



**BPC-A- The STARS Alliance:**  
**A Southeastern Partnership for Broadening  
Participation in Computing**

Students and Technology in Academia,  
Research and Service  
(STARS)

## **ANNUAL REPORT**

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# The STARS Alliance Overview: A Southeastern Partnership for Broadening Participation in Computing

## 1. Executive Summary of Year 2 Results

We believe that the disparity between the supply of interested women and minorities in computing and the global demand for computing talent is due to our failure to engage the population, our failure to convey the excitement and possibilities of computing, and our failure to convey the social relevance of computing. We also believe that the STARS Alliance is positively impacting campus communities and K-12 communities by engaging students and faculty in invigorating projects. Our partnerships are providing successful collaborations across institutions for greater impact and sustainability.

We formed the Students & Technology in Academia, Research, and Service (STARS) Alliance in the spring of 2005 in response to the National Science Foundation (NSF) Broadening Participation in Computing (BPC) program. This report describes the Alliance structure and goals, and summarizes the activities and outcomes for year two of the project (March 1, 2007 – February 29, 2008). The term “computing” is used to collectively refer to computer science, information systems, information technology, software engineering, computer engineering, and related disciplines and interdisciplinary areas.

The following evaluation report provides a detailed summary of the summative and formative information from the overall Alliance, its demonstration projects, and the yearly symposiums that are conducted, to illustrate the outcomes from this multi-institutional collaboration in Broadening Participation in Computing (BPC). First year and second year outcomes are discussed. Some of the most notable achievements are indicated below for each level of the Alliance.

### Alliance Structure Highlights

- 100% indicated that they have formed **helpful collaborations** as a result of membership, with **30 organizational partnerships** formed in industry, community, and academia.
- A theme of “**giving back**” emerged from faculty in regards to both their campuses and communities.
- The Alliance is providing strong professional collaborations for faculty across area of *tenure preparation, research motivation and progress, and knowledge and resource acquisition.*
- Challenges for faculty have been time management and work-life balance, as well as the loss of student talent due to graduation.

### Annual STARS Celebration Highlights

- 100% of faculty reported that they developed **helpful professional collaborations** through attending the conference.
- 100% of faculty believed the celebration had a positive impact on students.
- 92% of students reported that they felt the conference provided adequate opportunities for **community building**.
- A major emergent theme from student responses was **sense of community** (social and computing).

### STARS Leadership Corps Highlights

- More than **3,615 K-12 and college students participated in SLC Outreach activities**, with over **749 parents, teachers, counselors and administrators** present.
- There were 111 SLC students in year one, 142 in year 2, with 58 returning participants.
- Overall, 81% of students believe that they are forming **mutually beneficial peer relationships** through the SLC.
- The top reason for choosing a computing major is that it is **enjoyable and interesting**.
- 82% of students believe their **SLC projects are meaningful**.

## 2. STARS Alliance Overview

The Students and Technology in Academia, Research and Service (STARS) Alliance of eleven academic institutions with education, corporate, and community partners to broaden participation in computing (BPC) has completed the first year of implementation. 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.

Our project **goals and expected outcomes** are focused on under-represented student populations from middle school through graduate school and on information technology (IT), computer science, and computing-related programs (“computing disciplines”).

Goal 1 is **Recruiting** of under-represented populations, with the outcomes of a) increasing student enrollment in post-secondary computing programs, and b) increasing student awareness about computing disciplines and careers.

Goal 2 is **Bridging** for under-represented populations, with the outcomes of a) Increasing student readiness to enter computing programs, and b) Increasing the number of undergraduates (in computing or non-computing disciplines) who enter computing graduate school or workforce.

Goal 3 is **Retention** of under-represented populations, with the outcomes of a) Increasing the graduation rates in computing disciplines, b) increasing the year-to-year persistence and the declaration of majors in computing disciplines, and c) Increasing college adjustment and GPA.

Goal 4 is **Advancement** of assistant professors who are role models for under-represented student populations in computing, with the outcomes of increasing faculty peer and mentor support for research, teaching, and managing service.

Goal 5 is **Sustainability**, with the outcomes of a) Sustaining effective BPC practices at alliance institutions, and b) Institutionalizing alliance partnerships.

Goal 6 is **Dissemination**, with the outcomes of a) Increasing national awareness of effective practices, b) Serving as a model and repository for effective practices for BPC, and c) Promoting alliance implementation and evaluation methodology.

Our alliance provides a unique opportunity to evaluate BPC implementations at an inter-institutional level, to pool resources and expertise, and to offer stronger evidence and incentive for institutionalizing effective practices. This report provides an overview of the first and second years of project implementation in terms of the three levels associated with the Alliance: the Alliance itself, the Demonstration Projects, and individual impact on Students and Faculty.

Eleven colleges and universities comprise the Alliance, which consists of seven demonstration projects. The Alliance has formed **30 organizational partnerships** to date among industry, community, academic and K-12 institutions. The STARS Leadership Corps, with **253** graduate and undergraduate student participants combined in the first two years, has impacted more than **4,364 K-12 and university students, parents, teachers, and partner organization members with outreach programs and community service.**

We begin by presenting the background of the motivation for forming the Alliance, its overall model and structure and the evaluation plan. The methodology for evaluation is discussed. Results are presented for each alliance level with particular attention to first and second year cohort outcomes. We conclude with a discussion of the results, and outline current and future dissemination plans.

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,Se198]. 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.

## 2.1 Research Motivation

While Information technology (IT) is one of the fastest-growing areas of job growth, the Department of Labor projects that IT degree production will not keep up with demand for IT jobs in the current decade [Zwe05]. To meet the need for IT jobs and remain competitive, we must increase the number of students, and particularly those from historically underrepresented groups, receiving undergraduate and graduate degrees in the computing disciplines. The inclusion of these groups in computing can provide increased opportunities for individuals and an infusion of talent, creativity, and diverse perspectives that can shape the future of technology. Researchers and newspapers alike tout the need for broader participation in technology, and address some of the reasons for unequal representation [Rip05, Jas05, Mul05, Lew05, Lew03, Pos91, Pow90].

A central hypothesis motivating the SLC model is that students who use their computing skills for outreach, service, or research will be retained and will also recruit younger students into computing programs. The SLC embodies this idea, and incorporates multiple effective practices and values into a unified framework. For example, civic engagement (outreach) and community service help change the image of computing from a machine-centered field to a people-centered field, making its application more relevant and concrete. Mentoring is used to provide support and build community among students. Internships, early research experiences, and hands-on training promote increased competence, confidence, and interest in computing. Leadership, professional development, and teamwork provide students with the needed soft skills to succeed in the computing workforce. Similar programs based on these values can be found through the Learning through Evaluation, Adaptation, and Dissemination (LEAD) Center and the National Center for Women in Technology, ncwit.org. Some examples are given below.

**Civic Engagement, Recruiting and Bridging:** Several programs have introduced students to service learning and outreach as ambassadors or recruiters with great success [Coy05,Tall03, Hor04, Fla04]. Civic engagement projects, such as Girls are IT! [Dah03] and ChicTech [Kam04] provide students with opportunities to be leaders and role models for younger students, providing both recruitment and retention benefits.

Connecting computing to real applications that help others may encourage retention of women and minorities [Coh05, Cha00, Far02, NSF96]. Partnerships between universities, industry, and professional organizations will help computing programs stay connected to the job market. This connection has been shown to have a positive effect on gendered attrition [Coh05].

Student participation in research, such as in the National Foundation (NSF) Research Experiences for Undergraduates, the Computing Research Association Distributed Mentor Project, the

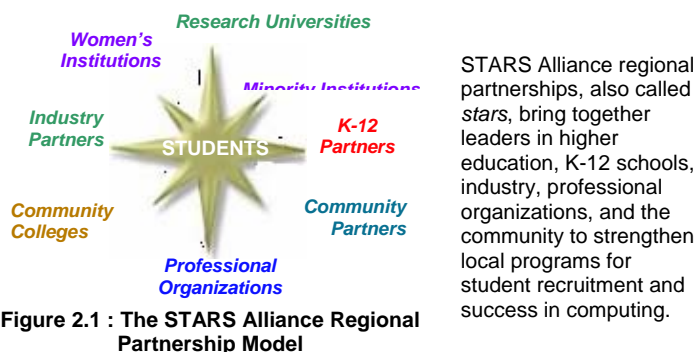
Georgia Tech/Intel Opportunity program, and the Tapia Spend a Summer with a Scientist program [Ale98], has tremendous benefits for retention [Asp00].

**Collaborative learning:** Research has shown that African-American success rates in science courses can be dramatically improved by shifting the learning paradigm from individual study to group processes, such as student work groups and student-student tutoring [Nel96, Tre92]. Others suggest such collaborative learning would improve retention of women in computing [Coh05]. SLC students are encouraged to collaborate in their projects.

**Persistence and Retention:** Factors that contribute to persistence in STEM disciplines for all students include ensuring adequate preparation, lab participation, hands-on research opportunities with faculty, and positive peer interactions and influences [Ast92]. High academic achievement prior to college and interest in STEM majors upon college entrance are also positively associated with STEM retention [Bon00]. For example, Post, Stewart, and Smith [Pos91] found that confidence regarding educational requirements was a significant predictor of math and science careers. Financial support, study groups, a supportive program community, specialized advising, setting high expectations for students, and peer solidarity have also been found to provide an environment highly supportive of strong academic performance [Hra95]. Relationships between peers offer the best support to underrepresented students [Coh05, Blu05].

A tiered mentoring model (students mentoring slightly younger and being mentored by slightly older students) has been shown to support students' college adjustment, GPA, retention, graduation and career preparation [Cha000, Tho05, Sey98].

The persistence of doctoral students in mathematics, and the quality of experience in graduate school, has been linked to how well integrated students are in the academic communities of their department and discipline [Tin93, Rog95, Her04]. In addition, doctoral students who persist in mathematics are more likely to have family members who are involved in mathematics, to have participated in research experiences as undergraduates, and to have been committed to mathematics from a very young age [Her02]. Initial information obtained during qualitative interviews of incoming SLC students supports this research finding in computing as well.



STARS Alliance regional partnerships, also called stars, bring together leaders in higher education, K-12 schools, industry, professional organizations, and the community to strengthen local programs for student recruitment and success in computing.

**A Unified Framework:** Despite the number of best practices throughout these multiple programs, none of these approaches integrate outcomes measurement into longitudinal and comprehensive data analyses. The SLC model is designed as a 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. Students can participate in the corps multiple years, undertaking different leadership projects, while remaining a part of the same corps. Based upon recent trends and research, we believe that the SLC model provides methods to foster community, as well as to systematically measure which efforts are most effective in broadening participation [Lew03, Ast92].

These findings and our experiences in intervention programs inform the design of the alliance programs. The SLC program incorporates the development of community and peer interactions with hands-on research and service that are so important for persistence and strong academic performance. Pair programming brings some of these advantages to the classroom, with the result of improved student aptitudes and attitudes in computing [Nag03]. MathGenie brings math education to the visually impaired [MathGenie], while Landmark’s learning disabilities work informs us all about teaching diverse students. The Alliance exchange and continued examination of other best practice resources will ensure the continued applicability of STARS programs.

## **3. STARS Alliance Activities**

### **3.1 Alliance Exchange**

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. These components are discussed in detail in later sections of this report.

The Alliance Exchange Report is a planned evaluation component which will provide the Alliance with formative feedback of progress towards goals, as well as serve as an operations management tools. This report will include itemized tasks and discussions conducted during the



steering committee meetings, the evaluation meetings, and the various task force meeting that have been conducted to date. Status updates for tasks will also be presented. The Exchange Report is currently underway and results will be presented in the June 2008 Annual Report.

## Survey and Interview Results

A total of 28 Steering Committee Members and Faculty liaisons were surveyed in May 2007 to gather feedback on the Alliance overall from the first year of program intervention implementation. Seventeen members responded to the survey, resulting in a response rate of 60%. The primary scope of the survey was to measure members' opinions of the Alliance as an organization, evaluate its progress towards goals, routine activities related to the Alliance, and note successes and lessons learned. Overall results from this year end survey indicate that Alliance members are inspired by their professional collaborations and have seen improvements in their students' confidence and leadership skills. Areas for development in the next year are to continue developing STARS cross-collaborations and to build more community and corporate partnerships. Follow up interviews were conducted with three steering committee members and one STAR coordinator during the 2007 STARS Celebration, to gain insights into the successes and challenges of managing a STAR. A detailed summary is provided below.

**Characteristics:** The characteristics of the Steering Committee members are that the majority represent doctoral research universities (Table 3.1). Most respondents indicated serving in multiple capacities for the Alliance, with most serving as Advisory Board members, Evaluation Team members, Academic Liaisons, and STAR Coordinators. Tasks that were most often engaged in on a regular basis by members were advising SLC students, evaluation, managing the SLC projects at their respective institutions, presenting, and formulating community partnerships.

Table 3.1. Alliance Steering Committee Members by Institutional Type

Alliance Steering Committee Members	
Institution Type	Percentage
Doctoral Research University	76
Community College	12
Baccalaureate College	6
Masters College	6

**Student Contact:** The majority of members indicated that they met with students on a bi-weekly basis. Of those who did engage in supporting students, the average amount of hours per week was 8. The largest amount of hours spent supporting students was 20 per week, with two members indicating this number. The most common amount of time was 3 hours per week. The lowest amount was an hour and a half per week.

All agreed that their students were well prepared, committed and passionate about their project work. Overall, 65% indicated that their expectations were met, and that they believed the students' expectations were also met. While this percentage is a strong indication that goals are being met, it is also an indication that there is additional progress to be made with respect to long term goals. Partly as a result of these findings, and feedback from our NSF site visit, we plan to engage all Academic Liaisons and Demonstration Project Coordinators in elaborating their own goals and tying them to the STARS Alliance goals for each academic year. These goals will be used in part to evaluate the performance of each participating project and school.

**Top Success:** When steering committee members were asked to report the top three successes of the Alliance to date, several themes emerged. Forming collaborations and building relationships, both between students and between faculty, were noted frequently. The conference, the STARS Leadership Corps, and the Broadening Participation in Computing efforts were also noted by many as top successes. Emergent themes from the individual interviews reflected similar successes in making an impact on BPC, and in particular, impacting individual students in the SLC and those who participated in outreach activities. “Giving back” to the students and the communities emerged as a strong theme from the faculty interviews.

**Top Lessons Learned:** The majority of members indicated several challenges to the success of the Alliance initiatives. Communication among the members, managing time, and managing student projects were notable challenges for members. Also of note were instilling leadership and accountability among the students. One member noted a powerful lesson learned was the value of shared experiences.

**Alliance Management and Communication:** Members applauded the use of the Alliance list serve as a communication tool and many commented that this enabled them to keep up to date and informed of priorities and topics. The Steering Committee meetings were cited as useful and productive. A few suggested lengthier time for the planning meetings during the conference.

**Cross-Institutional Collaborations:** The majority indicated that they thought the collaborations were going well. Three members, two from Landmark and one from FSU, indicated that they felt that there had not been cross-institutional collaborations beyond the annual conference, each of them referencing the desire for monthly seminars across the Alliance.

**Recruiting Students:** Member responses were mixed for this open-ended item. Half of respondents indicated that recruiting was going well, and that word of mouth was working successfully. Half indicated that recruiting had proven to be difficult, and that they learned to begin earlier in the academic terms. A challenge noted during the faculty interviews was in continuing program and student momentum during the spring terms, and replacing talent as it was lost to graduation.

**Recruiting Faculty for Pair Programming:** The majority responded “Not applicable” to this item. One respondent stated simply, “not as easy.” These responses suggest that the Steering Committee members are unaware of their role in recruiting other faculty to implement pair programming.

**Regional Partnerships:** Of those who responded to this question, all but one indicated that they had not formed strong regional partnerships. Two indicated lack of partnership within their own star. One member stated that this did not apply. However, as evidenced in the item below, the members are forming strong professional partnerships.

**Career Impact:** All members reported that the Alliance has enabled them to make helpful collaborations. Most respondents stated that they felt inspired, fulfilled and passionate about the project and especially in working with like-minded faculty. One member noted that impact had not been noted as of yet. One member noted that while it is a personally rewarding endeavor, participation in the Alliance endeavors were not impacting progress to tenure. A small minority of members indicated that they did not have the resources that they needed for their projects (6%).

Faculty interviews reflected that the Alliance has been tremendously helpful in their career development. For one member, service is a crucial component for obtaining tenure, so involvement in the SLC projects is beneficial. Faculty members noted that research publications are underway and that several meaningful collaborations have begun as a result of their participation in the Alliance. Partnerships on campus, across campuses, and with community organizations are fostering their respective SLC efforts, as well as enhancing their portfolios and professional development.

**Suggestions for how other universities can contribute to BPC:** The consensus of responses was to devote considerable resources, build community and corporate partnerships, and have a committed person to lead the charge for broadening participation in computing at other universities.

**Institutional Impact:** Response themes indicate that departmental and institutional impact have not yet been achieved due to the early stages of implementation. Several members noted that the increased visibility has generated wider interest in computing. A mood of optimism was evident in the responses during the faculty interviews.

**Student Impact:** The overwhelming theme from members was that the Alliance was increasing students' confidence and leadership skills. All agreed that students were increasing their academic adjustment. Members noted that students served as academic and personal resources to younger college students, and were passionate about outreach to students in K-12 and college campuses. One member noted that their students tended to prefer individual work over group projects, "Our students tended to be loners, and we struggled with the group-work components of our SLC project. However, our students seemed to bond with one another better, and they did have discussions about new computing topics as a result of their activities and workshops."

## 3.2 STARS Marketing and Careers Campaign

The **STARS Alliance web portal** was developed to disseminate information on the alliance and support a Marketing and Careers Campaign aimed towards K-12 students [[www.starsalliance.org](http://www.starsalliance.org)]. During a six month period, between June 2007 and January 2008, there were **3,662 visitors to the web portal**, with a total of 9,959 hits. Approximately 1,800 were first time visitors. Based on trend analysis much of the activity has been focused on the STARS Celebration; however, since the conclusion of our event, there has been a consistent rate of visitor traffic with **1,982** visits taking place afterwards. The Web site was visited by people from **64 countries and 48 of the 50 states**, with only North Dakota and Wyoming are not represented. North Carolina, Florida, Georgia, and California are the states where the most visits have originated. For a complete breakdown of traffic by country and state, please refer to the appendix. Design and development of age appropriate Web channels is underway for creating age-specific designs for a middle school channel. The anticipated launch will be February of 2008 following completion of focus group research.

The Alliance has established communication channels via list serves for student members as well as faculty members. Partnerships and localized student chapters have been established at STARS institutions with CRA-W, IEEE, ACM, and Women in Computing. The 2007 **IEEE Frontiers in Education** conference will publish first year results. Initial outcomes have been presented at the

**Grace Hopper Celebration, 2006.** Partnerships have been formed with the professional organizations of ACM, IEEE, and Women in Computing. At the **ACM SIGCSE conference**, Microsoft sponsored a STARS presentation to high school computing teachers.

Marketing Kits were developed as a tool for branding the STARS Alliance and spreading knowledge of the organization across K-12 and college campuses. The 250 kits included: pens, note pads, posters, postcards, and fact sheet, each with the STARS Alliance brand logo, developed by the marketing team. An additional 1500 pens were purchased for the Grace Hopper Conference information booth. To aid in college campus marketing, 300 t-shirts were printed and distributed to students and faculty involved in the Alliance; 2000 business cards were printed for SLC students to present at professional events and outreach activities.

In addition to the web portal and marketing tools, two projects currently underway are expected to bring increased national visibility to the STARS Alliance. Hollywood PSA and Jeffrey Nichols, a video producer in Hollywood, California is working with us to recruit a high profile star to serve as the name and face of our marketing efforts. Teresa Dahlberg and Anthony Chow have been working with image consultant Jill Ross as part of a national image campaign for computing. Ms. Ross has been hired by a consortium of technology companies led by **Microsoft** and **Intel** to shape a nationwide message.

Nationwide image campaign – Teresa Dahlberg and Anthony Chow have been working with image consultant Jill Ross (hired by a consortium of technology companies led by Microsoft and Intel) to shape a nationwide message. Jill Ross visited campus and spoke to SLC students in February 2008.

### **3.3 STARS Celebration**

A significant component of the Alliance is the annual celebration, which is held each August. The annual event has several functions: to induct new members to the values of the Alliance, to promote community building among students and faculty, and to prepare students for their upcoming SLC assignments. New SLC students are introduced to mentoring, leadership skills, research experiences, preparing for graduate school, professional development and civic engagement. Civic engagement emphasizes how computing and IT professionals can use their skills to improve our collective quality of life. Training covers the statistics on the disparity in the representation of women and minorities in computing careers as well as the national need to reverse the trend. Returning SLC students assist with training, share prior year experiences and receive additional training for assignments. Working in teams, the students choose their academic year assignment by the end of the week.

The 2007 STARS Celebration was conducted in Charlotte, North Carolina on the campus of UNC Charlotte. Students, faculty, and industry partners convened to collaborate on BPC initiatives and further partner for the upcoming year. A total of **113 students, 40 faculty, and 50 community partners** participated in the 2007 STARS Celebration conference. A complete conference program can be found at <http://www.starsalliance.org/program.html>.

Overall, the respondents were highly satisfied with the conference. In particular, students enjoyed meeting one another and sharing ideas and projects. They reported enjoying the opportunity to learn about computing and to meet industry professionals. In general, the conference was well received and motivated the students to pursue computing.

A major focus of the 2007 celebration was to showcase the previous year SLC projects for two reasons. First, the returning students were enabled to demonstrate their successes. Secondly, these returning students were teaching new students about the SLC values and projects in which they could become involved. Ninety-five percent of students indicated that they learned about projects that past SLC student performed, which shows that students were shown examples and possible project ideas. For students, our goals of indoctrinating students into the STARS Alliance values are being met. **Community building, computing identity and leadership** are strong themes from both 2006 and 2007 conference surveys. Students reported that they enjoyed meeting other students with computing interests, meeting and networking with industry representatives, and the interactive activities. A major theme students reported in 2006 was in learning (about diversity, careers, technology), while in 2007 a major emergent theme was sense of community (social and computing).

Faculty reported in the first end of semester survey, conducted in December 2006, that the benefits to participation in the Alliance have been **collaborations** between institutions, the **networking**, and the **idea generation** for research and publications that are emerging from collaborations. These same themes emerged from the faculty and partnership post conference survey in August, 2007, a strong indication that Alliance participation is beneficial to career and professional support. Several mention that it has been beneficial in adding to their portfolios. The Alliance has helped in the formation of **interdisciplinary partnerships** across institutions. These findings suggest that we are meeting sustainability goals, and will meet dissemination goals through future publications.

### 3.4 STARS Leadership Corps

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. The SLC fosters an extended student community among academia, industry and the community through *civic engagement, mentoring, professional development and/or research experiences* to promote recruitment and leadership development through service learning and retention. The SLC has been implemented with the following central values that have been shown to be effective for recruiting and graduating under-represented students in computing.

1. **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.
2. **Leadership** – developing students’ soft skills, including leadership and professional development, team work, writing, speaking, time-management, and work/life balance.
3. **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.
4. **Community** – developing students’ sense of belonging within a larger computing community; training on identity development, diversity and gender issues, and a tiered mentoring model (Figure 3.4).

Components of the SLC vary among the academic institutions within the Alliance. Each college and university chooses from a menu of options to deliver the main values of the Alliance, considering which options fit best within the institution. SLC programs choose several of the activities indicated below.

- o **SLC Monthly Seminar Series**

During the academic year, SLC students attend monthly seminars, held at institutions within regional stars, to cover STARS Celebration topics in greater depth.

○ **Electronic Journals**

SLC students at some STARS maintained an electronic journal during the first year to document activities and reflect on their impact and meaning. In the next year of SLC implementation, all students will be given questions to guide their journal entries to collect data for evaluation (e.g., perceptions of, and intentions to continue in computing).

○ **SLC Assignments**

SLC assignments generally fall within the following categories, and include three components: written reflection, presentation to peers, and outreach to community.

▪ **Outreach Ambassadors**

A small group of Student ambassadors are enlisted at each star and charged with designing their own creative way to spread the word about computing to 7<sup>th</sup>-12<sup>th</sup> graders 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. Ambassadors write about and present their experiences at the annual conference.

▪ **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 7<sup>th</sup> grade algebra. Students write and present their experiences, as above.

▪ **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 7<sup>th</sup>-12<sup>th</sup> graders.

▪ **Internship Experiences**

Students work in industrial settings to gain work experience. Students write about their experience, present their experience to peers and give a career-role presentation to middle or high school students or educators.

▪ **SLC Peer Coordinators, Peer Ambassadors, Peer Mentors**

Students assist faculty with SLC assignments. Typically Peer Coordinators (PC) lead students in activities that the PC has previously carried out. Peer Ambassadors may develop a 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.

○ **Tiered Mentoring-**

By participating in the SLC, students are exposed to role models at levels just above their own. Both formal and informal mentoring occurs in these groups.

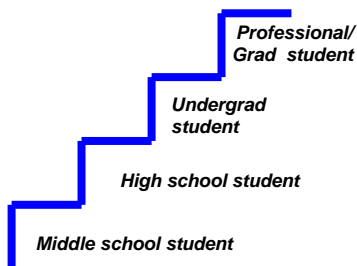


Figure 3.4: STARS Tiered Mentoring & Stair-step Role Models

- **STARS Opportunities:** An intentional effort is made to inform students of opportunities for Research Experiences for Undergraduates (REUs), graduate education, internships, and outreach opportunities throughout the Alliance.

**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”

Figure 3.4.2 The STARS Leadership Corps Model

In the following section of this report, highlights are presented for each institutional STAR Leadership Corps. Projects, events, and collaborations are indicated, along with outcome summaries. Successes and lessons learned at each star are also presented.

### 3.4.1 UNC Charlotte STARS

Academic Liaisons/ Staff:

Dr. Teresa Dahlberg, PI  
 Dr. Tiffany Barnes, Co-PI and Evaluator  
 Dr. Kim Buch, Evaluator  
 Ms. Karen Bean, Coordinator  
 Ms. Marguerite Doman, Coordinator  
 Ms. Audrey Rorrer, Evaluation Assistant

Partners:

UNC Charlotte Diversity in Technology Institute  
 Winthrop University  
 Elon University  
 Hope Junction  
 Habitat for Humanity  
 Girl Scout's Hornets Nest Council  
 Black Data Processors Association  
 Charlotte Chamber of Commerce  
 Charlotte Mecklenburg Schools  
 Kannapolis Middle Schools

[www.charlottestars.uncc.edu](http://www.charlottestars.uncc.edu)

**SLC Description and Outcomes**

The Charlotte chapter of the SLC consists of 16 students from UNC Charlotte, Johnson C. Smith University, Winthrop University, and Elon University. We also have one student from the University of Colorado participating in a research experience with our chapter. The corps consisted of 5 graduate and 16 undergraduate students. In the Fall Semester of 2007, Johnson C. Smith University formed its own SLC chapter. Of those students remaining, 7 students returned. We also



recruited 8 additional students. These students are comprised of 1 graduate student and 15 undergraduate students. Our mission is to provide outreach on our campuses, at local schools, and in our communities to encourage interest in computing careers. In order to achieve this, various leadership teams were formed. Each leadership team defined a specific target audience and developed a plan to outreach to that audience. . Our leadership teams were:

- GameCATS Team*- creates interest in computing through gaming, culture, and technology.
- High School Outreach Leadership Team*- presents *road shows* at local schools
- Team Hope*- Recruit more students into computing through middle school outreach using robotics.
- Research Experiences*- projects include: *Avari (Animated Virtual Agent Retrieving Information)*, a virtual character who answers questions about computer science faculty at UNC Charlotte; *DNS Research* which researches the problems and vulnerabilities associated with the Domain Name System responsible for turning domain names into IP addresses.

**Overview of Lessons Learned**

- Formalizing the SLC activities through an elective course provided consistency in meetings and in developing student commitment, teamwork and leadership.
- Recording information of events as they happen provides consistent documentation of the work being accomplished.

**Highlights of Successes**

- Outreach presentations included information on scholarships, college applications, digital humans, gaming, cyber-security and data visualization.
- Middle school outreach gave examples of things that the young students use that are based in technology, like gameboys, playstations, etc., provoking a consideration of an IT career.
- Habitat for Humanity Computer Setup, installing computers into Habitat homes.
- Game Nights on campus, 3 held on UNC Charlotte campus and one at Winthrop University. These events are generating good attendance and interest.



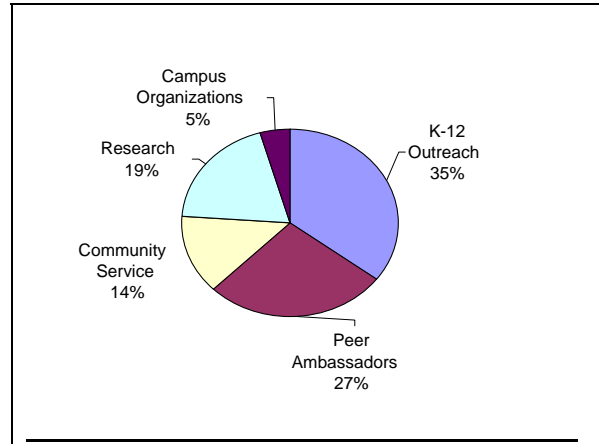
- Outreach activities at the main community library in Charlotte which used the Culturally Situated Design Tools (CSDT) to stimulate an early interest in math, programming, and computer related studies.
- Grace Hopper/Tapia Conferences - Students attending these conferences appreciated the diversity and ‘possibilities’ of the computer industry.

### STARS Student Participant Demographics

SLC Participants	Females	Males	Total
African American	19%	19%	38%
Asian	0%	0%	0
Caucasian	25%	31%	56%
Hispanic	6%	0%	6%
Total	50%	50%	100%

Primary Activities	# of SLC Student Participants
Outreach	6
Community Service	4
Peer Ambassadors	3
Research	4
Campus Organizations	1

### Project Types



### Events and Outreach Impact

Event/Outreach Activity	Location	# of Attendees	Grade Levels of Attendees	# of Teachers, Counselors, Parents
Outreach : Kannapolis IT Week	Kannapolis Middle School Kannapolis, NC	380	Junior High	1 per visit
Middle School Career Fair	Carmel Middle School Charlotte, NC	30	Middle School	
HSO to Vance High School	Vance High School Charlotte, NC	100	Senior High	1
Hawthorne School	Hawthorne School, Charlotte, NC	40	Senior High	1
Presentation at HHS Building	Charlotte, NC	50	Senior High	
Ardrey Kell Outreach	Ardrey Kell, Charlotte, NC	60	Senior High	1
Helping Vance teach linux	Vance High School, Charlotte, NC	15	Senior High	1
Colorado Road Show Training	University of Colorado at Boulder	25	K-12	
Avari Demo at ScienceFIRST	UNC Charlotte	150	Senior High	
Black Career Fair at West Charlotte High School	West Charlotte High School	150	Senior High	25
Girl Scouts Robot Camp	Colorado State University	13	Elementary	
ImaginOn CSDT	Charlotte Public Library – Main Charlotte, NC	27	Senior High	
CSDT Workshop : After school teachers program	Charlotte, NC	52		
Girl Scouts Internet Safety Patch	Girl Scout’s Hornets Nest Council Charlotte, NC	12	Junior High	
UNCC Explore - VASA Lab Demo	Charlotte, NC	90	Senior High	
REU presentation at Winthrop University	Winthrop University Rock Hill, SC	10	Collegiate	
Freshman Orientation Team	Colorado State University	400	Collegiate	
Welcoming CS Freshmen	Winthrop University Rock Hill, SC	40	Collegiate	
ACM Meetings/ Game Night	Winthrop University Rock Hill, SC			
Avari for Psyc 3806	UNC Charlotte Charlotte, NC	65	Collegiate	
Game Night at UNC Charlotte	UNC Charlotte, Charlotte, NC	10	Collegiate	
	UNC Charlotte, Charlotte, NC	200	Collegiate	
<b>Totals</b>		<b>1919</b>		<b>38</b>

### 3.4.2 SMITHITIES IN IT

#### Academic Liaisons/Staff:

Dr. Magdy Attia, PI

Dr. Hang Chen, Faculty Participant

Dr. Soumia Ichoua, Faculty Participant

Email: [www.jcsu.edu](http://www.jcsu.edu)

#### SLC Description and Outcomes

STARS Alliance program with UNCC was effective March 31, 2007, students activities and participation began fall 2007 semester, prior to JCSU enrollment into the program. JCSU STARS program was supervised and managed by UNCC. In addition to participating in JCSU meetings, in August, planning and participation of STARS Alliance Celebration 2007 for President Yancy's Public Forum at UNC Charlotte was successful. STARS faculty where able to recruit the following students from Computer Science and Engineering department, requirements included minimum 3.0 GPA.

#### **Demographics**

80%	female
20%	male
	African
100%	American
3.46	Average GPA

#### **Project Names**

Webpage Studies in CSE

Recruiting Freshman

SLC STARS Alliance Smithites in IT

IT Gala

Activities by the Principal Investigator, Dr. Attia, involved overseeing students' activities. The student leadership corps at JCSU is working the outreach program. Students present to middle school students, published the newsletter, and established the new groups. Some students are currently discussing the schedule for visiting Wilson Middle School in Spring 2008.

Activities by the Faculty, Dr. Chen and Dr. Ichoua are involved with increasing the participation of women, under-represented minorities, and persons with disabilities in computing disciplines through multi-faceted interventions focused on the influx and progression of students from middle school through graduate school in programs that lead to computing careers.

### 3.4.3 NC State STARS

<u>Academic Liaisons/ Staff:</u>	<u>Partners:</u>
Kristy Elizabeth Boyer, Academic Liaison	NC State Department of Computer Science
Kevin Damm, Assistant Academic Liaison	St. Augustine’s College
Mladen Vouk, NC State Co-PI and Regional STARS Liaison	Centennial Campus Middle School SAS
Laurie Williams, NC State PI and Pair	Tekelec
Programming Demonstration	Network Appliance (NetApp)
Project Director	EMC <sup>2</sup> Corporation

[www.stars.ncsu.edu](http://www.stars.ncsu.edu)

#### SLC Description and Outcomes

The NC State chapter of the STARS Student Leadership Corps consists of thirteen students from NC State University and three students from St. Augustine’s College. Of these bright students, five are graduate students and eleven are undergraduates. The NC State STARS chapter focuses on the following goals: 1) to retain our existing students through research, internship, mentoring, and outreach projects that help build these students’ identities as bright computing leaders, 2) to attract new students onto this leadership path, 3) to actively reach out to students in middle and high school to stimulate interest in pursuing computing as a career, and 4) to make these efforts sustainable over the long term by institutionalizing STARS activities. In keeping with these goals a number of research and outreach projects are underway or have already been completed.



*Undergraduate Research Projects:* “Tagger: A Tool for Annotating Dialogue”, “Empathy in Virtual Agents”, “STARS Evaluation Techniques and Results”, “Ripple: Remote Synchronous Collaborative Programming”, “Effect of Class Size on CS1 Delivery”, and “The Future of Gaming”

*Outreach Projects:* The SPARCS (Student Programming and Robotic Computer Science) Middle School Outreach program targets middle school students in grades 7-8 with sessions on the exciting potential of pursuing a career in computing. Major presentation sessions include: “Working with Alice”, “Programming Lego Mindstorm Robots”, “Basics of Web Development”, and more.

*Mentoring Projects:* Each of the undergraduate SLC students has a graduate student mentor through the SLC. In addition, a group of undergraduate SLC students is mentoring middle school students in the area through the SPARCS program mentioned above.

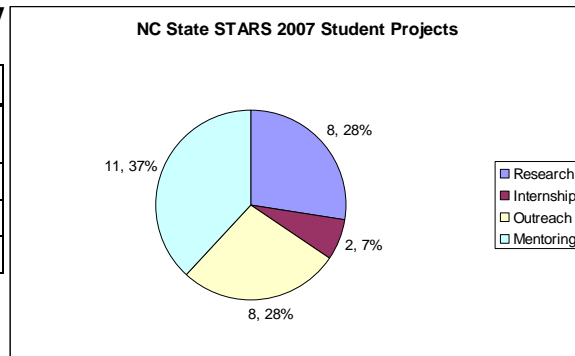
*Institutionalization:* The NC State STARS SLC has filed for and become a recognized campus student organization. As such it has additional rights, privileges and duties and is more visible and accessible to the broader student population.

*Sustainability:* The NC State STARS SLC activities are being integrated with the NC State Computer Science Department external relations program called e-Partners. Through that program, our SLC has received funding that supports its activities beyond what the NSF grant provides. We plan to continue increasing this support and make it into a long term departmental program. Because of the importance of diversity, retention and workforce issues, the Computer Science Department also provides additional support for coordination of the SLC program.

**NC State STARS Student Participants  
January 2007 through December 2007**

	Female	Male	Total
African American	8%	24%	32%
Caucasian	20%	40%	60%
Asian	8%	0%	8%
Total	36%	64%	

**Project Types and Student Participation**



**Events and Outreach Impact**

Event/Outreach Activity	Location	# of Attendees	Attendees
Final Exam Study and Game Session	NC State University	15	College Students
Fall 2007 Poster Celebration	NC State University	30	SLC Students, Industry Representatives, University Administrators
SPARCS (Student Programming and Robotic Computer Science) Middle School Outreach	Centennial Campus Middle School, Raleigh, NC	19	SLC Students, Middle School Students

## Lessons Learned and Highlights of Success

- Institutionalization! The formation of a STARS campus student organization has served as our first step toward institutionalizing the STARS effort. We are happy to report that this year, two of our participating members are non-stipend volunteers who joined through the student organization!
- External Support! Our student chapters has gained industry support facilitated by our department's ePartners program: four industry partners have donated a total of \$10,000 for our student research, outreach, and community service projects. Perhaps equally important to the monetary contribution is the attendance of industry representatives at our local STARS events. We encourage other chapters to invite industry representatives to student events (even from partners who are not able to provide financial support). These computing professionals are able to motivate and relate to our students in a unique way.
- Advanced Degrees! Three SLC students have reported completing applications to graduate school *primarily due* to the influence of their STARS mentors! We strategically pair undergraduate students with graduate student mentors who can encourage those undergraduates to persist in their education or pursue meaningful computing careers.
- Retention! Four undergraduate SLC students report they probably would have given up on a computing major because of the difficult coursework, but felt they were able to "stick it out" because of the support system offered by the STARS leadership corps. These students now know not only *how* to make it through this challenging major, but have a better grasp on *why* to continue on their path toward a degree in computing.
- Leadership! Components of sustainability include industry support, incorporating STARS activities into university programs, and most importantly recruiting high quality leaders to manage SLC activities. At NC State University the program hinges on graduate student staff who lead the effort, so we provide special fellowships from the Dean of Engineering and the Computer Science Department to support these graduate students.
- Poster Presentations! On December 6, 2007 the Raleigh SLC of STARS held a poster presentation to give STARS students a chance to display and discuss the work they had done during the Fall 2007 semester. Representatives from each of our industry sponsors were invited, including SAS, Tekelek, EMC, and Network Appliance (NetApp). The event was held in a high-traffic area, so students passing through the building on their way to class were given a view of the work our STARS students have been doing. The whole event was a great success, giving students a chance to network with members of industry and increasing publicity for the Raleigh SLC within NC State's Computer Science department. We plan on having a reprise of the event, with updated posters, at the end of the Spring semester.

### 3.4.4 Meredith College STARS



Academic Liaison: Ms. Kristin Watkins

Partners: Women and Math Mentoring



**Meredith College 2007-2008 SLC Students  
Allison Fairbank, Keyotta Sanford, Keri Rehm, Laurie Hunter  
(not pictured: Amy Ingram)**

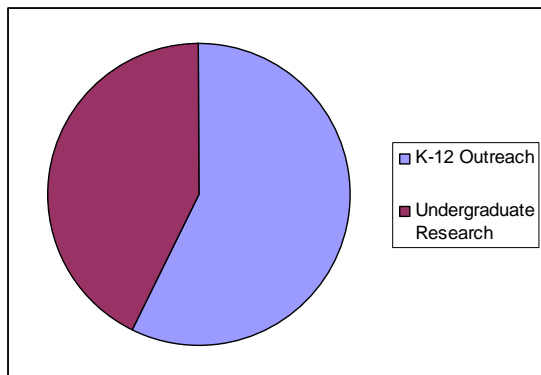
#### **SLC Description and Outcomes**

The Meredith chapter of the SLC for 2007-2008 consists of 5 undergraduate students. Two additional students participated in 2006-2007. Our mission is to provide outreach on our campus, at local schools, and in our community to encourage interest in computing careers.

#### **STARS Student Participant Demographics**

<b><u>SLC Participants</u></b>	Females	Total
African American	14%	14%
Caucasian	86%	86%
Total	100%	100%

## Project Types and Student Participation



Primary Activities	# of SLC Student Participants
Outreach	4
Research	3

## Events and Outreach Impact

Event/Outreach Activity	Location	# of Attendees	Grade Levels of Attendees
Sonia Kovalevsky Day	Meredith College	70	8 <sup>th</sup> graders
Celebrating Student Achievement Day	Meredith College		College
Girl Scout Day Camp	Raleigh	50	1 <sup>st</sup> -6 <sup>th</sup> graders

## Overview of Lessons Learned

- Teamwork is key.
- K-12 students respond best to interactive presentations in small groups.

## Highlights of Successes

- Students who participated in undergraduate research projects had the opportunity to share their research findings with all members of the campus community through presentations given as part of Meredith's Celebrating Student Achievement Celebration.
- Outreach presentations to middle school students included workshops on what you can do with a computer science degree, web development, digital music, and computer security. Feedback from the workshops was very positive.
- Both SLC students who graduated in May 2007 **continued on to graduate school.**

### 3.4.5 The STARS Leadership Corps at Auburn University

#### Alliance Members

Auburn University  
Computer Science & Software Engineering  
Spelman College  
Department of Computer Science  
Alabama A&M University  
Department of Computer Science  
South Carolina State University  
Department of Computer Science

#### Partners

- Atlanta City Schools
- Auburn University Engineering Administration
- Auburn University Office of Outreach
- Auburn City School System
- University of Alabama
- World Usability Day

#### Coordinators

*Dr. Juan Gilbert Dr. Cheryl Seals  
Dr. Andrea Lawrence  
Ken Rouse*

#### SLC Description and Outcome

The STARS Leadership Corps at Auburn University has worked in the areas of Research, Outreach, and Recruiting. Since the inception of the SLC we have been working with our community Partners, Auburn City Schools to provide a computing camp that has provided support to the local school system. Our work with the school system has fostered a lot of good will which is causing many doors to be opened to the SLC within the school system and our work with **Alice 3D** and **Squeak** have reached a broad audience with local newspapers and journal publication.



AU STARS were also privileged to have

access to many great invited speakers such as Diann Jordan, Wanda Dann, Laurie Williams, and at least a dozen others. All of the students in the SLC are exposed to a research component through our seminar series. Several SLC students were also industrious enough to complete their M.S. Theses this semester while participating in the SLC outreach activities. This also provided



an opportunity for other students to be exposed to research. We also had three SLC student undergrads complete their undergrad programs during the 2006-2007 year. The students that did not complete their Theses or Projects this semester are required to perform a research presentation on their research progress as the culminating research activity of the semester and many are encouraged to present their research at conferences. The SLC in Auburn and

Spelman have collaborated with local school systems to support computer clubs and after school programs. Spelman SLC members are heavily involved in **RoboCup**. During Fall we began a partnership with **World Usability Day**. We also have partnerships with the AU Office of Outreach, Office of Multicultural Affairs, Woman's Studies Program, and WISE Institute. We have 12 students currently active at Auburn this semester. We have 2 students active at **Spelman**, and 4 affiliated students at **South Carolina State** and one student at **Alabama A&M University** with hopes of increasing that number semester. We have impacted the lives of at least 160 K-12 students with our outreach programs. AU STARS and K-12 students presented at Engineering Day and were visited by at least 500 high school students and their parents. We have provided programs that were attended by at least 50 university students. Leadership assignments support WUD and **Women In Computing** (WIC) session.



### 3.4.6 Spelman/Auburn STAR

Spelman College, Atlanta, GA 30314 [www.spelman.edu](http://www.spelman.edu)

#### Academic liaison and staff

- Andrea W. Lawrence
- Charles Hardnett, research and project mentor

#### Partnerships

- Computer Science Department
- ACM and UPE Chapters
- The STARS students as catalysts and leaders



Since our group of students is small, the academic liaison manages most of the project. Students in the project participate in both outreach and research. Students are assigned to research mentors according to their area of interest. Both students and research mentors are contacted regularly to make sure all is going well. Four African American females comprise our SLC.

#### Lessons learned:

- It is important to have contact information for all involved. It is also important to keep in touch with the students in case any issues develop.
- When planning pre-college activities, it is important to contact parents or school faculty. A sign-up fee to confirm participation helps keep attendance predictable.

#### Successes:

- The students were involved in numerous outreach activities during 2006-2007, particularly with robotics and a Spelman College project called CARE that includes Saturday workshops and summer camp.
- All students have participated in research. Ashley Johnson spent the summer at NASA and has presented her work at conferences. Andrea Roberson has also presented the results of her work. The other two students are rising sophomores and plan to present in the Spring.
- The students organized and spear-headed a project called Geek Week at Spelman College. This was open to Spelman students, Morehouse College and Clark Atlanta University Students, and some members of the community. It included a Saturday pre-college workshop, a games night, a featured speaker from Google, and a robotics night as well as a concluding Geek Ball. A repeat is planned for the Spring.

### 3.4.7 Georgia Tech STARS



Academic Liaisons/ Staff:

Dr. Maureen Biggers, PI  
 Ms. Felecia Auzula, Coordinator  
 Mr. Ronald Stevens, Coordinator

Partners:

Georgia Tech Computing Diversity Lab  
 Minorities @ CC  
 Women @ CC  
 Girl Scouts' Girl Go Tech  
 YWCA  
 North Atlanta High School

<http://home.cc.gatech.edu/DiversityLab/3>



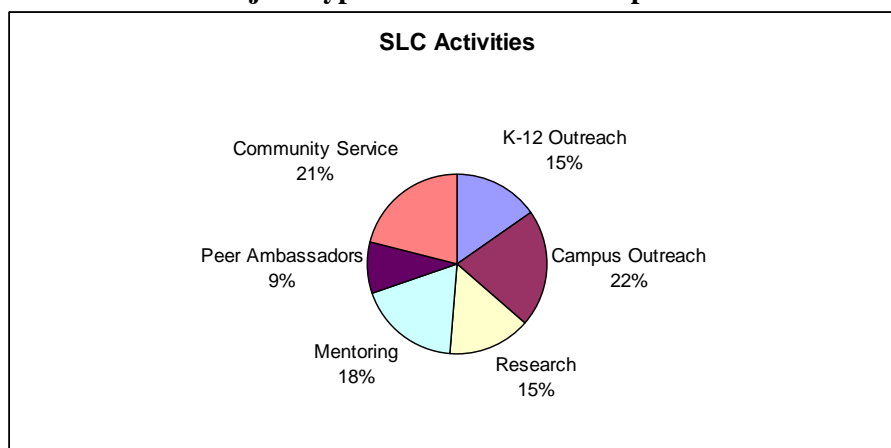
#### SLC Description and Outcomes

The Georgia Tech chapter of the SLC consists of 14 students from Georgia Tech. These students are comprised of 5 graduate students and 9 undergraduate students. The Georgia Tech SLC aims to encourage participation in computing through mentoring, outreach, and exposure to exciting research activities. Members of the GT STARS are working with Girl Scouts, High Schoolers, and their peers to explore the various ways computing can be used as a career.

#### GT STARS Student Participant Demographics

<u>SLC Participants</u>	Females	Males	Total
African American	7%	31%	38%
Asian	0%	8%	8%
Caucasian	31%	7%	38%
Hispanic	16%	0%	16%
Total	54%	46%	100%

## Project Types and Student Participation



K-12 Outreach	5
Campus Outreach	7
Research	5
Mentoring	6
Peer Ambassadors	3
Community Service	7

### Overview of Lessons Learned

- Networking with other organizations on campus helped us to learn about new opportunities for recruiting and retaining student within the school.
- Monthly meeting to discuss progress in the SLC activities allowed us to measure progress in the group.

### Highlights of Successes

- We were able to meet with freshman CS students to generate interest in the activities of STARS.
- We were able to create a GT STARS website.
- We were able to organize monthly meetings, create a STARS mailing list, and create a GT STARS Facebook group to open up communication among STARS members.

### 3.4.8

	<h2>The STARS Alliance Student Leadership Corps at FSU</h2> <p><a href="http://starsalliance.fsu.edu">http://starsalliance.fsu.edu</a></p>
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#### Alliance Members:

- FSU College of Information, Information Technology
- FSU College of Arts and Sciences, Department of Computer Science

#### Coordinators:

<p><i>Dr. Lawrence Dennis</i></p> 	<p><i>Dr. Lois W. Hawkes</i></p> 	<p><i>Dr. Ebrahim Randeree</i></p> 
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#### Staff:

- Andrew Bertino, Web Administrator, Staff

#### Partners:

- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>• TalTech Alliance</li> <li>• The Tech Shop</li> <li>• Infinity Computer Solutions</li> <li>• Fringe Benefits Mgmt. Co.</li> <li>• Ability 1<sup>st</sup></li> </ul> | <ul style="list-style-type: none"> <li>• Godby High School</li> <li>• Leon County Schools</li> <li>• Charter School of Arts &amp; Sciences</li> <li>• Nelson and Affiliates</li> <li>• Mary Brogan Museum of Arts and Science</li> </ul> | <ul style="list-style-type: none"> <li>• FSU Women in Computing</li> <li>• FSU Association of IT Professionals (AITP)</li> <li>• Tallahassee Community College</li> <li>• FAMU</li> </ul> |
|---|--|---|



#### SLC Description and Outcomes

For the Summer 2007-Fall 2007 period, the FSU Student Leadership Corps (FSU-SLC) Scholars Program involved a total of 15 students, including underrepresented minorities, women, and persons with disabilities. The students have grown in their confidence in leadership skills, in planning and implementation and in working with a diverse group of individuals.

#### Summer Semester 2007

Both graduate and undergraduate students from the Department of Computer Science and the College of Information teamed up to develop plans for various SLC activities for the summer and fall sessions. We were also able to secure permission from the Leon County School system to conduct various outreach activities targeted to school-age children and guidance counselors in the regional high and middle schools.

The students prepared marketing materials to be distributed during these outreach activities, and coordinated with the guidance counselors

**August 2007**

During the STARS Alliance Kick-Off Summer Workshop, FSU-SLC students participated in the poster session with papers describing research conducted in relation to BPC. This year, two of our Student Leadership Corps scholars were awarded service awards by STARS Alliance: *Jenniferanne Broido and Sara Diesburg*

**Fall Semester 2007**

The FSU SLC for the fall 2007 semester includes 14 students from IT and CS, 6 of whom are graduate students and the remainder, undergraduates. Our primary focus was a county-wide Computing Careers Night (CCN). In previous semesters, the SLC has taken on multiple projects with a team assigned to each project. However, due to the size of the CCN event, we had all the SLC members work on this one project, but divided them into sub-committees. Each of the sub-committees had a leader who maintained the associated blackboard site and led the group, and one student was the “communications director” who maintained information flow among the subcommittees. The four subcommittees were: Sponsors & Surveys; Logistics; Advertising & Marketing; and Speakers & Layout. Additionally, as of Fall 2007, FSU STARS is a Registered Student Organization (RSO) which provides it with funding and status for campus activities. The goals of the Stars Alliance map well into the Florida State University RSO guidelines. The SLC has also planned events for the Spring Semester. Current preliminary plans call for: Computer Set up/Maintenance and training (Lutheran Services, Ability First, Appalachee Ridge), Partnerships and joint projects (Girls Get IT, AITP, WICS, TSA), Computing Outreach (Execute the CCN project on a smaller scale with teams going to multiple schools, building a relationship with each school in preparation for a Fall 2008 CCN event).

**STARS Student Participant Demographics**

SLC participants	Females	Males	Total
African American	21%	0	21%
Asian	7%	7%	14%
Caucasian	43%	14%	58%
Hispanic	7%	0	7%
<b>Total</b>	79%	21%	100%

**STARS Outcome Metrics**

Our one large project included aspects of outreach, community service, mentoring and leadership training. This model allowed sub-groups to work on specific tasks, but to come together for project overview meetings. As a consequence the whole group felt more cohesive and they knew each other better. A subcommittee completed the process to become recognized as a campus organization.

		Attendees						
Event	Location	Total	HS	MS	CC	Parents, Teachers	Admin. & Professionals	SLC
CCN	Godby HS	130-140	45	4	1	34	35	14

**Overview of Lessons Learned and Successes**

The model of having a common general focus promoted camaraderie among the SLC participants and worked better for us than multiple distinct projects. The FSU STARS is now an RSO, improving its campus visibility. SLC worked with local high school students and administrators, as they all planned for the CCN together. It also brought together students from CS and IT into a single team, something which otherwise would not have happened. The concept of having ‘booths’ to represent local computer firms, two universities and one community college, and their five distinct academic programs was very successful with parents, students and teachers circulating among them.

**FSU STARS Alliance in the News (Tallahassee Democrat 11/29/2007) - Computing Careers Night a Great Success!** <http://tallahassee.com/apps/pbcs.dll/article?AID=/20071129/schools31/71129036/>



### 3.4.9 Florida A&M University STARS

#### Academic Liaisons/ Staff:

Dr. Edward L. Jones, PI  
Dr. Jason T. Black, Co-PI  
Ms. Davida Jones, Student Evaluations Coord.

#### Partners:

FAMU Department of Computer and Information Sciences  
Boys and Girls Clubs of the Big Bend  
Tallahassee Girl Scout's  
Leon County School Board Volunteers  
Nims Middle School Digital Harmony Tech Club  
Tallahassee Technology Alliance

[www.cis.famu.edu/~famustars](http://www.cis.famu.edu/~famustars)

#### **SLC Description and Outcomes**

The FAMU chapter of the SLC is made up of consists of 11 students - 9 undergraduates and 2 graduates. The current SLC is a revamped SLC, with FAMU's SLC having graduated over 50% of our SLC during the past calendar year. The current mission of the FAMU chapter is to focus on the following major impact items: Recruitment: working to increase the number of incoming Freshmen majors in the CIS area; Outreach: reaching out to K-12 to provide information and guidance concerning CS and IT fields; Service learning: conducting workshops, courses, and other tutorial opportunities for the community at-large on CS and IT topics.



In efforts to achieve these goals, the FAMU SLC has restructured the process by which projects are undertaken. In the first year of the program, the students in the SLC each participated in projects identified largely by the PI and Co-PI by dedicating a minimum of 10 hours per week toward the projects. This was an effective means of carrying out projects, but seemed to lead to an extraordinary amount of strain on SLC participants. Over the summer (and in particular during the 2007 STARS Celebration), it was decided to assign 1 project to EACH SLC member, which must be designed, implemented, completed, and reported on (in either oral or poster form) during the 2007-2008 calendar year. It was felt that this will serve to:

- Provide a true sense of leadership to each SLC participant
- Help better organize the SLC time commitment to projects
- Allow for each SLC participant to have an opportunity to present their work during the upcoming STARS Celebration.

The major project areas that have been designed and are either being currently implemented or are in development include:

- *CS and IT Days:* FAMU SLC members visit local K-12 schools to speak about careers in CS and IT, as well as college preparation
- *Adopt a school projects:* the FAMU SLC works to adopt local clubs or technology labs to provide support and other assistance
- *Internal CIS Awareness projects:* the FAMU SLC will host activities or events designed to strengthen CS and IT awareness and enthusiasm among current FAMU CIS students
- *Student-faculty development projects:* the FAMU SLC will provide opportunities for more networking among FAMU CIS students and faculty, as well as other round-table discussions and advisement activities

#### **Overview of Lessons Learned**

- Establishment of the *SLC Associate* category, to facilitate the participation of non-CIS students as auxiliary members of the SLC (many have requested to do so)
- Better utilization of the E-Journals for SLC members to quickly record progress on activities (photos, reflections, etc.)

#### **Highlights of Successes**

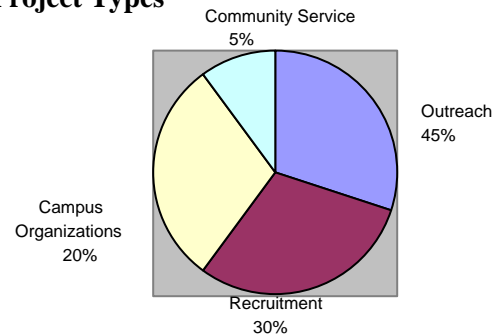
- Participated in several CS/IT Careers Nights career fairs held in the Tallahassee Area
- Assisted the Leon County *Digital Harmony Project*, which is an initiative to involve underrepresented families in the use of technology in learning

- Generated and distributed a *Tech Topics* newsletter, distributed among FAMU CIS students and faculty, to provide information about careers in IT, salaries, new technology, current trends, etc.
- Developed a *Meet the Faculty* seminar series, where CIS faculty can talk openly with students about their experiences in college, provide career advice, share hardship stories and how they overcame obstacles, etc.
- Begun designing systems for local area businesses (mostly websites) as a means of community service and service learning

### STARS Student Participant Demographics

SLC Participants	Females	Males	Total
African American	45%	55%	100%
Asian	0%	0%	0%
Caucasian	0%	0%	0%
Hispanic	0%	0%	0%
Total	45%	55%	100%

### Project Types



### Events and Outreach Impact

Event/Outreach Activity	Location	# of Attendees	Grade Levels of Attendees	# of Teachers, Counselors, Parents
Outreach : Godby High School IT Careers Night	Amos P. Godby High School Tallahassee, FL	~100	Senior High	8
Recruitment: East Gadsden Co. High School visit	East Gadsden County High School Havana, FL	25	Senior High	2
Recruitment: Visit to Leon High School	Leon High School Tallahassee, FL	5	Senior High	1
Recruitment: Visit to Rickards High School	Rickards High School Tallahassee, FL	55	Senior High	3
Recruitment: Visit to Wakulla Middle School	Wakulla County Middle School Wakulla, FL	58	Junior High	3
Outreach: Boys and Girls Club	Boys and Girls Club of the Big Bend Tallahassee, FL	48	Junior High	4
Recruitment: Visit to FAMU High School	FAMU DRS High School Tallahassee, FL	10	Senior High	1
Outreach: Tutoring at Bond Elementary	Bond Elementary School Tallahassee, FL	10	Elementary	
Seminar: Careers in CS and IT	Florida A&M University CIS Dept Tallahassee, FL	38	Collegiate	
Seminar: Meet the Faculty Session	Florida A&M University CIS Dept Tallahassee, FL	18	Collegiate	1
Outreach: Tech Topics Newsletter Series	Florida A&M University CIS Dept Tallahassee, FL	380	Collegiate	
Service Learning: workshop on Dreamweaver	Florida A&M University CIS Dept Tallahassee, FL	22	Collegiate	
Outreach: Welcome to CIS (for incoming Freshmen)	Florida A&M University CIS Dept Tallahassee, FL	28	Collegiate	
ACM Meetings / Game Night	Florida A&M University CIS Dept Tallahassee, FL	14	Collegiate	
Outreach / Service Learning: Nims Digital Harmony Project	Nims Middle School Tallahassee, FL	15	Junior High	1
<b>Totals</b>		<b>826</b>		<b>24</b>

## 3.4.10 Landmark College STARS Leadership Corps

### Academic Liaisons/Staff

Dr. Steve Fadden, Landmark College Principal Investigator

Julie Strothman, SLC Coordinator

Lorri LaMagdelaine, SLC Advisor

Stephanie Kreseen, STARS Alliance Industry Coordinator

[www.landmark.edu/stars](http://www.landmark.edu/stars)

### SLC Description, Management, and Outcomes

Ten students (three women and seven men) participated in Landmark's SLC between March and December 2007, with interests that range from education and communications to business, physical rehabilitation, and cognitive psychology. Each student is pursuing an Associate's Degree at Landmark College in Putney, VT, one of the only colleges in the country that exclusively serves students with learning disabilities and attention disorders.

Landmark College does not have a Computer Science or other technology-focused academic department; therefore the SLC represents one of the only focused opportunities at the College that provides students with an opportunity to explore technology and learn about computing. However, this situation also presents a significant challenge to the success of the Landmark SLC. Without the support and active participation of faculty members from a dedicated computing or technology department, Landmark's SLC program must be run by staff members. Given the nature of our program (intensive instruction for students who struggle with learning), our daily schedule (which provides about 50-75% more contact hours per week than the typical college), and the unique needs of our students, we have taken steps to ensure the greatest possible success of the STARS Alliance at Landmark College.

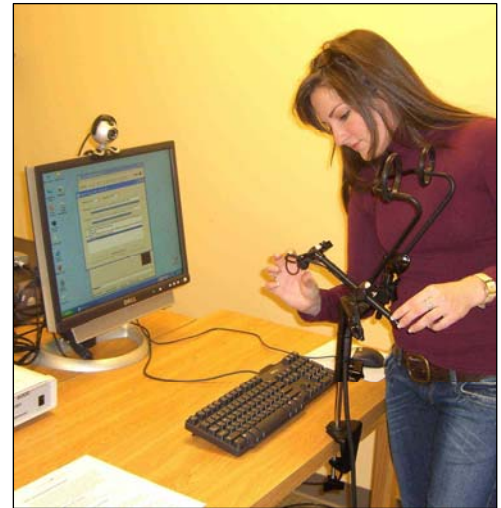
These steps include the active participation of two staff members from the Landmark College Institute for Research and Training (Steve Fadden and Julie Strothman), as well as additional support from a Landmark College advisor (Lorri LaMagdelaine) who specializes in working with students who struggle with learning challenges. To address our scheduling constraints, we have implemented a system of weekly lunch meetings with our students (as lunch represents the only time commonly available for all SLC members), as well as weekly team research meetings.

The Landmark SLC is dedicated to learning about diverse uses of computing and technology across multiple fields and domains and educating their peers about these opportunities. Landmark SLC participants gain research experience exploring how technology can be used to improve our understanding and support for people with learning disabilities and attention disorders. SLC members participate in regular team research meetings, weekly team lunches to discuss computing, technology, and related research, and in computing workshops.

### Research Projects

#### The Effects of Distractions on Reading Comprehension

Using an eyetracker, three students performed a study of the effects of website popup distractions





on reading comprehension. These students learned research methods using eyetracking technology. They presented their process and their early findings to peers and to the Landmark Board of Trustees. As a result of their presentations, we recruited new SLC participants and developed high-level support for institutionalization of the STARS Leadership Corps at the College.

### **Usability Study of Web-Based Algebra Learning Resources**

Three students performed heuristic evaluations and usability tests to evaluate the usability of selected online math learning resources. The study aims to improve success rates in basic algebra, a gateway STEM course, through the development of guidelines for the development and evaluation of math resources for independent use by struggling students. SLC students learned research methods in the context of usability testing and learned about the effects of design choices on efficiency, effectiveness, and satisfaction.

### **Lessons Learned and Successes**

In the SLC's third semester, we experienced our highest meeting attendance and participations rates. We attribute this success to the creation of smaller work groups and well-identified research goals. Our lunch meetings became a valuable time to bring the whole group together and learn what the other group had accomplished. We also attribute this success to changes in the selection process of new SLC students, and in early establishment of expectations for participation. Students who did not have all of their application materials in by the deadline were not considered for the program. At the start of the semester, continuing SLC members helped to reinforce the need for group work and active participation.

The Landmark SLC is interested in outreach to local K-12 students, but has been careful to keep our goals manageable. This semester, we responded to the local community's need for a K-12 website redesign by offering a heuristic evaluation of the current website as well as a needs identification for their redesigned site. The SLC hopes to work directly with the students in the coming year.

We had an increase in the number of SLC applicants for the Spring 2008 semester. Our SLC has put strong effort into promoting and celebrating the STARS program on our campus, both with their peers and with faculty and advisors. Most of our applicants have been encouraged to participate by their advisors. As awareness of the STARS opportunities grows, we will be better positioned to institutionalize the program.

### 3.4.11 USF Lakeland STARS

The STARS program, at USF Lakeland, started as a small group made up of one advisor and four mentors, and much has been accomplished by the TEAM (Teaching Educating And Mentoring). Along with the MathGenie program that has been led by Dr. Karshmer and supported by Rebecca Skipper.

Academic Liaisons/ Staff:

- Dr. Nathan E. Thomas, III – Co-PI
- Dr. Art Karshmer – Co-PI
- Carlos Fossi – Advisor, Academic Liaison
- Rebecca Skipper – MathGenie Support
- Paul Stanley – MathGenie programmer

Partners:

- Polk Community College Lakeland & Winter Haven Campus
- Le’Azon Technologies Institution
- USF Lakeland Engineering Dept.
- USF Lakeland IT Dept.
- University of San Francisco
- Pizza Hut
- Crispers
- Subway
- Mindframe



The USFL TEAM is using the six Thomas Principles (TP), Identity Development, Psychological Support, Social Support, Academic Support, Sense of Belonging, & Leadership Development, on a three prong structure focusing on:

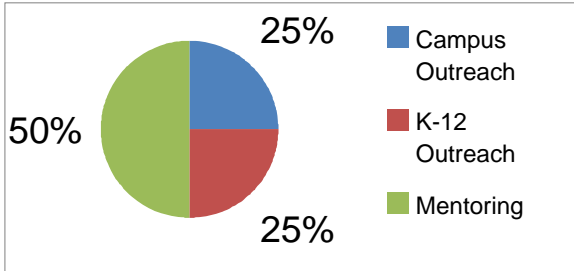
- 1) Community/Business
- 2) Faculty/Staff
- 3) Students

The way the Thomas Principles are being applied is through our outreach programs with local community colleges by recruiting students to join the USFL STARS and become part of our TEAM, working with local businesses to give students internship options and networking/job opportunities, teaming up with faculty to provide mentoring for the students and create research study opportunities, working with incoming students to help retain and graduate them, and working with future mentors/mentees to institutionalize the Thomas Principles in their day to day mentoring.

<u>SLC Participants</u>	Total Numbers	Females	Males	Total
African American	1	0%	9%	9%
Asian	0	0%	0%	0%
Caucasian	7	33%	25%	58%
Hispanic	4	0%	33%	33%
Total	12	33%	67%	100%

**STARS  
Student  
Participant  
Demographics**

### Project Types and Student Participation



Primary Activities	# of SLC Student Participants
Campus Outreach	5
K-12 Outreach	10
Mentoring	12

### Events and Outreach Impact

Event/Outreach Activity	Location	# of Attendees	Grade Levels of Attendees	# of Teachers, Counselors, Parents	Sub Totals
IT/Engineering Energizer	USF Lakeland	16	Undergraduate	2 teachers	13 students 3 adults
Recruitment	PCC Winter Haven	25	High school juniors/seniors	3 teachers	19 students 6 adults
STARS Math & Technology Summer Camp	Sleepy Hill Middle School	23	6 <sup>th</sup> , 7 <sup>th</sup>	1 teacher	14 students 9 adults
<b>Totals</b>					<b>64</b>

### Overview of Lessons Learned

- Preparation to inform students and formalizing a curriculum
- Modify curriculum to work with Thomas Principles and to align better with measurable outcomes

### Highlights of Successes

- New students become interested the more they hear of the program and see its campus involvement
- A STARS student group under Student Government Association (SGA) is being developed to have ongoing financial support, institutionalization in the system, and recognition of a serious program dedicated to student retention and graduation
- The SLC students participated in a summer camp involving over aged middle school students and are maintaining monthly contact with them to follow up on their progress
- USF STARS has taken initiatives to work with the school board and other local companies in order to create an atmosphere of inclusion for students in the program and to create a sense of belonging and pride to their campus and community
- One of our greatest successes was seeing two of our mentors graduate. One is continuing in grad school to pursue his Masters in IT and another is teaching mathematics in a community college

## 3.5 Demonstration Projects

### 3.5.1 Mentoring

In January 2007, seven alliance member universities (Year 1 Cohort) attended a successful three day workshop to learn how to implement the Alliance's Identity-based mentoring model using the Thomas Principles. The conference addressed five primary areas for potential implementers:



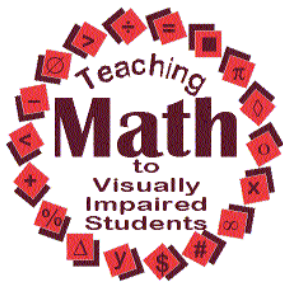
development, sustainability, implementation, evaluation, and program implementation support. After six months (February to July) implementation proved difficult because of internal organizational challenges (i.e., time and finding the right person to advise program). Several individuals are the lead Academic liaison's for their university and they struggle managing their alliance and implementing a mentoring program concurrently. The universities that have successfully started implementation have a graduate student or support staff to help implement and manage their programs.

Based on the initial implementation of the mentoring model, lessons have been learned to effectively implement and evaluate the model as a demonstration project. Establishing and funding mentoring as a demonstration project, rather than as a program, is a strategic shift made by the STARS Alliance for Year 2 implementation. This organizational move will assure mentoring model standardization across alliance universities that use mentoring within their SLC. Three key areas are being highlighted to develop program implementer leadership alliance wide: 1) Demonstration project Strategic Plan and Organizational Infrastructure, 2) Standardized program implementation, accountability and evaluation, and 3) Training and support. During January 2008, a mentoring training and implementation workshop was conducted, which provided alliance schools the means to prepare and plan their upcoming mentoring implementation. Fourteen faculty members and upper level students attending the workshop to prepare for managing their institutional mentoring programs during the 2008-2009 year.

### 3.5.2 Pair Programming

As a first step towards realizing systemic curriculum change to broaden participation in computing, NC State leads the Alliance efforts to replicate pair programming. The goal of pair programming is retention in computing programs. 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. During the second year of the Alliance, 5 Pair Programming workshops and presentations have been conducted at SIGCSE 2007, STARS Celebration 2007, Mississippi State, University of Wilmington, and the Software Engineering Education and Training Conference 2007. A journal article entitled, Lessons learned from seven years of pair programming at North Carolina State University, has been published in the December 2007 issue of the SIGSCE Bulletin.





### **3.5.3 Teaching Math to the Visually Impaired**

USF-Lakeland will lead an effort for teaching math to visually impaired students. The MathGenie is a computer program developed over the last three years with a goal of providing a personal math reader to blind students trying to learn math at all levels in K-12. Work generated by a teacher for sighted students is automatically converted for use by the MathGenie, requiring no special knowledge from the teacher concerning such issues as a Braille code and preparation of equations for the blind student [MathGenie].

In year 1, USF-Lakeland setup a lab to 1) teach visually-impaired college students how to use the MathGenie equation browser; 2) prepare university teaching faculty to use the MathGenie in their classrooms and labs; and 3) train K-12 teachers from the Polk County public school system to utilize the MathGenie in their classrooms. The alliance evaluation team will develop an evaluation to determine if such a tool is useful to college students and the ease with which teachers are able to integrate the use of the MathGenie into mainstream classrooms. The goal of Teaching Math to the Visually Impaired (TMVI) project is to support learning for visually impaired students in middle school math classes, enabling them to be prepared for a computing major in college

### **3.5.4 Assistive Technology: Computing Education for Students with Learning Disabilities**

The Southeast Alliance includes Landmark College, located outside of the southeastern geographic area. Landmark College was brought into the Alliance for their unique experience exclusively teaching college students with diagnosed LD. Landmark's population is unique, with all students having a diagnosed LD and/or AD/HD. While all Alliance members have students with LD, in most cases, we don't know who they are. Landmark College brings to the Alliance: a unique population—they are one of the few colleges in the nation exclusively serving students with LD and decades of expertise, best practices, and techniques for teaching students with LD, which will be disseminated among Alliance members and to the broader IHE community via the web portal. One of the points of replication of the SLC at all these institutions is to determine if it is equally successful with diverse student populations. Landmark's participation in the SLC enables all of us to see whether SLC works well for LD students. If the SLC needs to be modified for Landmark students, then the other Alliance members will be able to modify their own programs to better meet the needs of all students, whether or not diagnosed with LD.

### 3.5.5 AARCS: African Americans in Research in Computer Science

Juan Gilbert and Cheryl Seals of Auburn University proposed a BPC-Demonstration Project entitled "The African-American Researchers in Computing Sciences (AARCS)". The AARCS Demonstration Project is well suited for integration into The STARS Alliance. AARCS will broaden participation of African-Americans in computing using three components, Targeted Presentations, Future Faculty Mentoring and an annual mini-conference at Auburn University.



### 3.5.6 Culturally Situated Design Tools

Many cultural designs are based on mathematical principles. This software will help students learn standards-based mathematics as they simulate the original artifacts, and develop their own creations. This project, lead by Ron Eglash, is being implemented during the 2007-2008 academic year. SLC students will utilize CSDTs in K-12 outreach projects.



## 4. The STARS Alliance Industry Sponsorship Model






The purpose of the alliance sponsorship efforts is to enlist support, in terms of providing funding, student experiences, and advice for the alliance programs. We have developed a sponsorship model that we are using to recruit organizations to support the STARS Alliance through donations of resources, time, and money. These donations enable the Alliance to provide computing and technology experiences to additional students, expand offerings such as professional development workshops and presentations, and enable the Alliance to provide more experiences in computing and technology for students at the annual conference and other events. Figure 4.1 highlights synergistic program collaborations that allow us to pool resources. Our new Alliance members and partners are listed in Table 4.1.2.

**Figure 4.1 Highlights of STARS Partnerships & Collaborations with Synergistic Programs**

Pre-College Programs	
<b>Community Service</b>	SLC students: host girl scout visits on Girls are IT! Tech Bus <a href="http://www.girlsareit.org">www.girlsareit.org</a> ; Provide Internet Safety training for girl scout's "IT Badge"(UNCC, JCSU); Conduct Girl Scouts Workshops (Meredith); and Mentor at Boys and Girls Clubs (FAMU); Tallahassee Girl Scouts (FAMU)
<b>High School Tutors and Mentors</b>	SLC students serve in tutoring/mentoring programs: High School Tutor (Ga Tech); Tutoring Gifted Students (FSU); CS 101 High School Workshop Series (FAMU)
<b>On-campus events for K-12 students, parents, counselors</b>	SLC students assist and serve as role-models for K-12 events: Freshman Orientation (UNCC, FAMU); CoolComputing@Tech for high school students, parents and counselors (Ga Tech); Computing Careers Night (FSU); Fall & Spring Outreach, World Usability Day ( <a href="http://www.worldusabilityatauburn.org">www.worldusabilityatauburn.org</a> ), E-Day, Alice3D Competition (Auburn, Spelman); and Sonia Kovalevsky Math Day (Meredith); Girl Scouts Go Tech (Ga Tech); Geek Week (Spelman)
<b>Computing Roadshows for Middle and High school outreach</b>	SLC students develop and deliver presentations to inform and excite kids about computing careers with practical advice on applying to college: IMC@T and Women@CC (Ga Tech); Minority Outreach Teams and High School Outreach Teams (JCSU, FSU, FAMU, USF Lakeland, UNCC)

<b>Outreach with Industry and Professional Organizations</b>	SLC students strengthen existing industry K-12 outreach programs to provide “stair-step” role models (as per Fig. 3.4): Black Data Processors Association (BDPA) High School Academy (UNCC, JCSU); Women and Math Mentoring Org (Meredith); Community Neighborhood Renaissance Partnership (FSU)
<b>Post-Secondary Programs</b>	
<b>Student Organizations</b>	SLC students strengthen existing student orgs: Women in Computer Science (NCSU FSU); and are starting new orgs or student chapters: ACM-W, Gamer’s Alliance, Black Data Processors Association (UNCC); IEEE (JCSU);
<b>Mentoring Programs</b>	Existing mentoring programs inform the STARS Mentoring Model: Ga Tech Big/Little Sisters mentoring pairs upper level undergrads with Freshman; Peer & Group Mentoring (UNCC, FSU, FAMU); USF Lakeland GEAR UP employs tiered peer mentoring for minority students; Peer Tutoring Lab (FSU);
<b>Research Experiences for Undergraduates (REU) programs</b>	SLC students participate in REU programs: REU Sites (Auburn, UNCC, JCSU); Intel Scholars (GA Tech); McNair Scholars (UNCC); Scholars of the Future (Auburn). Students host lab demos and Roadshows to bring research to K-12.
<b>Website Development</b>	SLC students work with website development: [STARS WEB], [CELEBRATION 06], [CELEBRATION 07], [STARS CHARLOTTE], [STARS LANDMARK], [STARS FAMU], [STARS NCSU]

**Table 4.1.2 New Alliance Members and Partners for 2008**

<i>Stars*</i>	<i>University &amp; College Members</i>	<i>University, College, K-12, Industry, and Community Partners</i>
 <b>Virginia</b>	<b>Virginia Tech (Research)</b> • Department of Computer Science	Hollins University, University of Virginia’s College at Wise, Blacksburg-Montgomery school system, Beeks Community Center, ACM-W, Computer Science Community Service Org
 South Carolina	<b>University of South Carolina Columbia (Research)</b> • Department of Computer Science and Engineering <b>South Carolina State University (HBCU)</b> • Department of Computer Science	Benedict College, Midlands Technical College, other community colleges; Governor’s School- Science & Math, S.C. State Dept of Education, Richland County and Lexington County Public Schools; Blackbaud, Collexis, Interactive Data Visualization Inc; Assoc. for Women in Science, BDPA, Junior Achievement, SC Alliance for Minority Participation
 <b>Tennessee</b>	<b>University of Tennessee- Knoxville (Research)</b> • Department of Computer Science & ECE	UTK ACM Chapter, Tennessee Louis Stokes Alliance for Minority Participation (TLSAMP), Knox County School System, Knoxville College, UTK Office of Engineering Diversity Prog.
 <b>New Orleans</b>	<b>University of New Orleans (UNO) (Research)</b> • Department of Computer Science	Greater New Orleans Universities: Tulane, Loyola, Dillard, Xavier, SUNO; Northrop Grumman; GNO REU Site; GNO K-12 School system and Pierre A. Capdau Charter School.
 Central Georgia	<b>Georgia Southern University (Research)</b> • College of Information Technology	Swainsboro Tech College, East Georgia College, Ogeechee Tech College, Charter Conservatory for Liberal Arts & Technology, Bulloch Academy, ACM chapter, SWE chapter, Savannah State Univ.; School Districts of surrounding counties; Morris Multimedia, National Cash Register (NCR)
Joining the Eastern NC Star	<b>Saint Augustine’s College (HBCU)</b> • Department of Computer Science <b>Shaw University (HBCU)</b> • Dept of Computer Information Sciences	Louisburg College, Cisco, Halifax County High Schools, Upward Bound Programs; Forsyth Technical Community College; Wake County Public Schools;
Joining the Florida-Polk County Star	<b>Polk Community College (PCC) (Community College)</b> • Computer Network Engineering Technology	Polk County School Board, PCC High School, Polk Community College High School, Lakeland HS, Publix Supermarkets, Florida Regional Medical Center, FedEx National, AITP Chaptr, Polk Works Workforce 2020, Polk County Schools. FL High Tech Corridor

\*Blue Stars are new partnerships for 2007.

## 5. Evaluation Report

### 5.1 STARS Evaluation Model

Evaluation is a critical component of the STARS Alliance, to assess program efficacy and to inform academic community of which interventions can be successfully applied within the respective communities. Daniel Stufflebeam’s Context, Input, Process, Product (CIPP) model [Stuf00] is being used to assess the STARS Leadership Corps, providing valuable formative and summative evaluation measures. Using this model, evaluators record and assess the following:

- **Context**–the larger setting of the project
- **Input**–all crucial project staff, materials, and resources
- **Process**–strategies, activities, practices, and procedures used to carry out the project. This formative evaluation is used to solicit information to determine modifications and adjustments needed to improve how a project operates;
- **Product**–the ultimate result obtained that can be attributed to interventions carried out through the project. This summative evaluation is used to determine if a project should be continued, modified, or terminated.

The evaluation includes both quantitative and qualitative components. Rather than measure each institutional program in isolation, a battery of attitude measurements, qualitative interviews, and survey instruments are systematically and longitudinally implemented across Alliance institutions. This comprehensive data collection enables us to measure and compare outcomes on an array of variables. SLC initiatives are measured by student variables, program variables, and institutional variables; for example, results are disaggregated according to student demographics, university size and type, and what types of SLC projects the students undertake. This unique comprehensive measurement approach will provide specific outcomes data and meaningful descriptions of what types of programming initiatives are effective for particular student groups and institutions.

The goal of the evaluation plan and timeline is to help us track current status, along with what needs to be done, by whom, and by what date. Each member of the Alliance Evaluation Team (AET) is responsible either for a component of evaluation, or for providing information to one of the evaluators. Recall that each evaluator and each academic liaison was allocated budget support for student data collectors to support evaluation efforts. AET roles and responsibilities are indicated in Table 5.1.

**Table 5.1 Alliance Evaluation Team Roles**

Structural Component	Member(s)	Roles and Responsibilities of Component Member(s)
<b>Alliance Evaluation Team (AET) and AET Support</b>	AET members and AET support personnel are listed below	Role of team: The AET will evaluate the effectiveness of the Alliance and its activities in reaching the stated goals. Table 1 illustrates the goals to which each activity is expected to contribute. The roles of team members are described below. Each AET member is paired with a program support person who facilitates information flow between the AET and the ASC.
	Kim Buch, UNC Charlotte	Role: AET Member- Overall Project Evaluation & NSF Data Collection Responsibilities: Insures that all aspects of evaluation are being addressed; Lead evaluator of alliance structure.
	Tiffany Barnes, UNC Charlotte	Role: AET Support- Overall Project Evaluation 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;
	Teresa Dahlberg, UNC Charlotte	Role: AET Support- Alliance Structure & NSF Data Collection Responsibilities: Provide information needed to support evaluation.
	Anthony Chow, UNC Greensboro	Role: AET Member- Web Portal & Marketing Responsibilities: Lead evaluator of web portal and marketing campaign.



Audrey Rorrer, UNCC	Role: AET Member- Student Leadership Corps (SLC) Responsibilities: Lead evaluation of the SLC
Star Coordinators	Role: AET Support- SLC Responsibilities: Provide information needed to support evaluation.
Sally Berenson, NCSU	Role: AET Member- Qualitative research design Responsibilities: Lead evaluator for replication of pair programming
Laurie Williams, NCSU	Role: AET Support- Pair Programming Responsibilities: Provide information needed to support evaluation.
Mladen Vouk, NCSU	Role: AET Member- Teaching Math to the Visually Impaired (TMVI) Responsibilities: Lead evaluator for demonstration of TMVI
Art Karshmer, USF	Role: AET Support- TMVI Responsibilities: Provide information needed to support evaluation.

## 5.2 Instruments and Implementation

Evaluation is continuous throughout each level of the Alliance. The Alliance Exchange, the STARS Celebration, the student participants. Although our partners and outreach participants have not been assessed at this phase in the project, the Evaluation Team has plans to implement K-12 outreach evaluations in spring of 2008. The chart below indicates the instruments and implementations for each Alliance level. A complete chart of instruments and measures is included in the appendices.

**Table 5.2 Summary of Assessment Objectives, Activities, Measures and Data Collection**

Goals & Desired Outcomes	Activities	Example Measures	Data Collection
<u>Goal 1: Recruitment</u> <b>Desired Outcomes:</b> a. Increased student enrollment in computing b. Increased student awareness about computing	-Alliance Exchange -SLC program -SLC training -SLC peer mentoring -Pair programming -STARS Celebration	- Student participation/ attendance - Faculty & professional participation - Student enrollment & reflections - Attitude scale that assess knowledge & feelings toward computing - No. of papers presented and people affected by service	-Pre-post test - <b>Electronic journals</b> - <b>Exchange report</b> -Participation - <b>Longitudinal data Collection</b> (Years 2 and 3)
<u>Goal 2: Bridging</u> <b>Desired Outcomes:</b> a. Increased student readiness to enter computing b. Increased number of undergrads to enter grad school or workforce	-STARS Web site -Marketing & Careers campaign -SLC training -STARS Celebration	- No. of people affected - Attitude scale that assess knowledge & feelings toward computing - No. of student proposals; applications; interviews; people affected by service	-Marketing report -Project proposals - <b>Enrollment</b>
<u>Goal 3: Retention</u> <b>Desired Outcomes:</b> a. Increased computing graduation rates b. Increased year-to-year persistence & declaration of major in computing c. Increased college GPA	-Alliance Exchange -SLC program -SLC training -SLC peer mentoring -Pair programming -STARS Celebration	- Mentoring satisfaction scale - Identity development scale - Psychosocial & academic support scale - Sense of belonging scale - Leadership development scale - GPA; Enrollment	-Pre-post test - <b>Enrollment</b> - <b>Longitudinal data Collection</b> (Years 2 and 3)
<u>Goal 4: Sustainability</u> <b>Desired Outcomes:</b> a. Sustain Alliance efficacy b. Institutionalize Alliance partnerships	-Advisory Board -Pair Programming -Peer mentoring -Participation Index -Task Force	- No. of institutions & orgs participating - No. of new interchanges between institutions and orgs - No. of policies adopted	- <b>Bi-annual board Report</b>

	Dialogues	- Organizational Efficacy scale	
<u>Goal 5: Dissemination</u> <b>Desired Outcomes:</b> a. Increased national awareness of effective practices b. STARS serves as a model & repository for BPC c. Alliance implementation & evaluation methodology promoted	-Task Force Dialogues -Participation Index -STARS Web site -Marketing & Careers campaign -Alliance exchange -Entire SLC program -STARS Celebration	- Student participation & attendance - No. of policies adopted; papers presented; people affected by service, institutions requesting information, recommendations made & adopted, dissemination activities; - Measures to assess internal and external alliance efficacy	-Marketing report -Exchange report

Red indicates not fully implemented. Blue indicates data gathered, report underway. Underline indicates current initiatives.

### 5.3 Baseline Enrollment Data

Baseline data collected for the alliance institutions is shown in Table X below, providing us with a basis for comparison throughout the project. Collection of comprehensive enrollment, retention, and graduation rates are currently being compiled across institutions for years 2003 to present. Initial baseline data from first year of project implementation is contained in the Appendix. The expectation is that enrollments for underrepresented populations at these institutions will increase at a higher rate than for other institutions outside the alliance.

Table 5.3 Baseline Enrollment Data in Computing

	2003-2004		2004-2005		2005-2006		2006-2007	
	Undergrad	Grad	Undergrad	Grad	Undergrad	Grad	Undergrad	Grad
<b>UNC C</b>	527	*	570	283	505	281	530	*
<b>NCSU</b>	889	334	790	341	628	339	604	365
<b>FSU</b>	452	153	417	138	323	143	281	118
<b>FAMU**</b>	496		391		296		237	
<b>USFL**</b>	78		82		96		93	
<b>Auburn GA Tech</b>	102	24	81	23	75	21	73	12
	1312	416	1130	418	917	414	834	471

### 5.4 Second Year SLC Results

Pre-SLC Survey (see Appendix) data was collected in August 2007 for the second cohort of SLC students, which began in the Fall of 2007. The second cohort consisted of a total of 128 students; 57% are female. Overall demographics are presented in the chart below. The majority of students reported that their primary SLC projects were involving K-12 Outreach (51%), with 18% of students primarily engaged in Research projects. Of the secondary projects students reported being involved in, 26% are peer ambassadors, and 26% are mentoring. A large majority of students, 74%, moderately to strongly agreed that they were able to commit the necessary time to their projects. An even larger majority **believe their projects are meaningful** (82%).

Significant differences were noted among the second cohort participants as compared to the first cohort which was homogeneous across several key indicators in the Pre SLC Student Survey by school. These key indicators are as follows:

- Students in 2-year and 4-year schools reported less commitment to staying in the field of computing long term than those in research institutions?
- Confidence in computing as a major was significantly less for students at 2-year institution as compared to 4-year
- Academic goals for graduate school were lower for students at one 4-year private degree granting institution.
- Students in HBCU institutions were more likely to report career goals of working in computing fields within business and industry students in majority schools
- Students in small private schools were significantly more undecided about their career goals.
- Reported SES was significantly higher for students attending private institutions.

These findings are not surprising, given that there is expected variance among the student populations at the Alliance institutions with regard to the particular character and focus of each institution. For example, it is not surprising that students attending 2-year and 4-year institutions report less commitment to their majors, since they have not been as exposed to research and graduate programs of study as have been their peers attending university programs in computing.

Figure 5.4.1

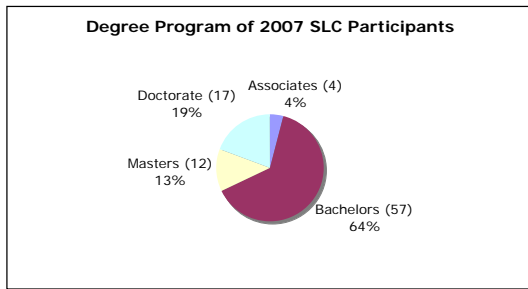
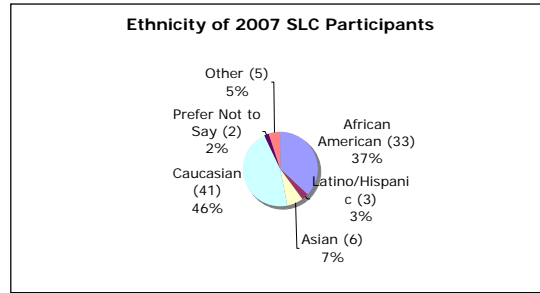


Figure 5.4.2



**Recruitment and Bridging Goals:** We are making substantial progress toward the desired outcomes of increasing enrollment of underrepresented students in computing as well as increasing student awareness about computing as evident from the SLC student commitment to pursuing graduate degrees in computing, and in their reported commitments to remaining in computing long term. Both cohorts have **reported high levels of commitment in their career and academic plans in computing areas**. Thirty-three percent of SLC students in Cohort 2 plan to obtain masters degrees and 29% plan to obtain doctorate degrees in computing; we anticipate an increase of students planning to obtain graduate degrees during the post assessment in May 2008. SLC students have conducted considerable outreach programming across the southeast with our organization and industry partners. To date, more than [3,615 K-12 and college students](#) have been reached by SLC outreach programs, along with over [749 teachers, parents, counselors and administrators](#).

**Retention:** Pre-SLC Survey results for the second year cohort suggest that our retention goals are being met. Most SLC students agree with the statement that their participation in the program will improve their GPA, help them decide computing is right for them, and increase their confidence in their major. Results also indicate a strong confidence in their ability to complete graduate school requirements. Means for these key indicators are presented below.

### 5.4.3 Means of Key Indicators of Retention for Pre SLC 2007

	N	Minimum	Maximum	Mean	Std. Deviation
Improve GPA	87	1.00	6.00	4.0920	1.41940
Help Decide Major	87	1.00	6.00	4.3218	1.58843
Confidence in Major	87	1.00	5.00	4.4713	.96254
Keep Computing Major	87	1.00	5.00	4.4713	.96254
I can succeed in graduate school	87	1.00	6.00	5.2184	1.07211

## 5.5 Comparison of First and Second Year Cohorts

The characteristics of Year 2 cohort are different from the Year 1 cohort in several significant ways. Overall, the second cohort reports less commitment to computing long term, less prior exposure to research and computing, and reports a lower SES status. Key distinctions between cohorts are presented below.

Figure 5.5 Comparison of Year 1 and Year 2 Cohorts on Key Indicators

<u>Year 2 Cohort</u>	<u>Year One Cohort</u>
47% lower middle class	85% middle class
64% parents with college degrees	53% parents with college degrees
57% female	51% female
33% believe they will obtain masters degree	66% believe they will obtain masters degree
29% believe they will obtain doctorate	50% believe they will obtain doctorate
59% plan to stay in computing long term	87% plan to stay in computing long term
63% agree that faculty are sensitive to minority issues	77% agree that faculty are sensitive to minority issues
47% agree that students are sensitive to women's issues	71% agree that students are sensitive to women's issues
59% agree that faculty are sensitive to women's issues	78% agree that faculty are sensitive to women's issues
50% agree that students are sensitive to minority issues	64% agree that students are sensitive to minority issues
Feel I fit in computing 4.91=M	Feel I fit in computing. 4.2=M

While the first cohort had no gender or ethnic differences among key indicators, the second cohort does exhibit some significant differences on key items between new versus returning SLC students, gender and ethnicity. **New SLC students** beginning in Cohort 2 were more **interested in the SLC as a means of helping them to decide whether or not computing is right for them** ( $p=.005$ ). New SLC students were more likely to commit to applying computing to benefit society than their returning peers ( $p<.05$ ). **Males in Cohort 2 reported stronger commitment to staying in computing long term** ( $M=5.6$ ,  $p=.019$ ), although females had a high average long term commitment ( $M=5.06$ ). Significant differences also were obtained between ethnic groups on knowing someone who works in computing, academic goals, and parental degree attainment. **Hispanic and Latino** students reported significantly **fewer parents with college degrees than did other ethnic groups** ( $p<.001$ ). **Hispanic and Latino students also reported knowing no one in computing fields more often than any other ethnic** group ( $p<.001$ ). Hispanic and African American students reported academic plans to obtain masters degrees whereas

**significantly more Caucasian and Asian students reported plans to obtain doctorate degrees** ( $p=.04$ ). Given these descriptive findings, each star will be charged with attending to the gender and ethnic differences in academic goals and career plans among their respective students through choice of SLC projects and educational activities.

## 5.6 Progress Towards Goals

The Alliance is making substantial progress towards the additional goals of Advancement, Sustainability, and Dissemination. Highlights are noted for each of these goals from aforementioned areas. New directions are also presented.

**Advancement:** Alliance goal 4 is advancement of assistant professors who are role models for under-represented 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.

**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. Both first year and second year 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 hiring staff support, implementation of score cards, and construction of the Alliance Exchange report. By hiring upper level student staff support, stars are better able to manage operations for their Alliance activities. The score card will enable Alliance leadership to determine where attention needs to be directed for star sustainability. The Exchange Report will provide a birds-eye view of how the Alliance is progressing towards its annual and overall goals.

**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. At this phase in the Alliance, we can only provide descriptive information on operationalizing STAR initiatives. However, by the end of year two of project implementation, we anticipate being able to provide in depth statistical analyses of STARS, aggregated by program, institution, and participation levels. These analyses will provide us with summative evaluation of our programs and to disseminate the effective practices to the professional community at large. Several publications and presentations have been conducted to date. The STARS Alliance website and marketing plan implementation continue to support our dissemination goals. Refer to Appendix for a complete listing of publications and products that disseminate information about STARS.

## 5.7 Continued and New Directions

There are several areas that require attention in the 2007-2008 academic cycle for the Alliance Evaluation Team. The issues are noted below with the planned resolutions, currently being implemented. We expect to present updated results from these efforts in the Final Annual Report for the academic cycle year of 2007-2008 upon its release in June of 2008.

Table 5.7 Future Directions

Alliance Exchange Reports need to be generated.	Information is collected; report will be generated for each year, beginning June 2008.
Database repository needs to be established.	The structure model and database have been established. Use of the database will begin in Year 2.
Demonstration projects require reporting attention.	Scorecards will be designed and implemented in Year 2 to track contributions and participation in the Alliance; routine reporting via database will be implemented in Year 2.
Data collector support is underutilized.	The Steering Committee is aligning the administration structure and funding support will be tied to reporting.
Institutional baseline data collection requires attention.	Basic data is collected; aggregated and targeted data will be collected during Year 2.
Longitudinal data not yet collected.	A longitudinal data collection plan is in development by the Evaluation Team and will be implemented in Year 2.
K-12 outreach impact not yet measured.	IRB for participation waivers is underway; once granted, outreach measures will be implemented in Year 2.
Electronic journaling requires attention.	Although electronic journaling is underway 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.
Mentoring component being implemented 2008.	The mentoring component was not funded during Year 1; the project will begin during Year 2 and continue in Year 3.

Our **motivation for extending the alliance** is to add participants, time, and activities: 1) Size - Year 1 activities have been incredibly successful. A close community has developed, resulting in research collaborations and an extended support network for faculty and students. Many Southeastern institutions want to join this community; 2) Time - Additional time is needed to especially focus on institutionalization of the STARS outcomes and to develop the stars constellation as a model that can be replicated in other geographic regions; and 3) Activities & Impact - We see a need to integrate into the alliance activities to support junior faculty role models and to better integrate the BPC community with the Computing research community. We aim to demonstrate a model whereby participation in activities such as the stars alliance will strengthen, not diminish, a young faculty members record for promotion and tenure.

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