Teresa Dahlberg, Principal Investigator, Project Director, UNC Charlotte
Tiffany Barnes, Co-PI, Evaluation Director, UNC Charlotte
Kim Buch, Evaluation, UNC Charlotte
Anthony Chow, Evaluation, UNC Greensboro
Audrey Rorrer, Evaluation, UNC Charlotte

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STARS Alliance website:
www.starsalliance.org

All proposals & annual reports are available online at this site.
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STARS Alliance Executive Summary 2009

The Students & Technology in Academia, Research, and Service (STARS) Alliance is a system of regional partnerships among **20 universities and colleges** and over **80 regional partners** in K-12 education, industry and communities sponsored by the National Science Foundation to Broaden Participation in Computing. All 20 academic members implement the **STARS Leadership Corps**, an innovative program that promotes K-12 recruitment and college-student retention by integrating service learning, collaborative learning, peer mentoring and community-building into regional communities. We define “computing” as computer science, information systems, information technology, software engineering, computer engineering, and related disciplines.

**2009 Results**

By **engaging young people** in computing outreach (700 college and 18,000 K-12 students at over 40 locations across the southeast), and **increasing undergraduate and graduate computing enrollments**, increasing **adoption of successful practices** of Pair Programming (in over 10 classes with over 400 students) in universities, **training K-12 teachers** to use Culturally Situated Design Tools, engaging students in the successful Discipline-Based Tiered **Mentoring** model (at 6 universities), the STARS Alliance is broadening participation across the southeastern U.S. while building a **sustainable community** to continue our work.

**Computing Enrollments**

STARS Alliance institutions have outperformed the national average in computing enrollments.

- From 2005-2006 to 2006-2007, PhD-granting Alliance universities experienced **lower undergraduate enrollment decreases (-4.25% Alliance; -17% national)**, and **graduate enrollment increases (8%)** while these numbers dropped nationally (-5%) [Taulbee 2008].
- From 2006-2007 to 2007-2008, PhD-granting Alliance universities experienced **lower undergraduate enrollment decreases (-6.9% Alliance; -11% national)**, and dramatically **higher graduate enrollment increases (23% Alliance; 3% national)** [Taulbee 2009].

**Participation in STARS**

The STARS Alliance is having a positive, viral impact on faculty and college and K-12 students.

- The STARS Leadership Corps has engaged more than **700 college SLC students** in computing outreach, research and service, resulting in **statistically significant improvements** in their computing self-efficacy, GPAs, commitment to computing, and perception of computing as socially relevant.
- The Corps has reached out to over **18,000 K-12 students** through summer camps, mentoring, after-school programs, and recruiting events at over 40 locations across the southeast.
- **May 2009 SLC Student Program Evaluation Survey Results:**
  - 77% show **increased interest in graduate education**
  - 92% felt that STARS helped others understand the value of computing
  - SLC students believe their projects were **meaningful**
  - 50% performed outreach as a primary project and felt they **motivated K-12 students** in technology
- **May 2009 Alliance Steering Committee Survey Results:**
  - 100% of STARS faculty & staff believe in the mission of STARS and trust its leadership
  - **Successes:** student development, partnerships, & outreach; **Challenge:** time management
  - Faculty & staff believe the Alliance is providing **strong professional collaborations** for recruiting students, recognition, research motivation and writing collaborations

**Building Community**

The 4 annual STARS Celebration conferences are forming a **strong BPC research community**.

- Over **775 attendees** from 2006-2009 from STARS, EL Alliance, A4RC, CAHSI, and NCWIT
- Presentations and workshops on BPC and technical research and professional development
- **2009 Celebration Survey Results:**
  - 99% of students felt the Celebration was welcoming, beneficial and **built community**
  - 100% of faculty & partners were **inspired** to engage in BPC practices
  - 100% of faculty & partners felt the conference promoted **professional collaborations**
STARS Programs emphasize the central values of excellence, leadership, civic engagement, service, and community. Early research experiences, internships and hands-on training promote increased competence, confidence, and interest in computing. Leadership, professional development, and teamwork develop students’ soft skills—critical for success in the computing workforce. Civic engagement and community service help to change the image of computing from a machine-centric field to a people-centered field, show the social relevance of computing, and emphasize computing applications. Mentoring and community-building among students develop students’ identity as computing professionals, regardless of gender or ethnicity.

### The STARS Leadership Corps Model

STARS Programs emphasize the central values of excellence, leadership, civic engagement, service, and community. Early research experiences, internships and hands-on training promote increased competence, confidence, and interest in computing. Leadership, professional development, and teamwork develop students’ soft skills—critical for success in the computing workforce. Civic engagement and community service help to change the image of computing from a machine-centric field to a people-centered field, show the social relevance of computing, and emphasize computing applications. Mentoring and community-building among students develop students’ identity as computing professionals, regardless of gender or ethnicity.
**STARS Alliance Overview**

The previous page shows an overview of the structure and members of the Students and Technology in Academia, Research and Service (STARS) Alliance. The Alliance has grown from 11 to 20 academic institutions who collaborate with education, corporate, and community partners to broaden participation in computing (BPC). The alliance purpose is to impact the culture and practice of computing disciplines by implementing, disseminating, and institutionalizing effective practices for recruiting, bridging, and graduating women, under-represented minorities and persons with disabilities in computing disciplines.

**Motivation**

Dramatically broaden participation in computing through best practices & community building.

Our motivation for forming the alliance derives from the substantial results published to inform effective practices for recruiting, bridging, and graduating under-represented persons in computing. Since many BPC interventions are implemented as tangential to the core research, teaching and service mission of academia, even successful programs can end when the faculty champion leaves or funding ends. Evaluating BPC implementations at an inter-institutional level provides a pool of resources and expertise, while offering stronger evidence and incentive for institutionalizing effective practices. Furthermore, research shows that higher student retention rates and satisfaction, particularly among minority students, result from the existence of a community of “like” students to support the development of a student’s identity [Coh05, Blu05, Tho05, Sel98]. However, the representation of some demographic populations is so small within an institution, it is difficult to foster communities of “like” students. Community-building efforts must extend beyond a single academic institution and beyond academia, as well.

**Innovation**

The STARS Alliance uniquely provides a unified framework to wrap successful programs.

Despite the number of best practices throughout multiple programs, none of these approaches integrate outcomes measurement into longitudinal and comprehensive data analyses. Our model is designed as a unified framework to wrap successful programs, such as Research Experiences for Undergraduates, Civic Engagement, and Outreach, with community building and development opportunities for students. In wrapping these existing programs into one model, the SLC is able to accomplish several components beneficial to BPC. Standardized, collective, and systematic research will demonstrate what program interventions are most successful in recruiting and retaining students in computing education and careers to produce comprehensive, consistent and meaningful evaluation. This model allows for existing programs to continue ongoing efforts unique to each institution while contributing to the collective evaluation.
In addition, research shows that higher student retention rates and satisfaction, particularly among minority students, result from the existence of a community of “like” students to support the development of a student’s identity [Coh05, Blu05, Tho05, Sel98]. However, the representation of some minority student populations is so small within their institutions that it is difficult to foster communities of like students. The STARS SLC model broadens a student’s community to include other academic institutions, as well as the community at large. Furthermore, the SLC emphasis on developing the students as members of a corps serves to enable students to see their community as being comprised of computing leaders, rather than being defined solely by gender, ethnicity, or (dis)ability. By building common STARS Alliance values, and wrapping programs together across the Alliance, we are able to create a larger community of like students, and thus strengthen the sense of community among both majority and underrepresented students.

The STARS Leadership Corps Model

Leadership Projects
are existing programs shown to be effective for BPC; The SLC puts a common “wrapper” around these to support an extended community and cohesive evaluation across programs & organizations

The STARS Leadership Corps is a national call to action…”to recruit, develop and become the next generation of computing professionals”

STARS Values
The SLC fosters an extended student community among academia, industry and the community through civic engagement, mentoring, professional development, and research experiences.

- **Excellence** – developing students’ technical excellence. Motivating and enabling students to become highly competent in computing, thereby increasing their confidence and interest in computing; preparing for entry into workforce, grad school and professoriate.
- **Leadership** – developing students’ soft skills, including leadership and professional development, team work, writing, speaking, time-management, and work/life balance.
- **Civic Engagement and Service** – developing students’ ability and desire to use computing and technology in service to society. Helping students to see the social relevance of computing, both through the workforce and research.
- **Community** – developing students’ sense of belonging within a larger computing community; training on identity development, diversity, gender issues, persons with disabilities, and a tiered mentoring model.

STARS Goals
Recruiting, bridging, retention, faculty advancement, sustainability, and dissemination

- **Recruit and retain** under-represented populations in post-secondary computing programs and increase awareness of computing disciplines and careers. Bridge student readiness for computing and increase the number of undergraduates who enter computing graduate school or workforce.
- **Advance** assistant professors by increasing faculty peer and mentor support for research, teaching, and managing service.
- **Sustain & Institutionalize** effective BPC practices at alliance institutions partnerships.
• **Disseminate** and increase national awareness of effective BPC practices.

### STARS Alliance Roles and Responsibilities

<table>
<thead>
<tr>
<th>Structural Component</th>
<th>Member(s)</th>
<th>Roles and Responsibilities of Component Member(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PI &amp; Project Manager</td>
<td>Teresa Dahlberg</td>
<td>Role: Project Manager&lt;br&gt;UNC Charlotte&lt;br&gt;Responsibilities: General point of contact for the alliance; Chair of the Alliance Steering Committee; Coordinate communications and activities of the Alliance Exchange Coordinate SLC implementation; Provide information in support of evaluation; Report to the NSF</td>
</tr>
<tr>
<td>Co-PI &amp; Evaluation Manager</td>
<td>Tiffany Barnes</td>
<td>Role: Overall Project Evaluation&lt;br&gt;UNC Charlotte&lt;br&gt;Responsibilities: General point of contact for the evaluation team; Coordinate communications and activities of the Evaluation Team; Insures that all aspects of evaluation are being addressed</td>
</tr>
<tr>
<td>External Evaluators</td>
<td>Kim Buch, Audrey Rorrer</td>
<td>Role: Evaluation Team Members- Overall Project Evaluation &amp; Data Collection&lt;br&gt;UNC Charlotte&lt;br&gt;Responsibilities: Insure that all aspects of evaluation are being addressed; Lead evaluation for overall Alliance, SLC; Collect supporting data; Report and disseminate progress toward goals</td>
</tr>
<tr>
<td>Web Portal Coordinator</td>
<td>Anthony Chow</td>
<td>Role: Evaluation Team Member for Institutional Data; Web Portal &amp; Marketing&lt;br&gt;UNC Greensboro&lt;br&gt;Responsibilities: Lead evaluator of web portal and marketing campaign</td>
</tr>
<tr>
<td>Academic Liaisons</td>
<td>See page 3 for comprehensive list</td>
<td>Role: Support STARS Leadership Corps and Demonstration Projects&lt;br&gt;Responsibilities: Provide information needed to support evaluation; Serve on Ad Hoc committees to lead Alliance; Manage Alliance implementation at institutional levels</td>
</tr>
<tr>
<td>Demonstration Project (DP) Coordinators</td>
<td>Laurie Williams, NCSU</td>
<td>DP: Pair Programming</td>
</tr>
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<td></td>
<td>Nate Thomas, USFP</td>
<td>DP: Mentoring Program</td>
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<tr>
<td></td>
<td>Tiffany Barnes, UNCC</td>
<td>DP: C-STARS: Culturally Situated Design Tools (CSDTs)</td>
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<tr>
<td></td>
<td>Cheryl Seals, Auburn</td>
<td>DP: African American Researchers in Computer Science (AARCS)</td>
</tr>
<tr>
<td>Management Team @ UNC Charlotte</td>
<td>Teresa Dahlberg</td>
<td>Role: Director; Responsibilities: Lead team in support of overall alliance</td>
</tr>
<tr>
<td></td>
<td>Maria Soliman</td>
<td>Role: Member; Responsibilities: Support alliance budget and planning</td>
</tr>
<tr>
<td></td>
<td>Karen Bean</td>
<td>Role: Member; Responsibilities: Support alliance planning and operations</td>
</tr>
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</table>

### STARS Evaluation Model

Evaluation is a critical component of the STARS Alliance, to assess program efficacy and to inform the community of best practices that can be successfully applied within the respective communities. Daniel Stufflebeam’s Context, Input, Process, Product (CIPP) model [Stu00] is being used to assess the STARS Leadership Corps, providing valuable formative and summative evaluation measures.
## Instruments and Implementation

The chart below relates program goals with activities, measures, data collection and key findings as of May 2009. To collect and report on important factors while keeping data collection requirements low, the AET has established online data collection tools, training at Celebrations, collecting information primarily through online surveys and a single report each semester. The AET has also required that an SLC student act as Evaluation Assistant at each STARS Institution.

<table>
<thead>
<tr>
<th>Goals &amp; Outcomes</th>
<th>Activities &amp; Example Measures</th>
<th>Data Collection</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal 1: Recruitment</strong>&lt;br&gt;Desired Outcomes: Increased enrollments in computing &amp; student awareness about computing</td>
<td>- Alliance Exchange&lt;br&gt;- Demonstration Projects&lt;br&gt;- STARS Celebration&lt;br&gt;- Student &amp; faculty participation&lt;br&gt;- Enrollment &amp; attitudes</td>
<td>- Pre-post test&lt;br&gt;- Electronic journals&lt;br&gt;- Participation&lt;br&gt;- Institutional enrollments&lt;br&gt;- Longitudinal SLC participant data Collection (2010)</td>
<td>- Change 2006-07 to 2007-08 in computing enrollments better than Taubbee schools: &lt;br&gt;- Grad: +23% : +3%&lt;br&gt;- UG: -4% : -17%&lt;br&gt;700 SLC students since 2006</td>
</tr>
<tr>
<td><strong>Goal 2: Bridging</strong>&lt;br&gt;Desired Outcomes: Increased student readiness to enter computing &amp; increased number of undergrads to enter grad school, workforce</td>
<td>- STARS Web site&lt;br&gt;- Marketing &amp; Careers campaign&lt;br&gt;- SLC training&lt;br&gt;- STARS Celebration&lt;br&gt;- No. of people affected&lt;br&gt;- Attitude scales</td>
<td>- Pre-post test&lt;br&gt;- Marketing report&lt;br&gt;- Project proposals&lt;br&gt;- Enrollment</td>
<td>- Statistically significant increases in computing efficacy, computing commitment, STARS identity and Grade Point Average for undergraduate SLC students</td>
</tr>
<tr>
<td><strong>Goal 3: Retention</strong>&lt;br&gt;Desired Outcomes: Increased computing graduation rates, year-to-year persistence, commitment to major in computing &amp; college GPA</td>
<td>- Alliance Exchange&lt;br&gt;- Demonstration Projects&lt;br&gt;- STARS Celebration&lt;br&gt;- Student &amp; faculty participation&lt;br&gt;- Enrollment, GPA, psychosocial, development &amp; satisfaction scales</td>
<td>- Pre-post test&lt;br&gt;- Comparison surveys&lt;br&gt;- Enrollment&lt;br&gt;- Longitudinal data Collection</td>
<td>- Statistically significant increases in computing efficacy, computing commitment, STARS identity and Grade Point Average for undergraduate SLC students</td>
</tr>
<tr>
<td><strong>Goal 4: Advancement</strong>&lt;br&gt;Desired Outcomes: Increased faculty &amp; peer mentors &amp; support for research, teaching, &amp; service</td>
<td>- Advisory Board&lt;br&gt;- Demonstration Projects&lt;br&gt;- Task Force Dialogues&lt;br&gt;- Alliances Exchange&lt;br&gt;- Faculty RPT achievement &amp; faculty attitudes assessment</td>
<td>- Qualitative interviews with faculty&lt;br&gt;- Faculty surveys&lt;br&gt;- Faculty products &amp; publications</td>
<td>- ALL Faculty report developing professional collaborations through Alliance &amp; Celebration&lt;br&gt;- 6 workshop, 26 conference and 10 journal publications</td>
</tr>
<tr>
<td><strong>Goal 5: Sustainability</strong>&lt;br&gt;Desired Outcomes: Sustain Alliance efficacy &amp; institutionalize Alliance partnerships</td>
<td>- Advisory Board&lt;br&gt;- Demonstration Projects&lt;br&gt;- Task Force Dialogues&lt;br&gt;- Organizational efficacy (participation, collaborations, policies adopted)</td>
<td>- Alliance Scorecards (Formerly called Bi-annual board reports; scorecard tabulation began in spring 2008)</td>
<td>- 15 classes at 10 universities now use pair programming&lt;br&gt;- 7 STARS classes/clubs created</td>
</tr>
<tr>
<td><strong>Goal 6: Dissemination</strong>&lt;br&gt;Desired Outcomes: Increased national awareness of effective BPC practices, model &amp; repository for BPC, Alliance implementation &amp; evaluation methodology promoted</td>
<td>- Task Force Dialogues&lt;br&gt;- Products Index&lt;br&gt;- STARS Web site&lt;br&gt;- Marketing campaign&lt;br&gt;- Alliances exchange&lt;br&gt;- Entire SLC program&lt;br&gt;- STARS Celebration&lt;br&gt;- Organizational efficacy (participation, collaborations,</td>
<td>- Alliance Scorecards (Spring 08 and on)</td>
<td>- Faculty &amp; students report inspiration for BPC practices (Celebration)&lt;br&gt;- 9 Marketing kits disseminated&lt;br&gt;- 234 college students in SLC&lt;br&gt;- 6 workshop, 26 conference and 10 journal publications at national and international venues</td>
</tr>
<tr>
<td>policies adopted</td>
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</table>
**STARS Alliance Exchanges**

The organizational structure of the STARS Alliance consists of an advisory board and an alliance exchange. Each of the alliance institutions brings together representatives from the academic institutions, school districts, industrial corporations and community groups who are partnering to implement interventions within particular schools or communities, which serves as our advisory board. The advisory boards provide input and support from the community and industry for reaching target populations (e.g., immigrant families not familiar with academia), providing internship opportunities for students, and assisting with dissemination of initiative opportunities and results. We refer to Alliance-wide interaction as the Alliance Exchange. It includes an Alliance Steering Committee (ASC), an Evaluation Team and multiple Task Force Dialogues. A total of 4 committees were in operation during the spring term. Two committees, the Alliance Steering Committee and the Evaluation Team, are permanent. Two ad hoc committees continued to address demonstration project needs, the Mentoring Committee, to plan the Celebration, Celebration Planning Committee.

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**Student Exchanges**

**Blogs & Social Networks: 4 Stars**

The entire SLC program has a Facebook Site: STARS Alliance SLC, with 131 members. Three STARS institutions, UNCC, NCSU, and FAMU, have official student blogs and social network sites. FAMU student journals will be available online soon. NCSU has seven student blogs on their STARS website, each of which detail student projects, goals, and progress. UNC Charlotte students use an online social network site, What’s Up CCI, [computersareme.com/whatsupcci](computersareme.com/whatsupcci).

UNC Charlotte students have created a social networking game called Snag’em to engage STARS students with one another, that was played at the STARS Celebration 2009 by about 30% of attendees. The game has been expanded and is being used to build community at UNCC in Spring 2010. The Snag’em project was supported through the UNC Charlotte REU Site additional funding from the Computing Research Association for a Collaborative Research Experiences for Undergraduates.

**Outcomes:** Students report a sense of belonging in STARS through surveys.

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**Alliance Exchange**

**Fall 2008 – Fall 2009**

**Alliance Steering Committee: 13 Meetings; 20 Institutional Members**

During Spring 2008 and Fall 2009, the topics of discussion included institutionalization of STARS, updates from each member institution, operational issues, and demonstration project implementation. Generally, this committee meets monthly throughout the year, with subgroup meetings as needed. STARS Celebration registration and budget processes were discussed, planned, and announced. Meeting Attendance in total for the term was 77%, with an average of 15 members present.

**Outcomes:** 100% of faculty and staff believe in STARS, trust its leaders, and are forming useful collaborations.

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**Communication Tools**

All committee meetings occur via teleconference. Web Office and Google Docs are the primary modes of information and document sharing. Web Office houses an institutional database, Alliance publications, and serves as a repository for report deadlines and meeting calendars. Teams use Google Docs for group documents in as needed. An Alliance wide listserv, [stars-l@listserv.uncc.edu](stars-l@listserv.uncc.edu), established in 2006, serves to disseminate a wide range of information across the Alliance. Meetings are announced with agendas, important dates are shared, relevant BPC information and issues of common interest are discussed.

**Outcomes:** Coordination of data collection has become easier, as indicated by faculty not reporting it as a challenge in 2009.

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**Marketing & Careers Campaign**

[www.starsalliance.org](www.starsalliance.org) is the center for our Marketing and Careers Campaign for K-12 students. The focus of marketing in the next year is website improvement and distribution of marketing kits to guidance counselors at K-12 schools in regions where STARS has university partners.
Evaluation Team:
9 Meetings; 4 permanent members
The Evaluation Team addresses how to evaluate and measure the Alliance from both formative and summative perspectives. The primary focus of the academic was threefold: 1) establishing scorecards for institutional and Alliance performance measurement, 2) preparing and streamlining online project management tools, Web Office and Google Docs, for implementation in the Alliance wide data collection, 3) developing evaluation instruments for demonstration projects and campus climate, and 4) preparing and submitting IRB applications. Data collection for institutional activities and enrollments continue to be a challenge for the committee. Timelines and ease of collection from institutions were discussed, as were scorecard metrics. IRB applications were planned and implemented Alliance wide for campus climate, longitudinal data collection, and mentoring. One hundred percent attendance was achieved from the corps members of the team. Ad hoc members joined in scorecard planning and reporting refinement discussions.

Outcomes: This report and a number of publications.

Celebration 2009 Planning Committee:
6 Meetings; 16 Members
The Celebration team met six times in Spring 2009 to plan and organize Celebration 2009. The committee managed conference registration, marketing, budget, workshop solicitation and selection, program development, and logistics of the conference. This year marks an expansion from previous Celebrations, in that additional Alliances will join in participation (EL Alliances, A-Force, CAHSI, CRAW, and ARCS).

Outcomes: Refer to the Celebration highlights, the Celebration program, and the Celebration Participant Surveys.

Mentor Committee:
6 Meetings; 8 Members
This committee implements and manages the the Mentoring Demonstration Project. The meetings functioned to provide updates and support. Topics addressed included recruitment & curriculum implementation, managing mentor mentee relationships, and developing new technology (blogs & google docs) to collect mentoring log data.

Outcomes: Refer to the Mentoring Evaluation summary below.
**Academic Liaison Survey and Interview Results**

In May and December 2009 a survey was administered to Alliance Steering Committee (ASC) members, and is primarily targeted to the Academic Liaisons who coordinate most STARS activities. Tasks that were most often engaged in on a regular basis by members were advising SLC students, managing the SLC projects at their respective institutions, conducting outreach and recruiting events, and formulating community partnerships. Academic Liaisons were also interviewed in August 2009 at the STARS Celebration. Survey & interview results are presented below.

**Alliance Steering Committee Surveys 2009**

100% (Spr09) and 92% (F09) of ASC survey respondents believe in the mission of STARS, think that the mission is feasible, and trust the STARS leadership.

<table>
<thead>
<tr>
<th>Respondents (Spring 2009 and Fall 2009)</th>
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<tbody>
<tr>
<td><strong>Spring 2009:</strong> 27 respondents;</td>
</tr>
<tr>
<td>• 27 respondents: 26 Academic Liaisons, 1 Evaluation Assistant SLC student</td>
</tr>
<tr>
<td>• Alliance participation: 15% &lt;1 year, 52% 1 year, 7% 2 years, 26% 4 years</td>
</tr>
<tr>
<td><strong>Fall 2009:</strong></td>
</tr>
<tr>
<td>• 12 respondents: 11 Academic Liaisons, 1 Alliance leader</td>
</tr>
<tr>
<td>• Alliance participation: 8% &lt;1 year, 17% 1 year, 42% 2 years, 8% 3 years, 25% 4 years</td>
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</tbody>
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<thead>
<tr>
<th>Alliance Activities Performed by Respondents</th>
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<tbody>
<tr>
<td>• 82% (Spr09), 92% (F09) manage the SLC at their institutions</td>
</tr>
<tr>
<td>• 85% (Spr09), 92% (F09) advise student SLC projects</td>
</tr>
<tr>
<td>• 48% (Spr09) manage demonstration project implementation at their star</td>
</tr>
<tr>
<td>• 56% (Spr09), 75% (F09) build community partnerships</td>
</tr>
<tr>
<td>• Average # of hours spent per week on SLC=6 (Spr09), 3.5 (F09)</td>
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<tr>
<th>Perceptions of the Alliance and their Role in it</th>
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<tbody>
<tr>
<td>• 90% (Spr09) report having the resources needed to help SLC students meet their goals</td>
</tr>
<tr>
<td>• 96% (Spr09), 92% (F09) understand their role, and their STARS responsibilities</td>
</tr>
<tr>
<td>• 96% (Spr09), 85% (F09) are satisfied with the level of flexibility within the Alliance</td>
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<tr>
<th>Relationship with and Perceptions of STARS Students</th>
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<tr>
<td>• 100% (Spr09), 75% (F09) felt their students were well-prepared to do their STARS projects</td>
</tr>
<tr>
<td>• 93% (Spr09), 92% (F09) felt their students exhibited commitment and passion for projects</td>
</tr>
<tr>
<td>• 96% (Spr09), 83% (F09) felt that their students’ expectations were met</td>
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</tbody>
</table>

**Distinctions between May 2008 & May 2009 ASC Survey Findings**

The tasks most commonly engaged in matched the 2008 results with one notable exception. In 2008, ASC members reported evaluation as a regular task whereas only 5 respondents noted evaluation in the 2009 survey. Evaluation fell from the list of notable challenges in 2009, an indication that the revised evaluation practices removed evaluation as an obstacle for Academic Liaisons in 2009. Time management continues to be a challenge for ASC members, and hopefully the inspirational force of the Alliance expressed by many ASC members in their surveys and interviews offsets this challenge. It is interesting to note, yet not unexpected, that as last year’s new members move into their second year of operating a Star, the percentage of ASC members who reported building community partnerships increased to 56% from 44% in 2008.
96% indicated understanding their role in the Alliance, up from 80% in the 2008 survey. 100% of respondents felt their SLC students were well prepared to carry out their projects, up from merely 75% in 2008.

These changes from 2008 to 2009 can be attributed to modification in evaluation reporting which include simplified reports and the addition of Evaluation Assistants at each Star, along with enhanced student training and faculty orientations during the 2009 STARS Celebration.

### Alliance Faculty Interviews, August 2009

Academic Liaisons are interviewed at each STARS Celebration to gather individual feedback about Alliance successes and challenges they experienced during the year. The main themes from these interviews were a sense that STARS is achieving name recognition and is making significant BPC accomplishments. Other emergent themes are listed below.

<table>
<thead>
<tr>
<th>Benefits to Alliance membership</th>
<th>Challenges:</th>
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<tbody>
<tr>
<td>• Increased institutional support of BPC</td>
<td>• Funding</td>
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<tr>
<td>• Increased campus &amp; personal recognition</td>
<td>• Implementing institutionalization</td>
</tr>
<tr>
<td>• Desire for Alliance longevity beyond grant</td>
<td>• Building collaborations</td>
</tr>
<tr>
<td>• Motivation to participate driven by mission, student outreach, and invitation from people of influence</td>
<td>Without STARS Alliance:</td>
</tr>
<tr>
<td></td>
<td>• Little or no outreach would occur</td>
</tr>
<tr>
<td></td>
<td>• BPC efforts would not be possible at current involvement levels</td>
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</tbody>
</table>
STARS Celebrations

The annual STARS Celebration, which is held each August, is our hallmark event. **Participation in the Celebration continues to grow each year**, from 128 participants in 2006 to 277 participants in 2009 *more than double from the first year*. The annual conference is a significant part of the Alliance in that it culminates our key values by showcasing excellence, leadership, civic engagement and community through posters, presentations, key note speakers and workshops. The Celebration has been central to building a computing community among underrepresented students and faculty. New SLC students are introduced to mentoring, leadership skills, research experiences, preparing for graduate school, professional development and civic engagement. Returning SLC students assist with training new students by sharing their experiences and engaging in leadership roles. New faculty and partners are oriented to the Alliance model and provided opportunities for networking and professional collaborations, such as writing circles and demonstrations of technical excellence. Working in teams, the students choose their academic year assignment by the end of the week, while faculty Academic Liaisons determine their SLC objectives and plan for the upcoming year. This report provides overall Celebration highlights and details the 2009 Celebration. For detailed summaries of the 2006, 2007 and 2008 Celebrations, please see the previous annual reports online (www.starsalliance.org).

**2009 STARS Celebration**, Tallahassee, FL: FSU and FAMU campuses
Program Chairs: Dr. Jason Black and Dr. Ebe Randeree
Focus: Making a Difference
Attendance: 277 (212 students, 41 faculty/staff and 24 partners & guests)

Celebration 2009 Overview

The event celebrated the success of the 3rd year of the Alliance and provided an energetic start to the 4th year of the organization's commitment to broadening participation in Computing and Information technology across the United States.

The Celebration included STARS members and guests representing *over 20 colleges* and universities as well as members of the *EL Alliance*. The A4RC joined efforts to provide research focused sessions, and CRAW provided mentoring sessions. Key notes included Dr. Brian Blake, Dr. Tracy Camp and Dr. Naomi Boyer.

Student participation included a judged poster competition highlighting leadership projects undertaken by their SLC programs. The *student developed networking game SNAGem* was instituted successfully. In addition, the conference offered numerous opportunities for training sessions, spanning such topics as Leadership, Technical Excellence, Web Development, and Community Outreach as well as workshops featuring Culturally Situated Design Tools, Mentoring Programs, and Assistive Technology, just to name a few.

Poster Session

Poster Chairs: Chutima Boonthum, Hampton University, and Kristin Watkins, Meredith College

Award Winners

**K12 Outreach**: Caitlin Buckhaults, University of South Carolina and Samantha Finkelstein, UNC Charlotte

**Retention**: Kirk Yoder, Florida State University

**Service Learning**: Corey Alexander, Georgia Southern University and Tara Durant, Hampton University
Student Celebration Survey Results, 2009

Responses from student 2009 STARS Celebration attendees were overwhelmingly positive.

- 99% of student attendees felt the Celebration was beneficial
- 91% were satisfied overall with the Celebration
- 98% felt welcomed at the Celebration
- 96% felt the Celebration provided adequate opportunities for Community building
- 97% reported learning about graduate school opportunities and funding sources
- Student themes for improving future Celebrations included providing more time for SCL team building, and incorporating breaks between sessions.

Due to the 2008 Opportunities for Improvement feedback to provide more social activities and professional networking, separate tracks were offered for students and faculty, and a social networking game, SNAG em, was introduced.

Faculty/Partner Survey Results, 2009

Responses from faculty, staff, & partner attendees were overwhelmingly positive.

- 93% reported that the conference met their expectations
- 98% were satisfied with the conference overall
- 100% reported developing helpful professional collaborations
- 100% were inspired them to become more involved in BPC
- Attendees felt the conference demonstrated how STARS can impact college students (100%) and 95% the culture of computing

- Themes for improving future Celebrations matched student responses of incorporating more Home Team Planning (team building) and offering more break periods; additional suggestions included hosting in a conference hotel facility. The formative feedback has been incorporated in the Celebration 2010, which will have scheduled breaks, Home Team Planning, and be hosted in a single hotel location.
Note: Celebration Registration participants self select their category; student participants from partner organizations (such as EL Alliance, ARCS) indicate themselves as student category.

**Student survey results from each Celebration show consistent results. Students find the Celebration to:**

- Inspire more involvement in BPC efforts
- Provide opportunities for community building
- Connect them with peers and faculty
- Learn about research and graduate school.

These cumulative findings indicate that the Celebration is **engaging students in a like community of peers focused on service learning and demystifying the graduate school experience.**

**Faculty & partner survey results** from each Celebration show that benefits of the Alliance include:

- collaborations between institutions
- networking
- idea generation for research and publications
- belief that participation is highly beneficial to students.
These themes are a strong indication that Alliance participation is beneficial to career and professional support and is fostering new partnerships.
Demonstration Projects in the STARS Alliance

STARS Alliance directly supported three demonstration projects in the 2008-2009 academic year: the STARS Leadership Corps, Pair Programming, and Mentoring. Each STARS institution implements the SLC every semester, and must implement Mentoring and Pair Programming at least once. These projects represent best practices for curricular and extra-curricular support that can help students be successful. Two separately funded projects are affiliated with STARS, C-STARS and AARCS.

The STARS Leadership Corps (SLC)

The STARS Leadership Corps (SLC) is a multi-year experience providing students with multiple touch-points to find information and support throughout their academic journey. Within the SLC, students participate in an outreach, research, service, or internship project supported by community building through monthly seminars and tiered mentoring. All SLC students write about and present their experiences at the annual STARS Celebration conference. An intentional effort is made to inform SLC students of opportunities for Research Experiences for Undergraduates (REUs), graduate education, internships, and outreach opportunities throughout the Alliance.

Outreach Ambassadors: SLC students design their own creative way to spread the word about computing to K-12 students, parents, and teachers in their areas. Ambassadors are challenged to dispel common misconceptions about computing (study, careers, myths) that abound among parents, counselors, teachers and students and participate in established outreach programs.

Service Learning: Students are enlisted to use their computing skills for community good, e.g., to setup networking and web sites for non-profits or for tutoring gate-keeper courses such as algebra.

Research Experiences for Undergraduates: Undergraduates are guided through a research experience by graduate student mentors, as per Georgia Tech’s Intel Opportunities Scholars program, or by a faculty mentor, as per Auburn’s Scholars of the Future and UNC Charlotte’s McNair Scholars program. Students write a research paper in a publishable format, present their work to peers and share their experiences with 7th-12th graders.

Internships: Students work in industrial settings to gain experience. Students write about and present their experience to peers and give a career presentation to K-12 students or educators.
Peer Coordinators, Ambassadors, & Mentors: Typically Peer Coordinators (PC) lead students in activities that the PC has previously carried out. Peer Ambassadors may develop a student chapter of a professional society for women or minority students. Peer Mentors provide mentoring to junior peers, e.g., juniors/seniors mentor freshman/sophomores and grads mentor juniors/seniors.

Summary Statistics for STARS Leadership Corps
(Reported participation from STARS Institutions)

<table>
<thead>
<tr>
<th>Year</th>
<th>STARS Institutions</th>
<th>SLC Students</th>
<th>Gender</th>
<th>SLC Ethnicity/Race</th>
<th>Education Levels</th>
<th>Outreach Events</th>
<th>Celebration attendance</th>
<th>SLC Primary Project types</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006-7</td>
<td>10</td>
<td>122</td>
<td>58% F;</td>
<td>African American</td>
<td>Undergraduate</td>
<td>5 @ AU, UNCC, FSU</td>
<td>2300</td>
<td>Outreach</td>
</tr>
<tr>
<td>2007-8</td>
<td>11</td>
<td>125</td>
<td>46% F;</td>
<td>Caucasian</td>
<td>Graduate</td>
<td>96 Events in Spr08</td>
<td>2838</td>
<td>Service</td>
</tr>
<tr>
<td>2008-9</td>
<td>21</td>
<td>229</td>
<td>48% F;</td>
<td>Hispanic</td>
<td></td>
<td></td>
<td>6051</td>
<td>Mentoring</td>
</tr>
<tr>
<td>Fall 2009</td>
<td>21</td>
<td></td>
<td>57% F;</td>
<td>Other</td>
<td></td>
<td></td>
<td>6923</td>
<td>Research</td>
</tr>
</tbody>
</table>

Gender: 42% M; 54% M; 52% M; 42% M

African American: 43%; 44%; 53%; 44%
Caucasian: 48%; 39%; 37%; 33%
Hispanic: 7%; 4%; 5%
Other: 12%; 10%; 5%; 18%

Education Levels: (from SLC Program Evaluations)
Undergraduate: 106; 104; 196; 183*
Graduate: 16; 21; 33; 52*

Outreach Events: (from STARS Data Reports)
No. of Outreach Events: 5 @ AU, UNCC, FSU; 96 Events in Spr08; 290; 142*
No. of Outreach Attendees: 2300; 2838; 6051; 6923*

Celebration attendance: (from registration)
Students: 105; 113; 183; 212
Faculty/Staff: 23; 43; 52; 41
Partners & Guests: 0; 50; 26; 24

SLC Primary Project types: (from SLC Program Evaluation Surveys)
Outreach: 48%; 46%; 56%; 42%
Service: 7%; 17%; 20%; 15%
Mentoring: 17%; 23%; 12%; 22%
Research: 25%; 12%; 10%; 19%
Internship: 3%; 2%; 2%; 2%

*All institutional data was not available at the time of this report.

STARS Leadership Corps Project Types
2006-2007 is a % of all selected; each student could select multiple. 2007-2009 are by primary type.
The STARS Alliance Mentoring Demonstration Project 2009

Coordinator:

Dr. E. Nathan Thomas III,
Campus Diversity Officer

Mentoring Demonstration Project Description

The goal of Identity-based Mentoring using the *Thomas Principles (IMTP) across the STARS Alliance is to help universities increase recruitment, bridging, retention, academic success and graduation of underrepresented students and women in computing and technology. The implementation of the mentoring model includes three steps: 1) Training and technical assistance for mentoring program implementers. Training is provided annually in January followed with bi-monthly meetings for technical assistance. 2) Training for the mentors on IMTP and promoting strong mentoring relationships. Student mentor training is conducted during the STARS Alliance annual celebration in August. Mentor training concepts are reinforced through school-based SLC activities. 3) Evaluation that examines the transfer of Advisor implementation to mentors effectiveness that impacts the increase of underrepresented students and women into computing and technology.

Requirement for schools to participate in project

1) Program Advisors attend Mentor Program training in January
2) Develop and implement a mentor and mentee recruitment plan
3) Program Advisors attend bi-monthly advisor meetings
4) Student mentors attend mentor training at STARS Celebration pre-workshop in August
5) Develop and Implement Fall/Spring mentoring program curriculum
6) Complete STARS Evaluations (Organization level and Mentor/Mentee level)

Mentors hone in on Dr. Thomas' message about the skills they need to be effective mentors.


Mentoring Advisory Committee
-Karen Bean, UNC Charlotte
-Kristy Boyer, NC State
-Joe Grafsgard, NC State
-Alretha McKenzie, USF Poly
-Chutima Boothum, Hampton
-Cherryl Seals, Auburn
-Gina Bullock, NC A&T
-Kera-Bell-Watkins, GSU
-Audrey Rorrer, Evaluation

Participating Universities:
-UNC Charlotte (UNCC)
-USF Poly (USFP)
-NC State
-FAMU
-Auburn University
-Spelman College
-NC A & T
-Georgia Southern University
-Hampton University

Website:
http://www.poly.usf.edu/x3702.xml
**Mentoring Program Outcomes 2008-2009**

**Organization Outcomes**

**2009 Mentor Program Training**

In 2009 Auburn, NC State, NC A&T, and USF Poly had personnel retrained because their programs were transitioning to new program leaders. Hampton was a new comer to the demonstration project and attended the training for mentor program leaders. Similar to 2008, 100% of the participants rated the training as excellent.

**Program Leader Meetings**

For 2009 six meetings were held for program leaders. The meetings functioned to provide updates and support. Topics addressed included recruitment & curriculum implementation, managing mentor mentee relationships, and developing new technology (blogs & google docs) to collect mentoring log data.

**Prior to celebration**

There were four meetings prior to the STARS celebration and six universities (UNCC, NCSU, Auburn, USFP, GSU, NC A&T, Hampton) attended at least 75% of the meetings. Auburn attended half of the meetings and the program leader struggled with personnel follow through. Auburn experienced some implementation success however it was sporadic throughout the year.

**After celebration**

There were two meetings and five schools attended 100% (UNCC, NC State, USFP, GSU and Hampton) and the other schools 50%. At these meetings leaders discussed starting the school year strong by acquiring mentees and conducting welcome and outreach programs with their students.

**Primary Themes From Organization Surveys**

Program leaders shared that transferring training to implementation can be a challenge for schools and the meetings were helpful. Some school struggled with acquiring mentees and mentee follow through with mentors. Program leaders report that students who participate in the mentor training are most involved and return to STARS the following year. The majority of schools have one to one mentoring relationships and others work with classes and have one mentor for every two mentees.

**Mentoring outcomes**

- Trained fall and spring mentors: 68
- Number of mentees: 60.
- Common mentor activities: SLC Outreach projects
- Top success: STARS students are more engaged
- Challenges: Solidifying the use of technology for collecting log data, mentee participation and accountability, developing an advisory group that lives beyond the leadership of Dr. Thomas, and integrating the principles into other mentoring methods (i.e., e-mentoring).

**2009 mentor training and campus mentoring**

Out of the seven schools that attended meetings all of them participated in the mentoring workshop. Although FAMU had not attended meetings they had students participate in the training. A total of 68 students represented these schools. An additional 33 students participated in the training that did not originally sign up for mentoring. These schools included Georgia Tech, St. Augustine, Landmark and Tennessee Knoxville. The total attendance for the training was 101 students. Out of the additional schools Georgia Tech and St. Augustine were accepted to participate in the 2010 Demonstration Project.

The mentor training continues to be highly rated as a successful training at the STARS Celebration. Students continue to highlight how their training builds their confidence and leadership skills. In 2009 we reported mentoring experiences in an accepted conference paper. Result showed that mentors who participated in the mentoring program compared to those who did not reported significantly stronger feelings that the program improved their academic performance, leadership skills, commitment to a career in computing, confidence in computing, and knowledge of computing.
Mentoring Survey Results

Mentoring began widespread implementation across the STARS Alliance in the 2008-2009 academic year, therefore the 2008-2009 year is the first available year of program outcomes. An analysis of variance (ANOVA) was performed to examine the pre and post SLC outcomes comparisons for the mentoring program participants in the 2008-2009 academic year (excluding non-mentoring participants). The mean outcomes for the survey constructs of career goals, computing interest, computing climate, self-efficacy, computing identity, attitude towards computing, and ethnic identity were compared with only one significant change from pre assessment to post assessment. A significant increase in computing identity was found between pre and post assessment for mentoring program participants (p=.000, Pre- M=3.35, Post- M=4.75).

Note: The survey that year did not distinguish between type of mentoring program participant, i.e. mentor or mentee. Future surveys make this distinction so we anticipate being able to determine differential effects of type of participation. An analysis was conducted on length of students’ participation for pre 08 post 09 without any significant results and indication that time was not a factor in the pre to post changes.

Pair Programming Demonstration Project 2009 Report

Coordinator: Laurie Williams

<table>
<thead>
<tr>
<th>University</th>
<th>Faculty</th>
<th>Classes</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMU</td>
<td>3</td>
<td>7</td>
<td>112</td>
</tr>
<tr>
<td>Georgia Southern</td>
<td>1</td>
<td>3</td>
<td>86</td>
</tr>
<tr>
<td>Hampton University</td>
<td>1</td>
<td>2</td>
<td>41</td>
</tr>
<tr>
<td>NC State</td>
<td>1</td>
<td>2</td>
<td>104</td>
</tr>
<tr>
<td>U. New Orleans</td>
<td>3</td>
<td>3</td>
<td>71</td>
</tr>
<tr>
<td>St. Augustine</td>
<td>1</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10</strong></td>
<td><strong>18</strong></td>
<td><strong>430</strong></td>
</tr>
</tbody>
</table>

Successes:
- Students got to know each other better
- Students were less frustrated
- Teaching staff has less grading
- Students seemed to enjoy lab more
- Students got better grades

Lessons learned:
- Teaching assistants must manage the switch between driver and navigator
- Teaching assistants must watch for pairs where one student seems to be doing more of the work
- Pairs work best when students of similar skill level work together
- Have to manage the situation when students drop the class and one in pair is left to work alone

Description: NC State leads the Alliance efforts to replicate pair programming. Pair programming is a method whereby students work in pairs to complete programming assignments that are part of computer science courses. The method provides students with peer support and social interaction, while increasing student learning. A benefit of pair programming is the increase in retention in computing programs. A Masters student completed a Masters thesis entitled, “Students’ Perception of Distributed Pair Programming in an Upper-Level Undergraduate Software Engineering Course.” In the future, pair programming workshop proposals will be submitted to Grace Hopper and SIGCSE conference to disseminate pair programming beyond the STARS alliance.

Results: During 2008-2009, pair programming workshops were conducted in Tampa in January 2009 and at STARS Celebration 2009. A Masters thesis was completed by a BPC-supported student entitled, “Students’ Perception of Distributed Pair Programming in an Upper-Level Undergraduate Software Engineering Course.” In the future, pair programming workshop proposals will be submitted to Grace Hopper and SIGCSE conference to disseminate pair programming beyond the STARS alliance.

Video: We have released two additional videos to add to our initial video “Fun with Pair Programming.” The first video was geared toward students. The second two videos are geared toward faculty members. One new video provides research results about pair programming for faculty, particularly those who may be reluctant to try pair programming. The other new video provides information on pair programming classroom management techniques. All videos are available at: http://agile.csc.ncsu.edu/pairlearning/
C-STARs Demonstration Project 2009

The Culturally Situated Design Tools help K-12 students learn math & computing in a cultural context as they simulate cultural practices such as Native American beadwork, African sculpture, Break dancing, Mayan temples, Graffiti, and Latino drumming. CSDTs have been used in K-12 schools with large numbers of African American, Latino and Native American students, and preliminary evaluations indicate statistically significant increase in both math achievement and attitudes toward technology-based careers.

Through a partnership lead by Ron Eglash (RPI) and Tiffany Barnes (UNCC), C-STARs engages STARs Leadership Corps students (CSLC) in conducting K-12 outreach with existing tools. Some CSLC students will also create new CSDTs, following a design protocol that ensures respectful use of cultural materials by a participatory process involving local members of educational and cultural communities. The project evaluation examines the impact of CSDTs on both SLC students and their outreach constituency. C-STARs is being implemented at UNCC, Georgia Southern, Hampton, FAMU, during the 2009-2010 academic year.

C-STARs Outcomes 2008

Unc Charlotte C-STARs: Dr. Barnes directs C-STARs work for the Alliance and with 3 groups at UNC Charlotte: GameCATS (4 CSLC), cMotion (3 CSLC), and Dance Tool. The cMotion group is designing a new tool to teach facial expression recognition to Autistic children through the use of online games. The Dance Tool group is creating a new tool to teach computing through Dance Choreography, to be completed in March 2010. The GameCATS conduct outreach to middle school students through Citizen Schools in Charlotte with games and CSDTs. GameCATS ran 2 summer camps Summer 2009 on CSDTs and games. Aecy Boyce has created a new Virtual Bead Loom Game that motivates kids to engage in the more complex tools available.

Georgia Southern C-STARs: Kera Bell-Watkins, C-STARs faculty and 7 CSLC students at Georgia Southern designed and held a workshop for 4-12th graders called “Learn to Culturally Whip Up a Computer.” They used recipes based on cuisines from African-American, Chinese-American, Latino, and Native-American cultures to help engage students in a hands-on approach to building a computer. Students from 4th grade through college participated in the workshop. Attendees were invited from the Girl Scouts, the Boy Scouts, the Boys and Girls Club, the Charter School and Georgia Southern University.

Other C-STARs Schools: Jason Black at FAMU and Ira Walker at Hampton University and their CSLC students have worked to develop partnerships with middle schools in their local areas and will conduct outreach with these schools in Spring 2010. FAMU C-STARs held a summer camp in Summer 2009.

New Curriculum: Dr. Kera Bell-Watkins also developed a new curriculum for students in a Software Engineering class to compete in on teams to develop new CSDTs. In Spring 2009, two teams of 5-6 students developed new versions of the Graffiti Grapher and Skateboard tools, and one team won a prize for the best resulting software.

AARCS Demonstration Project 2009

Juan Gilbert and Cheryl Seals of Auburn University lead a BPC-Demonstration Project called AARCS, which seeks to break myths about graduate programs in computing through role models and presentations.

AARCS broadens participation of African-Americans in computing using three components, Targeted Presentations, Future Faculty Mentoring and an annual mini-conference at Auburn University. AARCS is broadened through participation with STARs by an increased audience for their efforts. http://www.aarcsconference.org/. During the STARS Celebration 2009, AARCS sponsored several research workshops for SLC students.
The surveys consist of:

- **Student demographics** - items included self-report descriptions of gender, age, ethnic identity, current university, transfer student status, current year in school and degree sought, expected graduation date, current major, socio-economic status, and self-reported GPA.

- **Computing Attitudes and Intentions** - confidence in graduating with computing major, confidence in degree completion at current institution, intentions to remain in computing field long-term, interest in attending graduate school in computing, academic goals, career goals, age of first interest in computing, involvement in computing-related extra-curricular activities, involvement in UG research, presence of computer in home while growing up, quality of high school technology program, and expectations for participation in the SLC program.

- **Perceptions of Computing Department, Faculty, and Students** - satisfaction with features of department, types of faculty interaction, level of contact with departmental faculty, perceptions of department sensitivity to diversity, and ratings of the quality of relationships with students, faculty, and staff in the department. A single item measured extent to which students felt a part of the department.

- **Computing Identity** - a measure consisting of twenty 6-point Likert items designed to measure students’ identity with computing as a major and profession.

- **Computing Efficacy** - a measure consisting of twelve 5-point Likert items designed to measure confidence in performing/completing computing requirements.

- **STARS Identity** - a measure of items measuring the STARS values of diversity, inclusion, cooperation, service, and community.

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**STARS Leadership Corps 2009 Survey Results**

STARS Leadership Corps (SLC) students take a pre- and post-survey each year, and a program evaluation at the end of each semester. Since many participants are returning SLC students, note that the August 2009 pre-survey item responses are not pre-intervention measures for these students.

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**December 2009 SLC Program Evaluation Survey Results**

The 4th SLC cohort began in Fall 2009, and results from their December 2009 survey are below:

- 85% plan to continue participation next semester
- 86% agree that STARS increased their interest in graduate education
- 95% felt that STARS allowed them to help others understand the value of computing
- 95% thought STARS was personally rewarding
- 90% agree that STARS made them feel more satisfied with their current major
- 96% believe their project was meaningful
- Participation in STARS increased student’s awareness of career opportunities and enhanced their passion for computing
Overall, results indicate that the second SLC cohort shared many similarities to the preceding years, in that they are academically strong students with high levels of computing efficacy and computing identity. A total of 118 students responded to the program evaluation survey for the 2008-2009 academic year for a 46% response rate. Gender response: 49.1% Female and 50.9% Male. Projects were largely concentrated in K-12 Outreach and Mentoring.

The 2008-2009 SLC is a group of successful, confident students who are satisfied with their major, their departments, their faculty and peers:

- 99% believe they can complete their degree
- 96% reported that the SLC increased their collaborations with faculty and peers
- 94% reported that the SLC increased their leadership skills
- 93% reported that their projects increased their passion about computing
- 95% are satisfied with their computing departments
- 99% believe that computing requires creativity
- 95% are forming meaningful relationships with faculty and peers

These students are looking ahead to a successful future in computing/IT:

- 90% reported that the SLC increased their interest in graduate education
- 97% reported that the SLC increased their commitment to their major
- 91% said that the SLC increased their computing career awareness
- 96% plan to remain in computing long term

These students are developing STARS values and a sense of computing identity:

- 99% are committed to promoting computing to others
- 98% are committed to applying computing to benefit society
- 93% agree that SLC participation enabled them to help other understand the value of computing
- 92% found SLC participation to be personally rewarding
- 85% found their projects to be meaningful and made them feel more satisfied with their major
The STARS evaluation team developed the SLC pre- and post-survey to measure: self-efficacy for computing, sense of computing community, perceived social relevance of computing, intention to remain in computing, and self-reported GPA.

Sense of computing community items were designed to assess student interactions with each other, the computing faculty and their feelings of inclusion. Perceived social relevance of computing measures items such as “Computing research should focus on using computing to improve the lives of others”. Intention to remain in computing was used as a proxy measure for retention and graduation in computing and is termed “computing commitment”.

Participants included 282 undergraduate SLC students who completed pre- and post-SLC assessment surveys between Fall of 2006 and Spring of 2009. This sample included 56% females; 26% males, and 18% who did not specify their gender. The sample included 43% African Americans; 14% Hispanics; 15% Whites; 21% Asian American; 4% American Indian; and 3% who did not specify. Average response rate across the six survey administrations was 71%.

Cronbach’s alpha reliability coefficients were computed for each sub-scale and all yielded acceptable levels (above .70). Independent samples t tests were used to test for pre- and post-differences on all variables. As shown below, there was a significant pre-post improvement in computing efficacy (p=.002), computing commitment (p=.038), social relevance (p=.009) and GPA (p=.013) observed for SLC students. No significant differences were observed for computing community.

<table>
<thead>
<tr>
<th>Mean Differences in Pre- SLC and Post- SLC Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscales</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Computing efficacy</td>
</tr>
<tr>
<td>Social relevance</td>
</tr>
<tr>
<td>Computing community</td>
</tr>
<tr>
<td>Computing commitment</td>
</tr>
</tbody>
</table>
Alliance Scorecards

Scorecard compilation began during the 2007-2008 academic year as a mechanism for tracking Alliance and individual institution success and for accountability measuring. Scorecards for Spring 2009 and Fall 2009 are available at [http://www.starsalliance.org/mission.html#reports](http://www.starsalliance.org/mission.html#reports). Scorecards show that SLC project types and organizational structures varied by institutional type, affirming the flexibility of the STARS Leadership Corps model. Scorecards for each institution are given in the Fall and Spring 2009 scorecards available online at [http://www.starsalliance.org/mission.html#reports](http://www.starsalliance.org/mission.html#reports). While most institutions focused their SLC projects on K-12 outreach and mentoring, the scorecards reveal a distinction among research institutions and small private and/or HBCU institutions. SLC students at research institutions engaged in more internships and research projects, and produced more publications than did SLC students at smaller institutions. Research institutions held fewer meetings with their SLC students than did smaller institutions. Research institutions reported more industrial partners than did smaller institutions, however, the academic and community partnerships were similar across all Alliance institutions. Sustainability efforts were at equal levels across all Alliance institutions.

The fact that there were differential ways of implementing the SLC based upon institutional size is an indication that the type of activity and structure of the star is less important than the SLC community itself is to student engagement. Stars can leverage their resources in a variety of ways and develop unique SLC programs to suit the needs of their campus and region while still maintaining a positive impact on student outcomes pertaining to STARS identity, computing efficacy and computing identity, commitment to computing, GPA, and STARS identity. The key similarity is the SLC itself, which engages students in a variety of community activities that enhance students’ sense of commitment and identity to computing.

The use of scorecards has increased Academic Liaison’s understanding of data collection and evaluation and allows for comparison of performance of schools in a direct way. These narrative summaries allow each institution to report on their flexible SLC structures and implementation of the demonstration projects, and to highlight their successes and challenges. These relatively concise instruments help the STARS leadership identify areas of need and of excellence across the Alliance, and also provide a measure of performance that allows for decision making about inclusion and funding.

**Institutional Data Executive Summary**

Institutional data has been annually collected for each STARS Alliance institution. Baseline data for the original institutions has been gathered starting with the 2000 academic year and is updated each year. New institutions that joined the STARS Alliance during the 2007-2008 academic year began reporting institutional data at the end of the summer of their first year in August 2008. The original 10 institutions include Auburn, FAMU, FSU, Georgia Tech, Landmark College (no computing program), Meredith College, North Carolina State University, Spelman College, University of North Carolina at Charlotte, and University of South Florida Polytechnic. Johnson C. Smith University, an HBCU, was added in Fall 2007. Nine new institutions were added in Fall 2008.

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1 There were 10 original institutions but one institution, a two year college, does not have a computer science or information technology degree program.
2008: Georgia Southern, Hampton University, North Carolina A&T, Shaw, St. Augustine’s College, University of New Orleans, University of South Carolina, University of Tennessee-Knoxville, and Virginia Tech University. Data collected includes enrollment for graduate and undergraduates in computing majors, defined as all degree programs at each participating institution with CIP code 11, which represents computer and information sciences and also includes all the 4-digit sub categories within these disciplines. Enrollment data has been aggregated by ethnicity and gender. The full report is available online at [http://www.starsalliance.org/mission.html#reports](http://www.starsalliance.org/mission.html#reports). Trends reflect a positive increase in enrollment, particularly among women.

**STARS Alliance Trends Compared to National Trends [Taulbee 2009]**

Overall, the upward and downward trends of computing enrollments and graduations are similar between the STARS Alliance and national data as reflected in the Taulbee Annual Reports (website). However, there are some noteworthy distinctions, outlined below. Because the Taulbee survey draws upon a sample of US and Canadian doctoral granting institutions, only the doctoral granting institutions that formed the STARS Alliance since its inaugural year (2006)* were included in the comparison. Canadian institutional data was excluded from the comparison.

**Enrollment**: Undergraduate enrollments in computer science decreased in the Alliance and nationally from the 2005-2006 year to 2006-2007. However, the decrease was less for STARS Alliance doctoral granting institutions. In 2006-2007, there was a 4.25% decrease in undergraduate enrollments from the previous year within the doctoral granting Alliance institutions compared to a national overall decrease in undergraduate enrollment of 17% from the previous year (Taulbee). Graduate enrollment decreased 5% nationally (Taulbee) in 2006-2007 from the previous year whereas it increased 8% among Alliance doctoral granting institutions. In 2007-2008, graduate enrollment increased 23% among doctoral granting Alliance institutions enrollments from the previous year, whereas it increased 8% among Alliance doctoral granting institutions. In 2007-2008, graduate enrollment increased 23% among doctoral granting Alliance institutions enrollments from the previous year, whereas it increased 8% among Alliance doctoral granting institutions. In 2007-2008, the overall decrease since 2005 in undergraduate enrollment among doctoral granting Alliance institutions was 6.9% compared to 11% nationally (Taulbee). In 2007-2008 there was an overall increase of 32% in graduate enrollments among the doctoral granting Alliance institutions since 2005, and a decrease of 2% nationally (Taulbee). These differences between STARS Alliance and national trends indicate that the Alliance is impacting student undergraduate and graduate enrollments positively.

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<tr>
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<tbody>
<tr>
<td><strong>Alliance UG</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual % change</td>
<td>2871</td>
<td>2749</td>
<td>2671</td>
</tr>
<tr>
<td>% change since 2005</td>
<td>-4.25%</td>
<td>-2.84%</td>
<td>-6.97%</td>
</tr>
<tr>
<td><strong>Alliance Graduate</strong></td>
<td></td>
<td></td>
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<tr>
<td>Annual % change</td>
<td>1254</td>
<td>1355</td>
<td>1667</td>
</tr>
<tr>
<td>% change since 2005</td>
<td>8.05%</td>
<td>23.03%</td>
<td>32.93%</td>
</tr>
<tr>
<td><strong>Taulbee UG</strong></td>
<td></td>
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<tr>
<td>Annual % change</td>
<td>34984</td>
<td>29011</td>
<td>31003</td>
</tr>
<tr>
<td>% change since 2005</td>
<td>-17.07%</td>
<td>6.87%</td>
<td>-11.38%</td>
</tr>
<tr>
<td><strong>Taulbee Graduate</strong></td>
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</tr>
<tr>
<td>Annual % change</td>
<td>25325</td>
<td>24001</td>
<td>24769</td>
</tr>
<tr>
<td>% change since 2005</td>
<td>-5.23%</td>
<td>3.20%</td>
<td>-2.2%</td>
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</table>
**Graduation:** Graduation of masters and doctoral degrees declined nationally from 2006-2007 to 2007-2008 nationally by .9% (Taulbee). In doctoral granting Alliance institutions, graduation of masters and doctoral degrees increased 22%. In 2007-2008, undergraduate degrees being granted declined in both Alliance institutions and nationally, however the decline was slightly less among Alliance doctoral granting institutions (6% Alliance, 9% nationally).
Graduation in CS Majors

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<tbody>
<tr>
<td>Alliance UG</td>
<td>716</td>
<td>576</td>
<td>538</td>
</tr>
<tr>
<td>Annual % change</td>
<td>-19.55%</td>
<td>-6.6%</td>
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<tr>
<td>Taulbee UG</td>
<td>12154</td>
<td>9941</td>
<td>9000</td>
</tr>
<tr>
<td>Annual % change</td>
<td>-18.2%</td>
<td>-9.47%</td>
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<tr>
<td>Alliance Graduate</td>
<td>416</td>
<td>420</td>
<td>514</td>
</tr>
<tr>
<td>Annual % change</td>
<td>.96%</td>
<td>22.38%</td>
<td></td>
</tr>
<tr>
<td>Taulbee Graduate</td>
<td>8251</td>
<td>8731</td>
<td>8645</td>
</tr>
<tr>
<td>Annual % change</td>
<td>5.81%</td>
<td>-.985%</td>
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*Doctoral granting Alliance institutions from the initial cohort (2006) of STARS include: Auburn, FSU, Georgia Tech, NCSU, and UNC Charlotte. Auburn graduation data was unavailable.

Progress Towards Goals
The Alliance is making substantial progress towards the additional goals of Advancement, Sustainability, and Dissemination.

Recruit, Bridge, & Retain: The primary goals of the Alliance are to increase underrepresented populations into computing disciplines, to bridge their preparation, and to retain them into the field long term. The primary tool for these first three goals is the SLC. Results indicate that the SLC is an effective tool for the college student participants. Future directions are to more deeply evaluate the impact of a few SLC outreach activities on attendees, to monitor enrollments in computing programs, set up a comparison study for the SLC, and evaluate SLC participants longitudinally.

Advancement: Alliance goal 4 is advancement of assistant professors who are role models for underrepresented student populations in computing, with the outcomes of increasing faculty peer and mentor support for research, teaching, and managing service. The Alliance is providing professional collaborations between senior and junior faculty to enhance professional development for faculty. Informal faculty mentoring is also being provided as a development tool. Joint publication projects are also underway. Since the establishment of the STARS Alliance, Jason Black has received tenure and Tiffany Barnes is currently under review. We plan to continue to mentor junior faculty through the tenure process.

Sustainability: Alliance goal 5 is to sustain Alliance efficacy and to institutionalize Alliance partnerships. The Evaluation Plan contains a formative component to identify issues within the Alliance, enabling us to address these as they arise. The first three years of Alliance Steering committee surveys have indicated that we are addressing and meeting our overall goals. Specific issues being addressed in the current academic cycle are institutionalization and hiring staff support. Scorecards and the requirement for each institution to have an Evaluation Assistant have greatly improved Academic Liaison understanding and compliance with data reporting.

Dissemination: The sixth goal of the Alliance, dissemination, is to increase national awareness of effective practices for broadening participation in computing, and to provide STARS as a model and repository for BPC best practices. The Celebration has become a national event for dissemination of BPC practices. Within STARS institutions, 68 refereed publications have been submitted to date. The STARS Alliance hosted the February 2009 NSF-BPC PI meeting in Charlotte, NC and is now working to establish an ACM SIG for BPC.
Comparison group study
- A survey to compare SLC students to other computing majors has been developed and implemented during the 2008-2009 year at UNC Charlotte. During 2009-2010, wide scale surveys will be conducted between SLC students and non-SLC computing students within the Alliance.

Institutionalization and Scalability
- We are conducting Department Chair interviews to inform and engage the leadership at our member institutions in making STARS efforts permanent. As part of our extension grant, member institutions must submit a plan for institutionalization and scaling.

Reporting and data collection is uneven across STARS institutions
- The Evaluation Team has been successful in streamlining data collection through simplified reports and the requirement of schools to have an Evaluation Assistant. To further improve our evaluation efforts, we are developing a STARS member website to track participation and engage our alumni. Funding support continues to be tied to reporting and meeting of goals.

Institutional enrollment, retention, graduation, and GPA data collection
- Basic data has been collected and analyzed for the original institutions revealing similar trends found nationally. Comparisons to Taulbee data will continue for all 21 Alliance institutions.

Data collection and analysis efforts are being expanded for K12 Outreach
- A longitudinal data collection plan was developed is being implemented.
- K-12 outreach impact is measured by attendee numbers. In the next year, our Evaluation Assistants will work with our Admissions Offices to determine the impact of SLC outreach on regional admission trends.
- Evaluation Assistants interview SLC students and transcribe these interviews for qualitative analysis. This, combined with having a STARS Alliance REU student, enables our evaluation team to more quickly analyze these data and use the findings to provide feedback to institutions.

Electronic journaling and Web 2.0 community building
- Although electronic journaling is implemented at some institutions, utilizing this reflective student information for research content analysis presents an ethical conflict, as it is designed as an open student forum. Social desirability bias would contaminate any formal analysis of this data.
- As an alternative, SLC students are developing Web 2.0 methods for community building and support, such as our STARS Facebook page, the Snag’em games, and STARS web pages.

Continued and New Directions
There are several areas that require attention in the 2010-2011 academic cycle for the Alliance. The issues are noted below with the planned resolutions, currently being implemented. We expect to present comparative results from the first three years of implementation in the Final Annual Report.
Grants and Publications

1. **Auburn:** NSF RET – Research Experiences for Teachers is pending (submitted in November 2009). This grant will utilize the existing outreach structure of Auburn STARS and incorporate more teacher training in computing literacy and programming.

2. **FAMU:** NSF S-STEM: **African-American Women in Computer Science (AAWCS) Scholarship Program.** Award Amount: $565,000; Awarded: July 2008; Duration: until June 2012. Type of program: Scholarship for underrepresented women Description: Students are awarded $2,000 - $5,000 per semester based on Financial Need; students must maintain a 2.8 GPA and remain active in the program, which includes becoming members of ACM, STARS and FGLSAMP. Number of Participants: 19 per semester.

3. **FAMU:** NSF ITEST: **TRI-IT: Tri-institutional Initiative for Motivating Girls in IT.** Award Amount: $259,000; Awarded: September 2008; Duration: until August 2012. Type of program: Workshop and summer program for high school girls. Description: Students will participate in monthly workshop (after-school) with activities based on engineering and computer-related tasks; in summer, same students will attend 1-week summer program at FAMU, with topics such as mobile computing, GPS technology, and multimedia programming. Program is Alliance between FAMU, Florida Community College at Jacksonville (FCCJ) and Seminole Community College (SCC); students will also travel for 1-day mini-conference at end of summer program. FAMU SLC students will serve as instructors for summer program and monthly workshops. Number of Participants: 40.

4. **FSU:** X-Day events (Career Day - $1000, Club Day - $500, and Game Day - $2000) are supported by local businesses and the FSU Foundation. General expenses (food, drinks) are donated to STARS by the Academic Liaison.

5. **NCSU:** CSC ePartners funding 2009-2010: NCSU STARS Student Leadership Corps. ($20,000) Sponsors are AT&T, BlueCross BlueShield of NC, Cisco, Duke Energy, EMC, NetApp, SAS, and Tekelec.

6. **NCSU:** Drs. Vouk and Carter, have been awarded $353,881 by the National Science Foundation (NSF) to support collaborative research proposal titled “CPATHII: Incorporating Communication Outcomes into the Computer Science Curriculum.” The award will run from October 1, 2009 through September 30, 2012. In partnership with industry and faculty from across the country, this project will develop a transformative approach to developing the communication abilities (writing, speaking, teaming, and reading) of Computer Science and Software Engineering students. We will integrate communication instruction and activities throughout the curriculum in ways that enhance rather than replace their learning technical content and that supports development of computational thinking abilities of the students. We will implement the approach at two institutions. By creating concepts and resources that can be adapted by all CSC and SE programs, this project also has the potential to increase higher education's ability nationwide to meet industry need for CSC and SE graduates with much better communication abilities than, on average, is the case today. In addition, by using the concepts and resources developed in this project, CSC and SE programs will be able to increase their graduates' mastery of technical content and computational thinking. The NC State SLC will be involved in these activities.

7. **St. Augustine’s:** DOE Title III CCRAA Computer Science Lab Enhancement. (funded Dec 08). This grant included equipment money to expand our robotics project which as been incorporated into our STARS K-12 outreach projects. It has also funded acquisition of a virtual web-server complex, with which we plan to involve SLC students in student-faculty partnership to develop web-centric curriculum for the department.

8. **St. Augustine’s:** A BDPA sponsor, Oracle Corp., has funded student membership in BDPA for our STARS students.

9. **UNC Charlotte:** GameCats received a Chancellor’s Diversity Challenge Fund as did High School Outreach. GameCats received $5,000 for laptops and accessories to conduct outreach with a new Citizen Schools project in Spring 2010. The High School Outreach team received a grant for $3180 which has been used to purchase two laptops, one projector, two laptop bags, and two display adapters.
9. **UNC Charlotte:** Drs. Dahlberg and Barnes applied for and received funding (approximately $12,000) for 4 undergraduates to participate in the Computing Research Association Collaborative Research Experiences for Undergraduates for their students to develop games for social networking.


**Published Journal Papers (fully refereed)**


**Submitted Journal Papers (fully refereed)**


Fully Refereed Papers in Conference Proceedings


33. Jennifer Robison, Scott McQuiggan and James Lester. Evaluating the Consequences of Affective Feedback in Intelligent Tutoring Systems. To appear in Proceedings of International Conference on Affective Computing and Intelligent Interaction (ACII-2009), Amsterdam, the Netherlands. (Best Student Paper Award)


Conference on Human-Computer Interaction (INTERACT '09), Uppsala Sweden, August 2009, pp. 528-541.


Pending/Submitted


Refereed Symposium and Workshop Proceedings


the 2009 AAAI Spring Symposium on Intelligent Narrative Technologies II, Stanford University.

2009.


Abstract Refereed Papers in Conference Proceedings:


64. Bonto-Kane, M., St. Amant, R. "Variance in Execution of GOMS Keyboard Level Operators Show Alternative Directions in Designing and Evaluating Interfaces.” To appear in Richard Tapia Conference Celebration of Diversity in Computing 2009.*


Posters (not refereed)

8. Cherie Frazier and Jessica Jones. Pair Programming at Hampton University. STARS Celebration 2009, Tallahassee, FL.
11. Tara Durant and GiaVonni Powell. A Study of the Effectiveness of CSDTs for Activity Times of Varied Duration within a Tutoring Session. STARS Celebration 2009, Tallahassee, FL.

Podcasts


Television Programs

16. CIS Faculty – FAMU Research Press Conference discussing research and programs in the CIS department at FAMU; recorded Wednesday, Dec. 6, 2009 for local television channels (appeared on local news).
17. Jason T. Black, recorded October 20, 2008, FAMU Today television program, hosted by O. Sylvia Lamar and recorded for FAMU public television, local channel 20, Tallahassee, Florida
Invited Talks and Presentations at Professional Meetings and Universities


News Articles


Presentations about STARS


25. *Black, Jason. STARS Alliance and Careers in CS and IT. Presented to various high school and community college groups, Fall, 2009, Tallahassee, Florida


Materials (Presentations, posters, handouts) developed for outreach K-12, teachers, counselors


33. Caitlin Buckhaults, STARS participant; John Bowles, faculty mentor. Development of robotics simulation for FIRST robotics teams. Capricia Pettaway, REU participant from Benedict College (not STARS); Caroline Eastman, faculty mentor.


35. Capricia Pettaway, REU participant from Benedict College (not STARS); Caroline Eastman, faculty mentor. Preliminary development of a CSDT based upon sweetgrass basket weaving. University of South Carolina at Columbia.
36. Seals, C. D. Lesson Plans for Elementary, Middle School computer Clubs and Saturday Academies [http://www.eng.auburn.edu/stars/]


Exhibitions
42. Seals, C. D. & Lindsey, R. (March, 2008). ACMSE Digital Animation Festival. Top 8 students from our area computer camps presented their Digital animations in Alice 3D at ACMSE Poster Session.
43. Seals, C. D. & Lindsey, R. (Feb, 2008). Alice Film Festival Competition. We brought the top 10 students from our area computer camps to UAB for the Alice film festival and won 4 of the top 7 places in our category.

Related Reports

References