Broadening Participation
Serious Games
Analytics & AI in interaction

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Computer Science
1961: The Computers of Tomorrow

• By 2000, man should have a much better comprehension of himself and his system …

• because he will have learned to use imaginatively the most powerful amplifier of intelligence yet devised.
Human-amplifying computing

Computing can amplify compassion, communication, understanding, and creativity – and even transform people and our society.
### The STARS Community of Practice

Advancing innovation and discovery through **regional partnerships** to broaden participation

<table>
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<tr>
<th>STARS Leadership Corps</th>
<th>Research, Women’s, &amp; Minority Universities</th>
<th>Tiered Participation</th>
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</table>
| Tiered participation of students, professionals, & educators in research and civic engagement catalyzes regional partnerships | Industry  
K-12  
Community Colleges  
Community & Professional Organizations | The corps provides stair-step role models & mentors |

**Faculty, Industry**  
**Graduate students**  
**Undergraduates**  
**K-12 students**

**CORPS**
Partner to spread good things

- Tekkotsu Robots – with ARTSI Alliance
- REU Preparation – with A4RC Alliance
- Affinity Research Groups – with CAHSI
- CS Unplugged
- Alice
- Scratch, GameMaker
- Career Mentoring workshops – with CRA-W
- STARS Haiti - *One Laptop per Child* – with Waveplace Foundation and MAC
- ECEP (Georgia Computes! & CAITE)
- CS Toolkit with Microsoft
1700 STARS students
50 universities/colleges
Celebration: Aug 14-16 @ DC
“[STARS] has helped me map out my career goals … helped me discover how much I really want to be a professor.” ~ SLC Student

“STARS … students develop leadership skills and … participate in socially relevant outreach. [STARS creates] a sense of community … and resulted in many of them becoming graduate students.” ~ SLC Faculty
Outreach to 77,000 in K12
Beauty and Joy of Computing

- New CS Principles AP in 2016-2017
- NSF CE21 grant (1138596)
- NCSU+Berkeley collaborative project
- Prepares 172 high school teachers
- CSC 200 Spring 2014 -> future
BJC project: Math game
Creative Computing Education

A tiered project to:

Provide creative problem-based learning experiences in computing

Engage computing students in building games to teach introductory computing

A project sponsored by NSF IIS-0757521
BeadLoom Game

EleMental: The recurrence
SIGGRAPH 2009
Dance Tool

Wu’s Castle: ITiCSE08, SIGCSE09

Sera’s Castle: GDCSE 2008

The Catacombs: GDCSE08
Bots: learning to program
My name is As‘ad. I am 15 years old and I live in a small village called Hammana in Mount Lebanon.

I am the eldest of my parents’ seven children.

My father works on a silk farm. We don’t have much, but we get by.

Father says that the price of silk is falling. But food costs more money than ever.

We talk often of America and all the wealth there.

They say the streets are paved with gold.

Today, I became a deacon in the Maronite Church. Soon I will be old enough to work with my father.
Teaching math

Instructions
This game is about balancing a beam with objects on it like a see-saw. To start with, try these three. Click the red ball where you think the balance point for the beam is.

Back to Game
Mobile games

- Table Tilt
- a 2- to 6- player iPhone game
- Get the ball in the hole!
- Promotes team building

- World of Workout
- Promotes walking
- Gets heart rate up!
Games for exercise
CAREER: Educational Data Mining for Student Support in Interactive Learning Environments

Affect Learning!

Intelligent Feedback & Control

Base feedback on data mining

NC STATE UNIVERSITY
Interaction Networks show learning

Day 3 at the top
Day 1 at the bottom

Less space exploration -> more expert students
InVis: View INs
Generating hints
New Deep Thought Tutor

![Image of Deep Thought Tutor interface]
Game analytics

• Collaboration with local game company
• Provided data to class
• Class team explored data
• Created visualizations of user behavior
User Clusters

- C0: mostly idle (white!)
- C1: Gathering $$$ (blue)
- C2: Fighting (green)
HMMs
HMM-user 1
HMM- user 2
HMM-user 3
Undergraduate Research

- Honors Program @ NCSU
- CRA-W Distributed Research Experiences for Undergrads
- NOW: REU Sites 2006-2015
Ways to collaborate

• For 1 semester (3 months)
  – Provide data for analysis
  – Mentor a team
  – Email me (Tiffany.Barnes@gmail)

• For an outreach event
  – Professionals + our students help the community (K12, clubs, etc)
  – Email Veronica.Catete@gmail
Ways to collaborate

• Provide an internship or co-op
  – Through NCSU co-op program

• Sponsor a project
  – 1 summer REU: $10K, 1 student
  – 1 senior project: $5K

• Fund a PhD student
  – Build a partnership
  – Student works with you/your data – then for you when they graduate
Thank you!

Tiffany.Barnes @ gmail