Girl Scouts Computing Workshops	K-12	2005-2006	190
		2006-2007	372
		2007-2008	1300
HCI Camps	K-12	2007	10
		2008	15
CS AP Teachers	Teachers K-12	2003-2004	44
		2007-2008	87
Faculty Workshops	Faculty	2007	26
		2008	14
Summer Workshops (260 unique teachers have taken one or more workshops with us)	Teachers	2004	40
		2005	72
		2006	79
		2007	82
		2008	92
Summer Camps at Colleges and Universities	Institutions	2006	1
		2007	4
		2008	6

### *Our successes:*

- Our goal was to double APCS teachers in the state by 2009. We have already increased that number by 78%. We have a larger percentage of high schools offering APCS than any other state in the Southeast.
- Around half of the CIS programs in the state have now sent faculty to our workshops. 7—10 of 32 CIS programs in the state have changed their approaches. We have anecdotal evidence of increased enrollment in CS2.
- We sponsored the first African-American, all-girls YWCA robotics team in the state.
- We are seeing change in how Girl Scouts perceive computing, and we are documenting the kinds of Girl Scout workshop activities lead to the greatest positive changes in attitudes about computing.
- We have invented new kinds of summer camps, including successful HCI and OLPC programming camps.
- We have seeded six new summer camp programs around the state.

## K-12

# Georgia Computes!

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YWCA After-School Workshops

Girl Scout Workshops

Cool Girls  
Girls & Boys Club

New project

HCI Summer Course

Girl Scout Summer  
HCI/OLPC Camp

Teaching Teens to Design  
Social Networks

New project

Summer camps at Georgia  
Tech

Summer camps at other USG  
schools

Video Game Testers

New project

"How to run a summer camp"  
workshops for USG faculty

STEP Fellows

## Secondary Teachers

Training High School teachers  
in CS

Evaluation: AP Test Takers

## Undergraduate

Training USG faculty to teach  
CS in innovative ways

Evaluation: Curriculum  
adoption

Disciplinary Commons for  
Computing Educators

New project

Evaluation: Do novel courses  
influence attitudes towards  
CS?

## Graduate

Evaluation: Tracking CS  
graduate enrollment in  
Georgia

Using grad students as leaders  
and mentors

## Our Challenges

One of the lessons learned is that a rising tide does not lift all boats *equally*. While we have had an impact, we have not always had the targeted impact we want.

- Despite a dramatic increase in APCS teachers and high schools offering APCS, we have seen the same increase as white men in the number of women and members of underrepresented minorities taking the CS AP exam.
- Our faculty attendance at workshops is not what we had hoped for.
- We are challenged to get secondary computing teachers *trained and in* the computing classroom. We regularly get trained teachers who end up not teaching computing, or teachers in computing classes who are inadequately trained.
- We still have no data for the whole *University System of Georgia*. We have found that the USG central office does not have the kind of data that we believed.
- Field work with target users suggests that our online space as originally conceived may not achieve its goals, because students simply won't be interested in it. Others working on similar projects at other institutions have come to the same conclusion (particularly Mary Beth Rosson at Penn State). We have redesigned the online component to focus on teens designing their own online spaces instead of just using an online space we design.
- Our evaluation data about our curricula suggest that, while we impact retention, we do not change student attitudes about computing. Student attitudes about computing before classes are pretty much the same after.

## Our Future Directions

What we have done so far is paint with ***broad strokes***, offering workshops to all-comers at the secondary and undergraduate level, tracking whole populations with aggregate numbers, and working with large groups (like YWCA and Girl Scouts). We propose a more ***targeted*** approach going forward: Focusing on groups that serve minorities and women, focusing on and tracking specific students of interest, focusing on teachers who need support and training, and focusing on high schools that need special encouragement.

- We are starting partnerships with Cool Girls, Refugee girls (RRISA), and Boys and Girls Clubs.
- We are starting the *Disciplinary Commons for Computing Education* (DCCE), to bring together high school and undergraduate teachers in monthly meetings. Our goals are to improve the teachers' sense of community, increase communication flow between undergraduate and high school teachers, engage the teachers as researchers, helping with assessment efforts. (CPATH funded.)
- We are starting a new effort to engage African-American men in computing, by training game players to be game testers. In this way, we leverage their interest in video games to teach them about what's "under the hood." (BPC Demonstration Project Funded.)
- We have just applied for funding (from Google RISE) to start summer camps at high schools where the majority of students are members of minority groups.
- Explore new contexts for computing that may appeal where our current contexts will not, like social networking. We are starting a new project to engage middle school youth with creating their *own* social networks.
- We would like to implement an evaluation based on tracking individuals:
  - From High School and Middle School Camps
  - From High School AP programs for our teachers
  - Into our graduate
- We are considering the creation of an on-line Masters in Computing Education, to serve high school teachers who want further training and certification, and to serve USG computing faculty who do not have enough graduate credit hours in computing for their programs to become accredited.