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

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

FINAL EVALUATION REPORT

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

Executive Summary
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.

- Incoming freshmen interested in majoring in Computer Science has plummeted by 59 percent in the last 4 years and is now 70 percent lower than its peak in the early 1980s. HERI/UCLA, 2005
- In 2004 there were 17,700 computer science majors [in the U.S.] compared to 100,000 in India. Information Week, 2004
- A November 2006 survey of U.S. IT companies found that a shortage of qualified talent in the U.S. is the greatest human capital challenge facing information technology companies. ITAA, 2006

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). Some of the most notable achievements are indicated below for each level of the Alliance.

Alliance Structure Highlights
- **Collaborations** are beneficial to both students and faculty.
- Participation facilitates faculty and student **career development**.
- Alliance **goals are being achieved** and represent meaningful impact to the computing field.
- **Training, dissemination, and sustainability** goals are being met.
- STARS Institutions need **financial and staffing support** from their organizations.

Annual STARS Celebration Highlights
- 97% of students felt the workshop provided adequate opportunities for **community building**.
- 83% agreed with the statement that the STARS Celebration emphasized how computing and IT professionals can use their skills to **improve quality of life**.

STARS Leadership Corps End of Year Evaluation Highlights
- Overall, 94% of students expressed an interest in graduate school after participation in the program, thus supporting **retention** and commitment to computing.
- In support of bridging, 78% of students reported that SLC participation allowed them to **develop computing skills** and knowledge.
- 87% of students felt that participating in the SLC gave them opportunities to work with people like themselves, supporting the goal of creating a “like” community for under-represented students in computing.
- 95% of participants felt **supported by SLC Faculty**.
- 91% of students would recommend the SLC to others, an indication of overall **program success**.
1. Introduction

According to the Bureau of Labor Statistics, information technology (IT) is one of the fastest-growing areas of job growth, but IT degree production will not match the demand for these jobs in the current decade. If the U.S. economy is to remain competitive, we must increase the number of students receiving undergraduate and graduate degrees in the computing disciplines. This increase must occur across all segments of our population, but it is particularly important among those groups that historically have not participated at high rates: minorities, women, and persons with disabilities. The under participation of these groups causes a loss of opportunity for individuals, a loss of talent to the workforce, and a loss of diverse perspectives and creativity in shaping the future of technology.

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

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 year 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. 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, and first year results are presented. We conclude with a discussion of the results, and outline current and future dissemination plans.

2. Background

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, nctic.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.

**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.

2.2 Project Levels: STARS Model, Demonstration Projects, Alliance, Students & Faculty

2.2.1. STARS Leadership Corps Model

The STARS Leadership Corps (SLC) model presents a mechanism for streamlined intervention programs that are collectively implemented and measured. This model represents a paradigm shift from smaller scale programming efforts made in isolation toward a holistic collective of community building interventions and outcomes-oriented research which can be applied across institutions for widespread impact on computing recruiting and retention. 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.

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 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 research experiences. To promote recruitment, leadership development through service learning, and retention, first year mentees mentor high school students. An ecological approach is used to support mentors and mentees college adjustment, GPA, retention, graduation and Career preparation. 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.

2. 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.
3. **Leadership** – developing students’ soft skills, including leadership and professional development, team work, writing, speaking, time-management, and work/life balance.

4. **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.

5. **Community** – developing students’ sense of belonging within a larger computing community; training on identity development, diversity, gender issues, persons with disabilities, and a tiered mentoring model (Figure 2.2.1.2).

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.

- **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 7th-12th 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 7th 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 7th-12th 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 2.2.1.2: STARS Tiered Mentoring & Stair-step Role Models](image)

**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.
2.2.2 Demonstration Projects

Pair Programming

As a first step towards realizing systemic curriculum change to broaden participation in computing, NC State will lead the Alliance efforts to replicate pair programming. Extensive studies of student pair programmers have been conducted at [Nag03,Wil02a,Wil02b] and the University of California – Santa Cruz (UCSC) [Bev02,McD02]. Those studies consistently report, to varying degrees, the following observations relative to the use of pair programming in introductory computer science classes. An equal or higher percentage of pair programming students completed an introductory programming class with a grade of C or better when compared with solo programmers. Student participation in pair programming leads to at least similar exam performance on average when compared with solo programming students. Students that use pair programming on projects produce better projects than solo programming students. If pair programming is required only for a closed lab, there is no discernable impact on programming projects produced outside of the closed lab. Students in paired labs have a positive attitude toward collaborative programming settings. Students who use pair programming in an introductory computer science course are not hampered in future solo programming courses. Students who use pair programming in an introductory programming course are significantly more likely than solo-programming students to pursue Computer Science related majors one year later. 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.

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.
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.

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.

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.
2.2.3 Alliance

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.

- The ASC is made up of 21 senior personnel: the project director, web portal manager, five evaluators, and the 11 lead academic liaisons, and 4 demonstration project coordinators. They monitor institutional demographic data and guide development and implementation of programs and evaluation. New partners are currently being forged with additional institutions (Figure 2.2.7.2)
- The Evaluation Team is comprised of five of the senior personnel. They design, refine, guide, and evaluate the effectiveness of the Alliance and its activities.
- Each Task Force Dialogue (TFD) brings together a smaller group of alliance partners for a multi-institutional dialogue on important issues, such as:
  - **Bridging**: admissions criteria and building bridges between K-12 and undergraduate computing programs and between non-computing undergraduate programs to graduate computing programs;
  - **First Generation Students**: preparing our institutions for the Hispanic immigrant population whose children will reach college age in about five years;
  - **Combining Research & Outreach**: strategies for leveraging the Alliance infrastructure to engage computing researchers in broadening the impact of their research;
  - **Institutional Change**: incorporating successful interventions into the core academic mission.
Figure 2.2.3.1 STARS Partnerships & Collaborations with Synergistic Programs

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<th>Pre-College Programs</th>
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<tr>
<td><strong>Community Service</strong></td>
<td>SLC students: host girl scout visits on Girls are IT! Tech Bus</td>
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<td><a href="http://www.girlsareit.org">www.girlsareit.org</a>; Provide Internet</td>
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<td>Safety training for girl scout’s “IT Badge”(UNCC, JCSU);</td>
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<td>Conduct Girl Scouts Workshops (Meredith); and Mentor at Boys</td>
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<td>and Girls Clubs (FAMU)</td>
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<td><strong>High School Tutors and Mentors</strong></td>
<td>SLC students serve in tutoring/mentoring programs: High School</td>
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<td>Tutor (Ga Tech); Tutoring Gifted Students (FSU); CS 101 High</td>
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<td></td>
<td>School Workshop Series (FAMU)</td>
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<td><strong>On-campus events for K-12 students, parents, counselors</strong></td>
<td>SLC students assist and serve as role-models for K-12 events:</td>
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<td></td>
<td>Freshman Orientation (UNCC, FAMU); CoolComputing@Tech for high</td>
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<td>school students, parents and counselors (Ga Tech); Computing</td>
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<td>Careers Night (FSU); Fall &amp; Spring Outreach, World Usability</td>
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<td>Day (<a href="http://www.worldusabilityatauburn.org">www.worldusabilityatauburn.org</a>); E-Day, Alice3D Competition (Auburn, Spelman); and Sonia Kovalevsky Math Day (Meredith);</td>
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<td><strong>Computing Roadshows for Middle and High school outreach</strong></td>
<td>SLC students develop and deliver presentations to inform and</td>
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<td>excite kids about computing careers with practical advice on</td>
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<td>applying to college: IMC@T and Women@CC (Ga Tech); Minority</td>
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<td>Outreach Teams and High School Outreach Teams (JCSU, FSU, FAMU,</td>
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<td>USF Lakeland, UNCC);</td>
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<td><strong>Outreach with Industry and Professional Organizations</strong></td>
<td>SLC students strengthen existing industry K-12 outreach programs</td>
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<td>to provide “stair-step” role models (as per Fig. 1.2): Black</td>
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<td>Data Processors Association (BDPA) High School Academy (UNCC,</td>
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<td>JCSU); Women and Math Mentoring Org (Meredith); Community</td>
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<td>Neighborhood Renaissance Partnership (FSU)</td>
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<th>Post-Secondary Programs</th>
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<td><strong>Student Organizations</strong></td>
<td>SLC students strengthen existing student orgs: Women in Computer</td>
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<td>Science (NCSU FSU); and are starting new orgs or student</td>
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<td>chapters: ACM-W, Gamer’s Alliance, Black Data Processors</td>
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<td>Association (UNCC); IEEE (JCSU);</td>
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<td><strong>Mentoring Programs</strong></td>
<td>Existing mentoring programs inform the STARS Mentoring Model:</td>
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<td>Ga Tech Big/Little Sisters mentoring pairs upper level</td>
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<td>undergrads with Freshman; Peer &amp; Group Mentoring (UNCC, FSU,</td>
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<td>FAMU); USF Lakeland GEAR UP employs tiered peer mentoring for</td>
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<td>minority students [Tho05; Sey98]; Peer Tutoring Lab (FSU);</td>
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<td><strong>Louis Stokes Alliances for Minority Participation</strong></td>
<td>STARS Alliance structure and organization are informed by</td>
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<tr>
<td></td>
<td>existing LSAMP and other alliances: Florida/Georgia and North</td>
</tr>
<tr>
<td></td>
<td>Carolina (FAMU, UNC Charlotte);</td>
</tr>
<tr>
<td><strong>Research Experiences for Undergraduates (REU) programs</strong></td>
<td>SLC students participate in REU programs: REU Sites (Auburn,</td>
</tr>
<tr>
<td></td>
<td>UNCC, JCSU); Intel Scholars (GA Tech); McNair Scholars (UNCC);</td>
</tr>
<tr>
<td></td>
<td>Scholars of the Future (Auburn). Students host lab demos and</td>
</tr>
<tr>
<td></td>
<td>Roadshows to bring research to K-12.</td>
</tr>
<tr>
<td><strong>Website Development</strong></td>
<td>SLC students work with website development: [STARS WEB],</td>
</tr>
<tr>
<td></td>
<td>[CELEBRATION 06], [CELEBRATION 07], [STARS CHARLOTTE],</td>
</tr>
<tr>
<td></td>
<td>[STARS LANDMARK], [STARS FAMU], [STARS NCSU]</td>
</tr>
</tbody>
</table>
## 2.2.3 Alliance Members and Partners

<table>
<thead>
<tr>
<th>Stars*</th>
<th>University &amp; College Members</th>
<th>University, College, K-12, Industry, and Community Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virginia</td>
<td>Virginia Tech (Research)</td>
<td>Hollins University, University of Virginia’s College at Wise, Blacksburg-Montgomery school system, Beeks Community Center, ACM-W, Computer Science Community Service Org</td>
</tr>
<tr>
<td></td>
<td>• Department of Computer Science</td>
<td></td>
</tr>
<tr>
<td>South Carolina</td>
<td>University of South Carolina Columbia (Research)</td>
<td>Benedict College, Midlands Technical College, other community colleges; Governor’s School- Science &amp; 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</td>
</tr>
<tr>
<td></td>
<td>• Department of Computer Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>South Carolina State University (HBCU)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Department of Computer Science</td>
<td></td>
</tr>
<tr>
<td>Tennessee</td>
<td>University of Tennessee- Knoxville (Research)</td>
<td>UTK ACM Chapter; Tennessee Louis Stokes Alliance for Minority Participation (TLSAMP), Knox County School System, Knoxville College, UTK Office of Engineering Diversity Prog.</td>
</tr>
<tr>
<td></td>
<td>• Department of Computer Science &amp; ECE</td>
<td></td>
</tr>
<tr>
<td>New Orleans</td>
<td>University of New Orleans (UNO) (Research)</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>• Department of Computer Science</td>
<td></td>
</tr>
<tr>
<td>Central Georgia</td>
<td>Georgia Southern University (Research)</td>
<td>Swainsboro Tech College, East Georgia College, Ogeechee Tech College, Charter Conservatory for Liberal Arts &amp; Technology, Bulloch Academy, ACM chapter, SWE chapter, Savannah State Univ.; School Districts of surrounding counties; Morris Multimedia, National Cash Register (NCR)</td>
</tr>
<tr>
<td></td>
<td>• College of Information Technology</td>
<td></td>
</tr>
<tr>
<td>Joining the Eastern NC Star</td>
<td>Saint Augustine’s College (HBCU)</td>
<td>Louisburg College, Cisco, Halifax County High Schools, Upward Bound Programs; Forsyth Technical Community College; Wake County Public Schools;</td>
</tr>
<tr>
<td></td>
<td>• Department of Computer Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shaw University (HBCU)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dept of Computer Information Sciences</td>
<td></td>
</tr>
<tr>
<td>Joining the Florida-Polk County Star</td>
<td>Polk Community College (PCC) (Community College)</td>
<td>Polk County School Board, PCC High School, Polk Community College High School, Lakeland HS, Publix Supermarkets, Florida Regional Medical Center, FedEx National, ATP Chaptr, Polk Works Workforce 2020, Polk County Schools. FL High Tech Corridor</td>
</tr>
<tr>
<td></td>
<td>• Computer Network Engineering Technology</td>
<td></td>
</tr>
</tbody>
</table>

*Blue Stars are new partnerships for 2007.

### 2.2.4 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.
2.3 Evaluation
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 [33] 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.
2.3.1 Evaluation Plan and Timeline

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 2.3.1.

<table>
<thead>
<tr>
<th>Structural Component</th>
<th>Member(s)</th>
<th>Roles and Responsibilities of Component Member(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alliance Evaluation Team (AET) and AET Support</td>
<td>AET members and AET support personnel are listed below</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>Kim Buch, UNC Charlotte</td>
<td>Role: AET Member- Overall Project Evaluation &amp; NSF Data Collection Responsibilities: Insures that all aspects of evaluation are being addressed; Lead evaluator of alliance structure.</td>
</tr>
<tr>
<td></td>
<td>Tiffany Barnes, UNC Charlotte</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>Teresa Dahlberg, UNC Charlotte</td>
<td>Role: AET Support- Alliance Structure &amp; NSF Data Collection Responsibilities: Provide information needed to support evaluation.</td>
</tr>
<tr>
<td></td>
<td>Anthony Chow, UNC Greensboro</td>
<td>Role: AET Member- Web Portal &amp; Marketing Responsibilities: Lead evaluator of web portal and marketing campaign.</td>
</tr>
<tr>
<td></td>
<td>Audrey Rorrer, UNCC</td>
<td>Role: AET Member- Student Leadership Corps (SLC) Responsibilities: Lead evaluation of the SLC</td>
</tr>
<tr>
<td></td>
<td>Star Coordinators</td>
<td>Role: AET Support- SLC Responsibilities: Provide information needed to support evaluation.</td>
</tr>
<tr>
<td></td>
<td>Sally Berenson, NCSU</td>
<td>Role: AET Member- Qualitative research design Responsibilities: Lead evaluator for replication of pair programming</td>
</tr>
<tr>
<td></td>
<td>Laurie Williams, NSCU</td>
<td>Role: AET Support- Pair Programming Responsibilities: Provide information needed to support evaluation.</td>
</tr>
<tr>
<td></td>
<td>Mladen Vouk, NCSU</td>
<td>Role: AET Member- Teaching Math to the Visually Impaired (TMVI) Responsibilities: Lead evaluator for demonstration of TVMI</td>
</tr>
<tr>
<td></td>
<td>Art Karshmer, USF</td>
<td>Role: AET Support- TMVI Responsibilities: Provide information needed to support evaluation.</td>
</tr>
</tbody>
</table>
Alliance and program-level objectives

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

Goal 5 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 evaluation plan works in the following way: Alliance activities are developed to align with research evidence that shows that such activities will impact the overall goals of the Alliance. Evaluation of each activity is tailored to measure the particular factors that contribute to BPC goals. Overall assessment of Alliance success will be determined through a careful comparison of baseline data, disaggregated by race, ethnicity, gender, and physical ability for each institution and observing gains or losses in each of the specific outcomes identified. A summary of assessment objectives, example measures and data collection associated with each of the project activities is given in Table 2.3.2.
<table>
<thead>
<tr>
<th>Goals &amp; Desired Outcomes</th>
<th>Activities</th>
<th>Example Measures</th>
<th>Data Collection</th>
</tr>
</thead>
</table>
| **Goal 1: Recruitment**  | - 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  
- Electronic journals  
- Exchange report  
- Participation  
- Longitudinal data Collection (Years 2 and 3) |
| **Desired Outcomes:**  |  |  |  |
| a. Increased student enrollment in computing  
 b. Increased student awareness about computing | |  |  |
| **Goal 2: Bridging**  | - 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  
- Enrollment |
| **Desired Outcomes:**  |  |  |  |
| a. Increased student readiness to enter computing  
 b. Increased number of undergrads to enter grad school or workforce | |  |  |
| **Goal 3: Retention**  | - 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  
- Enrollment  
- Longitudinal data Collection (Years 2 and 3) |
| **Desired Outcomes:**  |  |  |  |
| a. Increased computing graduation rates  
 b. Increased year-to-year persistence & declaration of major in computing  
 c. Increased college GPA | |  |  |
| **Goal 4: Sustainability**  | - Advisory Board  
- Pair Programming  
- Peer mentoring  
- Participation Index  
- Task Force Dialogues | - No. of institutions & orgs participating  
- No. of new interchanges between institutions and orgs  
- No. of policies adopted  
- Organizational Efficacy scale | - Bi-annual board Report |
| **Desired Outcomes:**  |  |  |  |
| a. Sustain Alliance efficacy  
 b. Institutionalize Alliance partnerships | |  |  |
| **Goal 5: Dissemination**  | - 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 |
| **Desired Outcomes:**  |  |  |  |
| a. Increased national awareness of effective practices  
 b. STARS serves as a model & repository for BPC  
 c. Alliance implementation & evaluation methodology promoted | |  |  |

Red indicates not fully implemented. Blue indicates data gathered, report underway. Underline indicates current initiatives.
2.3.2 Issues
There are several areas that require attention in the 2007-2008 academic cycle for the AET. The issues are note below with the planned resolutions.
TMVI required reporting attention as no data has been presented to date.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alliance Exchange Reports need to be generated.</td>
<td>Information is collected; report will be generated for each year.</td>
</tr>
<tr>
<td>Database repository needs to be established.</td>
<td>The structure model and database have been established. Use of the database will begin in Year 2.</td>
</tr>
<tr>
<td>Demonstration projects require reporting attention.</td>
<td>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.</td>
</tr>
<tr>
<td>Data collector support is underutilized.</td>
<td>The Steering Committee is aligning the administration structure and funding support will be tied to reporting.</td>
</tr>
<tr>
<td>Institutional baseline data collection requires attention.</td>
<td>Basic data is collected; aggregated and targeted data will be collected during Year 2.</td>
</tr>
<tr>
<td>Longitudinal data not yet collected.</td>
<td>A longitudinal data collection plan is in development by the Evaluation Team and will be implemented in Year 2.</td>
</tr>
<tr>
<td>K-12 outreach impact not yet measured.</td>
<td>IRB for participation waivers is underway; once granted, outreach measures will be implemented in Year 2.</td>
</tr>
<tr>
<td>Electronic journaling requires attention.</td>
<td>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.</td>
</tr>
<tr>
<td>Mentoring component not implemented.</td>
<td>The mentoring component was not funded during Year 1; the project will begin during Year 2 and continue in Year 3.</td>
</tr>
</tbody>
</table>
## 2.4 Investigators

The Evaluation Team is comprised of individuals from Alliance member institutions, headed by Dr. Tiffany Barnes of UNC Charlotte. Core team members are noted in Figure 2.4.1.

<table>
<thead>
<tr>
<th>Investigators:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teresa Dahlberg</strong>, principal investigator, is an Associate Professor of Computer Science at UNC Charlotte, who specializes in networking. Dr. Dahlberg is the main PI and Program Manager for the STARS Alliance. She also serves on the Advisory Board and as faculty mentor for NSF grant DGE 0231833 entitled “GK-12 Fellowship cooperative with Philip O. Berry Academy”. In its second year, this Track 1 GK-12 Program Grant involves 10 Science and technology UNC Charlotte graduate students working in a high-poverty, high-minority technology high school. As a subcontract for the NSF funded project “Girls are I.T.” NSF EIA-0204398, ITWF YR2002 awarded to the Girl Scouts, Hornets’ Nest Council of N.C. (<a href="http://www.girlsareit.org">http://www.girlsareit.org</a>), she developed the Explorebots activity that resides in a mobile technology classroom that is traveling to girl scout troop meetings in Western N.C. The technology teaches applications of robotics, sensors, networking, and vision, while emphasizing the social context of the technology for planetary exploration (e.g., Mars Rover), exploring disaster sites, etc.</td>
</tr>
<tr>
<td><strong>Tiffany Barnes</strong>, co-principal investigator, is an Assistant Professor of Computer Science at the University of North Carolina at Charlotte, who specializes in educational data mining and using games to improve learning. Dr. Barnes is co-PI on NSF-BPC funded Culturally Situated Design Tools grant that teaches math and computing through online tools for discovering and creating cultural artifacts. She received her PhD in Computer Science at North Carolina State University in 2003. She is Director of the Game2Learn Research Lab at UNC Charlotte. The Game2Learn lab is currently developing and testing games to teach introductory programming, with the goal of broadening participation and increasing learning.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation Team:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sarah B. Berenson</strong>, recently became the Yopp Distinguished Professor at the University of North Carolina in Greensboro. She built a nationally and internationally recognized mathematics education program during her tenure at North Carolina State University as a Professor of Mathematics Education. Professor Berenson’s work focuses on the preparation of teachers and the under-representation of women minorities in science, technology, engineering and mathematics careers.</td>
</tr>
<tr>
<td><strong>Anthony Chow</strong>, joined the faculty at The University of North Carolina at Greensboro during the Fall 2006 semester after serving five years on the faculty of FSU’s College of Information. He managed the computer-based training program of the Florida Department of Revenue’s General Tax Administration Division, served as the manager of quality assurance and training for an Internet company, served as IT Director for Florida State University’s College of Information, worked as Director of the FSU College of Information’s Usability Center.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Doctoral Students:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Audrey Rorrer</strong>, doctoral student in counselor education at UNC Charlotte, assisted the investigators’ efforts to design instruments, implement research plans, and provide documentation and reporting. She assisted in writing papers for conference and journal submissions. Her research is concerned with multicultural education and ethnic identity development, cross-cultural relationships, and the issues of career development of women and minorities.</td>
</tr>
<tr>
<td><strong>Jennifer Thomas</strong>, a doctoral student at UNC Greensboro, is assisting Dr. Anthony Chow with marketing and evaluation tasks.</td>
</tr>
</tbody>
</table>
Evaluator:

Kim Buch, is an Industrial/Organizational Psychologist and an Associate Professor of Psychology at the University of North Carolina at Charlotte. She is the lead evaluator for the STARS Alliance. She is the author of numerous papers on the topic of individual learning and organizational change, has presented papers at ASEE and IJEE annual conferences, and has published articles in the Journal of Engineering Education and The International Journal of Engineering Education. Kim has been an evaluator for numerous grants, including the NSF Southeastern University and College Coalition for Engineering Education (SUCCEED). She is currently a co-PI on an NSF ADVANCE institutional transformation grant at the University of North Carolina at Charlotte.
3. Methodology

3.1 Goals and Levels

Alliance members are continually surveyed to measure the effectiveness of the overall alliance structure and progress toward alliance goals. Alliance institutional data is collected each year, to be analyzed in several ways to determine if the programs implemented through the STARS Alliance are affecting enrollments from year to year, and will be compared to national averages, as indicated by studies conducted by NSF and the Computing Research Association Taulbee Survey (online at: http://www.cra.org/statistics/), to determine if the observed effects are the result of national trends or local interventions. The STARS Leadership Corps and other STARS programs are continually evaluated to compare outcomes. Each program evaluation collects demographic, performance, and satisfaction data from participating students. Student participants are surveyed throughout their participation to measure effectiveness of the programs on an individual level in terms of self efficacy, identity development, college adjustment, and other demographic and attitudinal data. The experimental design is a repeated measures longitudinal design without a control group. This evaluation provides formative feedback for the continued improvement, and provides data for annual summative assessments. [Please refer to the summary of the evaluation goals, measures, and data collection is presented in Figure 2.3.2].

In this first year of programming implementation, we are able to report initial summative data for the SLC Midterm Evaluation, SLC Post Assessment, qualitative findings from student interviews, the 2007 and 2007 STARS Celebration evaluation, and the Alliance Annual Meeting evaluation. Separate evaluations are developed by the Project Coordinator and Evaluator for each of the Demonstration Projects (Pair Programming, Teaching Math to the Visually Impaired, and African Americans in Research in Computing). The SLC was the primary project in year one, while other demonstration projects are expected to be more fully integrated in year two.

There are three levels of evaluation associated with this project, including: 1) Alliance, 2) program, and 3) individual. The over-arching research question at the Alliance level is: Are the activities, communication, and structure of the alliance facilitating the mission and goals of the Alliance? At the program implementation level, i.e. carrying out and measuring demonstration projects, the over-arching research question is: How does participation in the SLC and other demonstration projects affect the recruiting, bridging, or retention of these students in computing disciplines? At the individual level, impact on students and faculty are continuously measured, with the overarching research question being: How does involvement in the Alliance benefit participants?
3.2 Participants

Alliance Steering Committee: Alliance Steering Committee members were surveyed to measure the effectiveness of the overall alliance structure. Twenty individuals from twelve institutions participated in the survey. This evaluation will continue to provide formative feedback for the continued improvement of the Alliance, by providing data for annual summative assessments.

<table>
<thead>
<tr>
<th>Alliance Steering Committee Members</th>
<th>Institution Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Doctoral Research University</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>Community College</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Baccalaureate College</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Masters College</td>
<td>6</td>
</tr>
</tbody>
</table>

STARS Leadership Corps: All eleven academic partners will participate in the SLC, along with Morehouse College, and other new partners as they join the Alliance. Up to 180 SLC students are selected annually from incoming freshman, transfer students, newly-declared computing majors, and new graduate students, as well as returning students. Students are eligible to receive SLC stipends for two years of up to $500/semester for undergrads and $1,000/semester for grads. Some students receive SLC stipends for summer participation (e.g., to assist with outreach, summer camps and SLC program coordination). Students are encouraged to continue their SLC participation beyond 2 years without additional stipends. Our aim is to engage the students to want to share their SLC experiences by serving an advanced leadership role (e.g., peer mentor or coordinator). Attempts are made to support ALL SLC students to attend the annual STARS Celebrations. Each year, a few SLC students are randomly selected for interviews during the STARS Celebration.

SLC participants will be recruited from through fliers, emails, and by word of mouth. Participants are selected based on the potential of applicants to benefit from the SLC program, based on their applications, including GPA, courses taken, time until graduation, and essays on why students are interested in the program. Faculty participants will be recruited on a semester-by-semester basis to supervise student projects. Gender and ethnicity of 2006-2007 SLC students are reported in Table 3.2.1.
### Table 3.2.1 Gender and Ethnicity of SLC Participants

<table>
<thead>
<tr>
<th>SLC Participants</th>
<th>Females</th>
<th>Males</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>26%</td>
<td>23%</td>
<td>49%</td>
</tr>
<tr>
<td>Asian</td>
<td>5%</td>
<td>4%</td>
<td>9%</td>
</tr>
<tr>
<td>Caucasian</td>
<td>21%</td>
<td>16%</td>
<td>37%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>&lt;1%</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>53%</td>
<td>47%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**STARS Alliance Celebration**: Students, faculty and industry partners attended our first annual conference of educational activities. During the first academic year of implementation, approximately 80 undergraduate and graduate students, and 20 faculty, industry and community partners participated in the Alliance activities in the first year of implementation.

### 3.3 Measures and Data Collection

We will continue collecting data on both faculty and student participants’ attitudes after each semester of participation in the SLC program. We will also collect student grades longitudinally for participants to determine long-term effects of the program.

All quantitative data are being collected electronically via Survey Monkey. The data collected for each phase is kept confidential. When reporting all survey results, care will be taken to ensure that no individual's response can be identified.

### Alliance Structure

Alliance members are surveyed at the annual board meetings and at the end of each semester to measure progress towards alliance initiatives and to obtain recommendations for continued progress.

### Baseline Data

The Evaluation Team collects the number of undergraduates, graduate students, and faculty in computing disciplines at each institution, disaggregated by program (first, second, third, fourth, fifth, sixth+ year Bachelors, Masters, PhD) or faculty type (full professor, associate professor, assistant professor, researcher, teaching faculty), resident status, race/ethnicity, gender, physical ability, and learning ability/disability. This data will be used in future comparisons for benchmarking progress.

### Students and Faculty

**SLC Surveys**: All newly participating students receive the Pre-SLC Survey during the annual conference. At the midpoint of the academic year, all students receive the Midterm SLC Evaluation. At the completion of the academic term, students will receive the SLC Post Survey and Program Evaluation. Pre-SLC and Post-SLC surveys are compared. The surveys consist of a combination of Likert scale items and open ended
questions designed to measure their previous exposure to leadership and computing, as well as their demographic information, and attitudes, identity development, and self-efficacy surrounding computing.

Faculty Surveys: Participating faculty receive via email the Faculty SLC Mid-term evaluation after their first semester of participation, to provide formative feedback. After their second semester of participation, they receive the Faculty SLC Program survey to rate their satisfaction with the program, and collect data for formative and summative evaluation.

STARS Celebration Evaluation: Likert scale and open ended items asked students and Alliance members about their conference experience. They were asked what they liked best about the conference, what suggestions they have for future conferences and any other comments they would like to make.

3.4 Design and Procedure
Survey instruments are provided in the Appendices. Each of the above mentioned surveys was developed by the Evaluation team based upon current research and accepted measurement scales. Surveys consist of Likert scale questions and some open ended questions for additional comments.
4. Results

4.1 Alliance Structure

The initial Alliance annual meeting was conducted in January, 2006 in Charlotte, North Carolina. Eighteen faculty members attended the STARS Alliance Annual Meeting in January, 2007 in Tampa, Florida. At both meetings, topics discussed and presentations covered Paired Programming pedagogy, Teaching Math to Visually Impaired Students, Growing and Sustaining the Alliance efforts, marketing, and evaluation components. Sixty-five percent of participants were female. The majority of attendees were members of the Steering Committee, with some members representing industry, serving as academic liaisons, community liaisons, or served in administrative capacity. Eleven members represented doctoral research institutions, five from master level or Bachelaureate level institutions, with one from a community organization. Overall satisfaction with the meeting was ranked satisfactory by 89% of participants. Ninety-four percent felt that the agenda and supporting materials were satisfactory. Themes from open comments suggest that a project management tool is necessary. Another major theme reported from the group was that time management is the largest obstacle for faculty in participation.

Highlights from ASC Steering Committee Surveys and Program Evaluations

- 100% of members believe in the Alliance mission and that the goals are feasible
- 65% of members felt that their expectations were met
- 65% of members felt that student expectations were met
- 100% indicated that they have formed helpful collaborations as a result of membership
- “All our SLC students are exceptional students who have gone on and gotten various other awards on campus and have taken on many other leadership roles. The graduates are placing well in the job market and there seems to be a continued interest in helping us out.”
- 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.

Summary

A total of 28 Steering Committee Members were surveyed 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. 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.

**Student Contact**: The majority of members indicated that they met with students on a bi-weekly basis. A large number indicated that the question was not applicable (41%). 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. 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. All agreed that their students were well prepared, committed and passionate about their project work.

**Top Success**: When 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, was noted frequently. The conference, the STARS Leadership Corps, and the Broadening Participation in Computing efforts were also noted my many as top successes. Emergent themes from the individual interviews reflected similar successes in making 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-cultural 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 faculty recruiting role.

**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, i.e. staff and financial support, 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.

**BPC:** The responses on how to broaden participation in computing resulted in a consensus from faculty. Response themes on how to achieve BPC were 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 has 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, however, a theme among faculty was that they are receiving strong verbal support from their campuses, rather than tangible support.

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.”

Management of the SLC: Faculty responses during interviews suggest a theme of challenge in the transition between year one and year two implementation. Funding and managing funds continued to be a challenge for faculty in the Alliance. The staffing needs for program management changed from start up to sustaining the program. Frustrations centered on staff turnover, particularly when students were employed on staff. Time management was a concern for those faculty who were without administrative assistance; they reported that managing the demands of their positions while balancing the management of the SLC proved difficult.

Summary of Alliance Exchange
Overall feedback obtained from Alliance faculty members and partners indicates that the goals are well underway. The collective responses indicate that the communication between Stars is adequate, that strong collaborations are forged, and that the mission is both valuable and feasible.

Figure 4.6.1 Year 1 Alliance Exchange Activities
- Initial Planning Meeting of Alliance Steering Committee (ASC) and Evaluation Team (ET), Jan. 2006, Charlotte.
- Monthly ASC & ET Teleconferences
- ASC meeting, Aug 2006, Atlanta, STARS Celebration
- ASC meeting, Oct 2006, San Diego, Grace Hopper Cel
- ASC training events - Jan 2007, Tampa – Pair Programming, STARS Mentor Training

Alliance Exchange – Evaluation
- Collaborations are beneficial to both students and faculty
- Participation facilitates faculty and student career development
- Alliance goals are being achieved and represent meaningful impact to the computing field.
- Training, dissemination, and sustainability goals are being met
Baseline Information
Initial baseline data collected for the alliance institutions is shown in Tables 4.1 and 4.1.2 below, providing us with a basis for comparison throughout the project. 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 4.1.2: Estimated Baseline Enrollment in Computing at STARS Academic Partners 2005

<table>
<thead>
<tr>
<th>School</th>
<th>PhD Students</th>
<th>MS Students</th>
<th>Undergraduate students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Female</td>
<td>Minority</td>
</tr>
<tr>
<td>Ga. Tech.</td>
<td>260</td>
<td>49 (19%)</td>
<td>12 (5%)</td>
</tr>
<tr>
<td>NCSU</td>
<td>121</td>
<td>23 (19%)</td>
<td>4 (3%)</td>
</tr>
<tr>
<td>UNCC</td>
<td>56</td>
<td>9 (16%)</td>
<td>2 (3%)</td>
</tr>
<tr>
<td>Auburn</td>
<td>45</td>
<td>19 (42%)</td>
<td>7 (16%)</td>
</tr>
<tr>
<td>FSU</td>
<td>37</td>
<td>9 (24%)</td>
<td>4 (11%)</td>
</tr>
<tr>
<td>FAMU</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>USF-L</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Spelman</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Meredith</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Landmark</td>
<td>Community College, 100% Learning Disabled or AD/HD</td>
<td>389*</td>
<td>108 (28%)</td>
</tr>
</tbody>
</table>

Table 4.1.3: Estimated Baseline Enrollment in Computing at NEW STARS Academic Partners 2005

<table>
<thead>
<tr>
<th>School</th>
<th>PhD Students</th>
<th>MS Students</th>
<th>Undergraduate students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Female</td>
<td>Minority</td>
</tr>
<tr>
<td>GSU</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hampton</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>St August.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Shaw</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>USC</td>
<td>35</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>UT-Knox</td>
<td>115</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Va Tech</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Includes non-computing students.
4.2 SLC Evaluations

Participants

The data indicate that students in the SLC are not representative of the “typical” computing student. They are much more diverse - 51% are women, 62% are underrepresented minorities, and 14% have a physical disability. The single largest group is African American females. They are from a largely “middle-class” background, parental educational attainment is above average, with 61% reporting at least some college.

Most (76%) decided to pursue computing before entering college, and the most common factors influencing this decision were career opportunities and intrinsic interest in it. There were no gender differences in factors influencing the decision to study computing. Fewer than a third felt that their high school computing program prepared them for success in their computing majors.

SLC students are above-average academically, with a mean GPA in their majors of 3.33 on a 4-point scale, and they are extremely confident that they will complete their current degree program (4.7 on 5-pt scale). Over one third strongly agree that they will obtain a PhD, and 42% strongly agree that they will obtain a Masters degree. Finally, 93% are confident that Computing is the right major for them, and 87% plan to stay in the field of Computing long-term. They are mostly undergraduate computing majors, with 20% PhD and 11% MA students.

Highlights of the SLC Evaluation at Year End (Post Assessment)

- “I liked the satisfaction of knowing that I made a difference in children's lives.”
- 95% felt supported by SLC Faculty
- 91% of students would recommend the SLC to others
- 81% met their project goals
- 89% reported that their team was responsible
- 88% had the resources they need
- 80% felt that they were able to commit the necessary time for projects
- 70% “Feel satisfied or very satisfied that “I am part of the department”
- 93% are confident that Computing is the right major for them
- 87% plan to stay in the field of Computing long-term

Eighty-one percent reported that their project goals were met, an initial indication that our goal of increasing public awareness of computing careers is successfully underway. Of those students not graduating, 99% stated that they plan to continue participation in the SLC next year. ALL respondents would recommend participation in the SLC to other students.

Participation in the SLC increased the interest in graduate education for 83% of students at the Midterm Evaluation, while only 73% noted the SLC increased their interest in graduation at Post SLC Assessment. However, it should be noted that 94% of SLC respondents at year end indicated a strong interest in obtaining a masters degree and/or doctoral degree. This is a clear indication that students who participate in the SLC are motivated to obtain graduate degrees, regardless of whether or not they attribute plans to their SLC participation.
An interesting finding in the SLC Program Evaluation was that there were no significant differences between male and female students on the following: GPA, confidence that computing major is right for them, plans to obtain MS or PhD degrees, overall satisfaction with their computing departments, computing identity, and computing efficacy. Other interesting findings were that 36% of students rated their high school technology/computing programs as “not good;” only 14% rated them as excellent. While the majority reported frequent contact with faculty, 6% reported that they had no contact with computing faculty during the semester.

A common theme communicated from students’ open ended responses is reflected by this comment: “The STARS Alliance has engaged me to use computing to make a positive impact by exposure to other areas of technology and to be of service to other students and community members. It has provided [middle school students] access to computing resources. It has allowed them to see women and minorities as role models.”

SLC Project Involvement
Project area distribution was largely concentrated in Research and K-12 Outreach activities. Figure 4.2 shows the distribution of SLC student activities and highlights of the evaluation. These participation rates suggest that the Alliance is targeting its goal areas of generating a pipeline into colleges and graduate programs. The low volume of participation in Community Service projects is not surprising, given that faculty liaisons have noted that development of community partnerships is needed for the upcoming year. The survey design allowed students to check participation in multiple activities, and so does not allow identification of their primary involvement. This also precluded analysis of responses by type of SLC project. The survey will be re-designed to allow these analyses in the future.

Figure 4.2 Highlights from SLC Participation

<table>
<thead>
<tr>
<th>STARS Leadership Corps – Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Participation in the SLC increased commitment to computing majors for 73% of students - supporting retention.</td>
</tr>
<tr>
<td>• 78% reported that SLC participation allowed them to develop computing skills and knowledge – supporting bridging</td>
</tr>
<tr>
<td>• A high majority (91%) felt that their computing faculty care about diversity.</td>
</tr>
<tr>
<td>• 87% of students felt that participating in the SLC gave them opportunities to work with people like themselves, supporting the goal of creating a “like” community for under-represented computing students</td>
</tr>
</tbody>
</table>

The following section below highlights item responses on key components of the Post SLC survey. These components represent student perceptions of their Computing
Departments, the effect of SLC participation on career and academic plans, perceptions on the diversity climate in computing, attitudes regarding identity development, computing identity development, and computer efficacy. An overall program evaluation is provided.

**Student Perceptions of and Involvement in their Computing Departments**

Students were asked to rate their level of satisfaction with a several aspects of the Computing/IT department at their current institution on a 5-point scale ranging from very satisfied (5) to not at all satisfied (1). Means across institutions are displayed below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of teaching</td>
<td>3.7</td>
</tr>
<tr>
<td>Quality of academic advising</td>
<td>3.9</td>
</tr>
<tr>
<td>Availability of extracurricular activities</td>
<td>3.7</td>
</tr>
<tr>
<td>Degree of interaction w/ faculty</td>
<td>3.9</td>
</tr>
<tr>
<td>Welcoming atmosphere of department</td>
<td>3.9</td>
</tr>
<tr>
<td>Availability of cutting-edge or innovative courses</td>
<td>3.4</td>
</tr>
<tr>
<td>Diversity of faculty and students</td>
<td>3.6</td>
</tr>
<tr>
<td>Extent to which you feel you are a part of department</td>
<td>3.8</td>
</tr>
<tr>
<td>Overall satisfaction with department</td>
<td>3.8</td>
</tr>
<tr>
<td>Beneficial relationships with student peers</td>
<td>4.5</td>
</tr>
<tr>
<td>Meaningful relationships w/ faculty/staff</td>
<td>4.1</td>
</tr>
<tr>
<td>Feel like I am a part of the department</td>
<td>4.1</td>
</tr>
</tbody>
</table>

There were no significant gender differences on any item.

**Department’s Climate for Diversity**

Students were asked to rate the Computing/IT department at their current institution on a 5-point scale ranging from strongly agree (5) to strongly disagree (1). Means across institutions are displayed below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students here are sensitive to minority issues</td>
<td>3.7</td>
</tr>
<tr>
<td>Faculty here are sensitive to minority issues</td>
<td>3.9</td>
</tr>
<tr>
<td>Students here are sensitive to women’s issues</td>
<td>3.8</td>
</tr>
<tr>
<td>Faculty here are sensitive to women’s issues</td>
<td>3.9</td>
</tr>
<tr>
<td>Students here are sensitive to disability issues</td>
<td>3.7</td>
</tr>
<tr>
<td>Faculty here are sensitive to disability issues</td>
<td>3.9</td>
</tr>
</tbody>
</table>

There were no significant gender differences on any item.

**Summary of how SLC students feel about their Computing Departments**

Overall, SLC students are satisfied or very satisfied with most aspects of their Computing Departments. The aspects receiving the lowest ratings were the diversity of faculty and students and the availability of innovative courses. The aspects receiving the
highest ratings were the existence of beneficial relationships with student peers, the quality of academic advising, the degree of interaction with faculty, and the “welcoming atmosphere of the department”. Furthermore, 64% report at least weekly contact with Computing faculty, 77% are satisfied or very satisfied with the degree of interaction they have with faculty, 67% are satisfied or very satisfied with the availability of extracurricular activities, and 73% report feeling satisfied or very satisfied with their department.

Student perceptions of their department’s climate for diversity is positive, in that the majority (66%) satisfied or very satisfied with the diversity of students and faculty in their Computing departments, and agree that both students and faculty are sensitive to minority, gender, and disability issues. However, another way to frame the data is that almost a quarter of students do not agree that their department’s faculty are sensitive to minority, gender, and disability issues, and over a quarter disagree that students in their computing department are sensitive to minority, gender, and disability issues.

Student Attitudes: Identity Development, Computing Identity, and Computing Efficacy
Mean scores for six items designed to measure Identity Development, and rated on a 5-point scale from strongly disagree (1) to strongly agree (5) are reported below, along with the scale score (overall identity). Means are reported below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can relate to people around me in my extracurricular activities</td>
<td>4.29</td>
</tr>
<tr>
<td>I can cope with not doing well on a test</td>
<td>3.76</td>
</tr>
<tr>
<td>I can relate to people around me in my classes</td>
<td>4.27</td>
</tr>
<tr>
<td>I can make friends with people from different background</td>
<td>4.61</td>
</tr>
<tr>
<td>I can cope with friends’ disapproval of my chosen major</td>
<td>4.58</td>
</tr>
<tr>
<td>I can adjust to a new campus environment</td>
<td>4.53</td>
</tr>
<tr>
<td>Overall Identity score (mean of above 6 items)</td>
<td>4.36</td>
</tr>
</tbody>
</table>

Mean scores for items designed to measure Computing Identity, and rated on a 5-point scale from strongly disagree (1) to strongly agree (5) are reported below, along with the scale score (overall computing identity).

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am committed to promoting Computing to others</td>
<td>4.29</td>
</tr>
<tr>
<td>I feel I fit in field of Computing</td>
<td>4.21</td>
</tr>
<tr>
<td>A degree in Computing will allow me to obtain a well-paying job</td>
<td>4.53</td>
</tr>
<tr>
<td>I expect to be treated fairly on the job if I enter the Computing field</td>
<td>4.01</td>
</tr>
<tr>
<td>A degree in Computing will give me the lifestyle I want</td>
<td>4.17</td>
</tr>
<tr>
<td>Computing professionals have the responsibility to use their skills to improve the lives of others</td>
<td>4.17</td>
</tr>
<tr>
<td>Most developments in Computing are unnecessary to people’s Everyday lives</td>
<td>2.40</td>
</tr>
<tr>
<td>I enjoy being a computing student on my campus</td>
<td>4.37</td>
</tr>
<tr>
<td>Overall Computing Identity Mean</td>
<td>4.43</td>
</tr>
</tbody>
</table>
Mean scores for 18 items designed to measure **Computing Efficacy**, and rated on a 5-point scale from strongly disagree (1) to strongly agree (5) are reported below, along with the scale score (overall computing identity).

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Someone like me can succeed in a Computing career</td>
<td>4.56</td>
</tr>
<tr>
<td>I will succeed in my science courses</td>
<td>4.49</td>
</tr>
<tr>
<td>I will succeed in my programming courses</td>
<td>4.44</td>
</tr>
<tr>
<td>I will succeed in my math courses</td>
<td>4.47</td>
</tr>
<tr>
<td>Doing well at math will enhance my career opportunities</td>
<td>4.23</td>
</tr>
<tr>
<td>Doing well at math will increase my sense of self-worth</td>
<td>3.41</td>
</tr>
<tr>
<td>I can complete the programming requirements for Computing majors</td>
<td>4.51</td>
</tr>
<tr>
<td>I can complete the math requirements for Computing majors</td>
<td>4.68</td>
</tr>
<tr>
<td>I can complete the science requirements for Computing majors</td>
<td>4.59</td>
</tr>
<tr>
<td>I can complete my current Computing degree</td>
<td>4.60</td>
</tr>
<tr>
<td>I can succeed in Computing without having to give up outside interests</td>
<td>4.13</td>
</tr>
<tr>
<td>I am confident in my ability to succeed in a Computing graduate program</td>
<td>4.01</td>
</tr>
<tr>
<td>Taking math courses will keep my career options open</td>
<td>4.02</td>
</tr>
<tr>
<td>Overall Computing Efficacy</td>
<td>4.32</td>
</tr>
</tbody>
</table>

**Summary of Student Attitudes**
All item and scale scores show overall strong identity development, computing identity, and computing efficacy among SLC students. While these results are encouraging, they do not indicate whether SLC students differ from other Computing students on these measures. A comparison with a control group of non-SLC Computing students is needed.

**Overall SLC Program Evaluation**
Eighteen surveys items asked students to evaluate the effect of their SLC participation on a range of factors, using a 6-point scale ranging from strongly disagree (1) to strongly agree (6). Mean responses to these items are listed below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased collaboration with faculty</td>
<td>4.65</td>
</tr>
<tr>
<td>Increased my work with my peers</td>
<td>4.73</td>
</tr>
<tr>
<td>Gave me more opportunities to work with people like me</td>
<td>4.75</td>
</tr>
<tr>
<td>Provided me with the chance to network professionally</td>
<td>4.20</td>
</tr>
<tr>
<td>Allowed me to help others understand the value of computing</td>
<td>4.46</td>
</tr>
<tr>
<td>Increased by interest in graduate education</td>
<td>4.13</td>
</tr>
<tr>
<td>Increased my commitment to my major</td>
<td>4.36</td>
</tr>
<tr>
<td>Increased my interest in computing research</td>
<td>4.16</td>
</tr>
<tr>
<td>Allowed me to develop my computing skills and knowledge</td>
<td>4.32</td>
</tr>
<tr>
<td>Made me feel more confident in my computing abilities</td>
<td>4.34</td>
</tr>
<tr>
<td>Increased my awareness of career opportunities</td>
<td>4.33</td>
</tr>
<tr>
<td>Made me feel more committed to a career in computing</td>
<td>4.33</td>
</tr>
<tr>
<td>Made me feel more satisfied with my current major</td>
<td>4.52</td>
</tr>
<tr>
<td>Exceeded my expectations, with regard to its benefits</td>
<td>4.32</td>
</tr>
<tr>
<td>Improved my leadership skills</td>
<td>4.61</td>
</tr>
<tr>
<td>Was personally rewarding</td>
<td>4.91</td>
</tr>
<tr>
<td>Was demanding of my time</td>
<td>4.17</td>
</tr>
<tr>
<td>Helped improve my academic performance</td>
<td>3.71</td>
</tr>
<tr>
<td>The goals of my SLC project were met</td>
<td>4.59</td>
</tr>
<tr>
<td>I had the resources I needed to do my SLC project</td>
<td>4.69</td>
</tr>
</tbody>
</table>
Gender Differences
It is particularly noteworthy that there were no significant differences between male and female students on any items. There were no gender differences on GPA, confidence in computing major, or plans to obtain graduate degrees. No gender differences were found on computing efficacy, computing identity, or in satisfaction with computing departments.

Open Ended Responses
Several themes emerged from the open ended response items. Their expectations regarding participation were career preparation, to provide outreach to women and minorities about computing, peer interaction, and both giving and receiving mentorship. Students felt that their experiences in the SLC greatly improved their overall confidence and awareness of computing fields. Teaching experiences in K-12 Outreach excited a large majority of students, and many noted that these experiences enabled them to enhance their own understanding of computing. An overwhelming theme emerged regarding what students liked best about their experiences: working with children stimulated the students tremendously as evidenced by the comments. Meeting new people with similar interests, learning new information and engaging in meaningful work that has an impact on society were three other strong themes. Ninety-one percent of students would recommend the SLC to other students. Of those who indicated they would not be returning to the SLC the next academic year, the large majority noted it was due to their graduation. A very small number (8%) indicated that the amount of time required for participation was a deterrent. As evidenced by respondents comments, the Alliance is meeting its goals of developing leadership skills, career awareness and preparation, and forming a sense of community among the STARS SLC students.

Indications: Student comments suggest that the students are not aware of the broader significance of the Alliance, and are unaware of the efforts to disseminate and exchange information beyond their own communities. Respondents indicate an excitement about their projects and a desire to share with the larger community. A theme was noted that students want to be connected to one another and share projects across institutions, yet are uncertain how to accomplish this. Time commitment was a significant theme, yet the majority of respondents suggested that there be more frequent communication among the SLC at home institutions and across the STARS. This feedback suggests that the Alliance faculty continue to explain the mission, vision, and impact of the Alliance, along with how it functions. Providing greater structure to students regarding their projects also seems necessary. One respondent suggested that successful projects be demonstrated to the entire SLC, and that templates be provided for future use.
In response to the question of how program administrators could provide more support, several themes emerged. Feedback noted that the administrators could attend events, communicate with students more often, inform the community about the Alliance, and provide suggestions, contacts, and leadership to the students. One particularly compelling comment stated:

“Many students are inexperienced with the planning and time management skills necessary to take on a large project. Many SLC projects are semester-long or span multiple semesters, so this inexperience results in incomplete or rushed results. Program administrators may ask that the project goals be reviewed by someone on staff for feasibility, and more than one semester-end milestone may need to be assigned to the students, especially the undergraduates. Students also need to feel that they aren't being overloaded with an extracurricular project, as well. Many of the STARS students have one or more part-time jobs in addition to their course load and STARS requirements. STARS should not feel like a burden, but rather provide an opportunity, and this deserves at least a mention during the workshops and throughout the semester.”

Students have developed a STARS identity and their responses reflect a common sense of values. Emergent themes to this item were: cares, is committed, embodies leadership, makes a difference, impacts the community, encourages underrepresented people to pursue computing, is passionate, and is a role model for others. One student added, “and has computer love.”

Students noted that the misconceptions they saw in K-12 students about computing were that computing is nerdy or geeky, and that computing professionals perform isolated work at computers. In general, K-12 students initially thought computing careers to be boring, or too difficult, and that all the jobs would be outsourced.

**Conclusion:** The first year of STARS Leadership Corp implementation has produced desired results of instilling professional values and a strong sense of community among the student participants. Community outreach has served to develop leadership skills among the SLC students, and to unite them in a common purpose. The continuing students, along with faculty liaisons, will be able to better anticipate and address the administrative and time management challenges.

### 4.3 Qualitative Findings

Common themes from the qualitative interviews conducted during the August 2006 symposium are emerging regarding interest in computing careers. Emergent themes toward careers are **altruism, creativity, and mentorship.** Themes regarding initial early interest in computing are game playing that requires problem solving, along with a motivation to be self-sufficient. Freshmen students who participated in a Fall 2007 focus group discussion reflected similar themes regarding interest in computing. These students identified perseverance in problem solving as a characteristic of computing students. Overall, students stated that a family member or mentor had been influential in their
decision to pursue a career in computing. The overwhelming majority of students indicated that their reason for persistence in computing is due to a commitment to giving back to their communities and an excitement about the creativity inherent in computing careers. New and returning students were interviewed during the August 2007 Celebration, and will continue throughout the academic year. A team of researchers will continue to assess these interviews for themes regarding student interest in the field, in the Alliance, and their experiences of computing overall.

4.4 STARS Demonstration Projects

The STARS Alliance serves as an incubator for new demonstration projects and the scaling and replicating of best practices among the diverse alliance institutions. In addition to the core demonstration project, the SLC, the following section details the complimentary projects of the Alliance. Alliance-wide dissemination of Pair Programming was implemented to increase student retention and success in gate-keeper computing courses. A tiered mentoring model was developed for implementation into the STARS Leadership Corps program. An exploratory project, Teaching Math to the Visually Impaired, was begun for middle school math teachers to prepare visually impaired students for college. STARS students participated in the African American Researchers in Computer Science demonstration project for recruitment into computing doctoral programs. AARCS hosts an annual conference. A new demonstration project using Culturally Sensitive Design Tools was begun to foster learning among African American, Hispanic, and American Indian children. Data for this demonstration project is being collected for the 2007-2008 academic year.

4.4.1 Pair Programming

Laurie Williams of North Carolina State University is the principal investigator on Pair Programming. As the dissemination proceeds, she will be involved with collecting data for analysis. A primary partner is Virginia Polytechnic University. A notable success for the project is the continued interest in pair programming and greater awareness of pair programming.

4.4.2 Teaching Math to the Visually Impaired (TMVI)

Art Karshmer serves as the principal investigator on the Mathgenie project. Rebecca Skipper is the primary tester; Paul Stanley is the primary programmer on the project. Primary resources for the project are two computer labs, at University of South Florida Lakeland, and at University of San Francisco. The Nemeth Braille Translator and Braille Embosser are key tools. Primary partnerships for TMVI are with the Student Government Association and the L’Azon Technology Institute. Target audiences for outreach were those with any type of visual impairment including ADHD, amp, and dyslexia. School systems are expressing great interest in the tools.

4.4.3 African American Researchers in Computer Science (AARCS)

Juan Gilbert is the principal investigator for the AARCS program. Cheryl Seals and Jerlando Jackson are co-principal investigators. A primary resource available to the program is the Human Centered Computing Lab at Auburn University. Corporate
Sponsorship was provided by Microsoft for the AARCS conference held at Virginia Polytechnic University. Throughout the year, four targeted presentations were conducted at Auburn University, Southern University, Indiana University, and at the STARS Celebration. Analysis of program interventions are currently underway. Two publications related to AARCS and the Alliance are Williams, L. and Layman, L., Lab Partners: If They’re Good Enough for the Natural Sciences, Why Aren’t They Good Enough for Us?, Conference of Software Engineering Education and Training (CSEET) 2007, Dublin, Ireland; and Williams, L., Lessons Learned from Seven Years of Pair Programming at North Carolina State University, Inroads: ACM SIGCSE Bulletin, Vol. 39, No. 4, December 2007, to appear.

Two panel presentations were presented during the October 2006 Grace Hopper conference. Twenty-five students and 3 faculty members were formally mentored through this program last year.

4.4.4 Culturally Situated Design Tools (CSDT)

This demonstration project is headed by Ron Eglash. The project joined the Alliance for the 2007-2008 academic year. A CSDT workshop featured the tools and provided STARS with a means for implementing use of the variety of CSDT programs for SLC outreach projects. Data are being collected throughout the year and initial results reported at year end.

4.5 STARS Celebration Evaluations

The Celebration Conference was held in August 2006 in Atlanta, serving to welcome Alliance members and kick off the year of STARS Leadership Corps activities. The primary objectives for the student participants were to inform them about diversity workforce needs in computing, connect them with a “like” community of under-represented colleagues, and introduce and connect them with SLC projects. 105 students and 23 faculty participated in the conference. Alliance members, faculty, community supporters and industry representatives also attended and participated.

The structure of the conference consisted of breakout workshops for students on a variety of topics designed to inform and prepare students for academic work in computing. Industry partners and faculty presented information in the workshops and in presentations to the group at large during meals. A sampling of activities included in the workshops and presentations were diversity awareness, the demand for computing professionals, demonstrations of robotic technology, lab tours and social activities. The conference concluded with student presentations to the alliance about their plans for SLC activities in the upcoming academic year.

Overall all respondents reported that the conference was beneficial, with 97% of students reporting that they felt welcomed at the conference and that it provided adequate opportunities for community building. Ninety-eight percent of participants felt satisfied with the statement that they received training that included statistics on the disparity in representation of women and people of color in computing careers. Sharing a common theme among the student participants, one student noted, “I felt it was an excellent opportunity to network, share ideas, and collaborate with other students in the SLC. The presentation and poster session helped to build my confidence with public speaking and
articulating my project ideas. I enjoyed the team building social activities that allowed students to become better acquainted.”

**Highlights of the Likert scale items are as follows:**
- 92% felt the Workshop provided adequate opportunity for me to select an SLC project.
- 97% felt the workshop provided adequate opportunities for community building.
- 83% agreed with the statement that the STARS Celebration emphasized how computing and IT professionals can use their skills to improve the collective quality of life.
- While 98% agreed that they received training that included statistics on the disparity in representation of women and people of color in computing careers, only 86% agreed that they received training on the disparity in representation of persons with disabilities in computing careers.
- 80% felt that they were given ample time to select a leadership assignment that complimented my leadership and professional needs.
- 83% of students reported that they would like more social activities during the conference.

In review of these open ended items, several themes emerged. Students reported that they enjoyed meeting other students with computing interests, meeting and networking with industry representatives, and the interactive activities. Another major theme students reported was in learning; participants reported that they liked learning about diversity and disparity in computing, career opportunities, how to be successful in their careers, and also about the other Alliance schools and institutions. One student noted that “meeting so many who share the same obstacles in pursuing a degree where they are the minority” was enjoyable. The 2007 Celebration was held in Charlotte, North Carolina with a twofold purpose. The symposium goals were to induct new Alliance members and to showcase the first year project successes. Concurrent workshops and presentations were conducted along several tracks. Student tracks focused on leadership, technical excellence, service and civic engagement, and community. Faculty and Alliance member tracks focused on Steering Committee discussions and broadening participation in computing. Figure 4.5.1 lists the student seminars offered.
The 2007 STARS Celebration conference was conducted in Charlotte, to showcase the student successes of year one, and to welcome and induct new members into the Alliance and SLC. A total of 113 students, about 40 faculty, and 50 community partners participated in the conference.

Students, faculty and community partners were surveyed to determine how they perceived the conference and to learn about their experiences of the conference activities. A summary of the results follows along with recommendations for future conferences.

Participants
All conference participants were invited to participate in the post conference evaluation. Participation was voluntary. For the 2007 survey, a response rate of 57% for students and 74% for faculty was obtained. The majority of student participants reported their ethnicity as Caucasian (47%), followed by 45% African American. Eight percent reported being Asian/Pacific Islander and 3% Hispanic/Latino.
Faculty and partners were primarily affiliated with research universities (54%), with 39% reporting affiliations with colleges and non-research universities; 8% of respondents represented industry partners. Over half of participants were first time celebration attendees (62%). However, only 15% were new to the Alliance organization. The majority of attendees were female (70%). Ethnicity representation for faculty and partners was 85% Caucasian, 8% African American, and 8% Hispanic/Latino. Most respondents were faculty liaisons (60%), with 40% indicating Steering Committee membership. Twenty percent were industry partners, and 10% community partners; participants serve in multiple roles and were able to select from a menu of role options.

Materials
Two surveys were created for evaluation; one survey was designed for student participants and the other for faculty and community partners. Both surveys were conducted through an online survey management software, Survey Monkey. Confidentiality was maintained. Results were analyzed using Microsoft Excel.

Design and Procedure
All conference participants were invited to participate in the surveys through email notification. The emails contained a link to the confidential online survey. Data was collected and retrieved through the online product management software, and converted into Excel for ease of analysis. The student survey consisted of a total of 18 items, with 15 likert scale items and three open ended items. One demographic item was added to the 2007 survey. The faculty/partners survey consisted of 35 likert scale items, four open ended items, and 5 demographic items, a total of 44 items.

Results
Students
Overall all respondents reported that the conference was beneficial, with 97% of students reporting that they felt welcomed at the conference and that it provided adequate opportunities for community building. Ninety-eight percent of participants felt satisfied with the statement that they received training that included statistics on the disparity in representation of women and people of color in computing careers. Sharing a common theme among the student participants, one student noted, “I felt it was an excellent opportunity to network, share ideas, and collaborate with other students in the SLC. The presentation and poster session helped to build my confidence with public speaking and articulating my project ideas. I enjoyed the team building social activities that allowed students to become better acquainted.” Overall highlights are presented in Table 5.1.
Table 5.1: Highlights from Student Surveys

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>97%</td>
<td>92%</td>
<td>The workshop provided adequate opportunities for community building.</td>
</tr>
<tr>
<td></td>
<td>83%</td>
<td>89%</td>
<td>The STARS Celebration emphasized how computing and IT professionals can use their skills to improve the collective quality of life.</td>
</tr>
<tr>
<td></td>
<td>98%</td>
<td>88%</td>
<td>I received training that included statistics on the disparity in representation of women and people of color in computing careers.</td>
</tr>
<tr>
<td></td>
<td>80%</td>
<td>88%</td>
<td>I was given ample time to select a leadership assignment that complimented my leadership and professional needs.</td>
</tr>
<tr>
<td></td>
<td>83%</td>
<td>94%</td>
<td>I would like more social activities during the conference.</td>
</tr>
<tr>
<td></td>
<td>86%</td>
<td>69%</td>
<td>I received training on the disparity in representation of persons with disabilities in computing careers.</td>
</tr>
<tr>
<td></td>
<td>92%</td>
<td>72%</td>
<td>The Workshop provided adequate opportunity for me to select an SLC project.</td>
</tr>
</tbody>
</table>

**Themes from Open ended items.** 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). One student noted that “meeting so many who share the same obstacles in pursuing a degree where they are the minority” was enjoyable.

A large majority of students recommended that longer break periods be incorporated between speakers and activities in 2006, which was implemented in 2007. The 2007 respondents indicated a need to offer two tracks of activities to accommodate new and returning students. Facilities and food were the major themes in the suggestions.

**Faculty/Partners**

Overall, faculty and partners stated that they felt they had competent understanding of mentoring and the STARS Leadership Corps. However, most respondents reported a lack of understanding in the demonstration project areas, especially Culturally Situated Design Tools, which is a new Demonstration Project added in 2007. Faculty sessions were overall rated useful. Mentoring and Pair Programming received the highest ratings of utility, and Libraries as Essential Community Partners received the only low rating (2 on a 5 point scale).

Of note, faculty and partners were surveyed during the 206-2007 academic cycle regarding steering committee participation and overall Alliance initiatives. The 2007 faculty survey of the Celebration conference was the first formal evaluation of their perspective specific to the conference. Future evaluations of their conference engagement will continue.
Highlights from 2007 Faculty Survey

- 100% stated that expectations of the conference were met.
- 100% were satisfied with the conference overall.
- 100% have developed helpful professional collaborations through attending the conference.
- 100% believe that the celebration had a positive impact on individual student who attended.
- 90% think that the conference prepared students to conduct successful SLC projects.
- 90% indicated that the STARS Celebration inspired me to become more involved in BPC efforts.
- 43% indicated that they spent an average of 75% of time spent managing the SLC.
- 100% believe that the SLC has increased student awareness of career opportunities.

Themes from Open ended items from Faculty and partners. The emergent theme for most useful component of the conference was networking with other Alliance members. No emergent themes could be concluded from the conference suggestion item, as responses varied widely. However, the conference planning committee facilitated discussions to the Alliance in organizing and structuring the conference, and will continue to do so in future planning activities. New insights were produced by the conference, as indicated by the theme that many participants noted a new focus on local public relations between government and industry.

The overwhelming majority of faculty members indicated that they believed the mission of the Alliance was very valuable, and also feasible. Responses indicated from both the May and August 2007 surveys that enthusiasm for being part of the Alliance is high, despite the challenges noted. Challenges that faculty liaisons reported fall into the general themes of student semester turnover, staffing challenges, funding challenges, and lack of tangible institutional support and resources. Several faculty from research oriented institutions indicated the career challenge presented by contributing a significant amount of their time to service delivery in SLC management; these institutions devalue the service component of their participation in the Alliance. However, half of faculty noted that they spent less than 10% of their time developing internal support; the majority indicated that between 60 and 75% of their time is spent managing the overall SLC program. All faculty reported that participation in the Alliance has enabled them to develop strong and meaningful professional collaborations and mentoring relationships.

Overall Discussion

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 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 conference surveys.

4.6 STARS Marketing and Dissemination

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. The Alliance has established communication channels via listserves 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 org of ACM, IEEE, and Women in Computing. At the ACM SIGCSE conference, Microsoft sponsored a STARS presentation to high school computing teachers. Figure 4.6.1 displays the web portal.

Figure 4.6.1. STAR Alliance Web Portal
5. Highlights from Each STARS

5.1 The STARS Leadership Corps at UNC Charlotte

Alliance Members
UNC Charlotte
College of Computing & Informatics
Johnson C. Smith University
Department of Computer Science and Engineering

Coordinators
Dr. Teresa A. Dahlberg
Dr. Tiffany Barnes
Marguerite Doman, Karen Bean

Partners
• UNC Charlotte Diversity in Information Technology Institute
• Winthrop University
• Girl Scouts Hornets Nest Council
• Black Data Processors Association
• Charlotte Chamber of Commerce
• Charlotte Mecklenburg School System

Evaluators
Dr. Kim Buch, Audrey Rorrer

www.charlottestars.uncc.edu

SLC Description and Outcomes
The Charlotte chapter of the SLC consists of 22 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. These students are comprised of 3 graduate students and 18 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.
The STARS Leadership Corps at UNC Charlotte

Our first effort was team organization and developing ways to manage our ideas into action. Charlotte STARS leadership teams can be grouped by two general target outreach audiences. One group of leadership teams targets peers and does ambassadorship for the campus. The other group reaches into the community, talking to local schools and student programs.

**Peer Outreach and Campus Ambassadors**

The goal of the *Women in Computing Leadership Team* is to foster outreach activities that promote women’s participation in computing. The group formed a local chapter of the ACM-W at UNC Charlotte. Social events were held to create community among members and to facilitate recruiting new members. The *Gamers’ Alliance Leadership Team* educates peers on the diversity of computing careers. They held a ‘gaming night’ to provide a friendly environment for students to enjoy video games. Students were also guided to develop video games. Informal discussions led to topics of study in IT and IT careers. To continue this outreach the Gamers’ Club was started and meets monthly. The *Peer Outreach Leadership Team* at UNC Charlotte assisted with tours of High School students visiting our labs. When guiding the visiting students on campus, the SLC students had the opportunity for more intimate conversions about computing careers and courses of study on campus. The SLC students also assisted in working a lab demo, if needed. This leadership team drafted a Constitution to be used to make the SLC a recognized student organization on campus.

Middle School and High School Outreach

The *Minorities in Computing Leadership Team* aligned itself with the professional organization of Black Data Processors of America (BDPA). They were able to participate in programs already established by the BDPA. The High School Computer Competition (HSCC) Academy, sponsored by the BDPA, is designed to influence Middle School and High School students to pursue careers in Information Technology. The SLC students assisted in the 10 week Saturday classes of the Academy. The SLC students also participated in the 2007 Black Family Technology Awareness Fair by talking with parents and students about the benefits of a career in IT. The *High School Outreach Leadership Team* created a set of presentations that they took to local schools. These presentations included information on scholarships and college applications. They demonstrated the fun things that undergraduates are able to do in a computing or informatics major. The topics included digital humans, cyber-security and hacking. The
modular approach to the presentations allowed other SLC students with an interesting 15 minute talk to participate in this outreach. This outreach has been well received in the Charlotte school district. They were invited to present to different high schools almost every week. The *Middle School Outreach Leadership Team* created a presentation that addresses the stereotypes of IT professionals and careers. By putting a new face on IT students, they break those misconceptions. By giving examples of things that the young students use that are based in technology, like gameboys, playstations, etc., they provoke a consideration of an IT career. Finally, they made a point to encourage students to stay in higher level math and science studies and to take any available computer classes.

**Research Experience**

The SLC students participating in *Research Experience* are working on projects including: *Shakespeare Karaoke*: The purpose of this experiment is to measure the effectiveness of learning about a play by interacting with a virtual human, versus learning about the play by reading its text. Our hypothesis is that interacting with the virtual character will lead to a better understanding of the play, or, at the least, will be more enjoyable for participants than the traditional text approach. *Officer Ed*: Conducting eyewitness identification through software is used to eliminate any influence by the interrogator. A virtual human, Officer Ed is being developed to administer the photographic lineup through guided conversation. The results of the ability to customize the virtual officer’s appearance and language to increase eyewitness rapport, as well as to encourage greater usability are being studied at a Charlotte - Mecklenburg police station. *Charlotte*: The goal of Charlotte is to create a virtual human that will autonomously interact with students on three topics of computing: jobs, research projects, and a UNC Charlotte computing degree overview. *Games2Learn*: This study focuses on college level students and their interactions with games as a learning tool. The hypothesis is that the game play of the Games2Learn project will hold students’ interest, and therefore increase retention and enrollment into the Computer Science field.

“*The one thing I enjoyed most about the STARS Leadership Program is having my first real taste of trying to work with and educate, not only the general public, but young teenagers who may or may not be college bound. It was quite an eye opening experience seeing the myriad of reactions and personalities of the students we interacted with.*”

- Zach Wadler, UNCC

“*The goal of my group, Smithites, is to enlighten students in middle and high schools about the wonderful world of technology by using skills taught through various conferences attended to create dynamic presentations to captivate students’ interests. ... When we finally made it to one of the middle schools and made our presentation, the kids were very excited about technology, & that made my day.*”

- Tiffany Huggins, JCSU
5.2 The STARS Leadership Corps at North Carolina State University

Alliance Members
NC State University
Department of Computer Science

Coordinators
Kristy Elizabeth Boyer
Dr. Mladen Vouk

SLC Description and Outcome
NC State STARS Leadership Corps students have built a community around the STARS program through group meetings, open discussions of issues, and building friendships in their diverse group. These STARS students have completed projects including:
• Cutting-Edge Research
• Mentoring
• Peer Outreach
• Internships in Industry.

We believe NC State STARS students are now more confident in their computing skills, have become better communicators and team members, and are aware of the issues facing the computing pipeline.

The STARS Leadership Corps at Meredith College

Alliance Member
Meredith College
Department of Mathematics and Computer Science

Partner
Women and Math Mentoring

Coordinator
Kristin Watkins

SLC Description and Outcome
Meredith College’s STARS Leadership Corps is a small group of committed young women whose energy and enthusiasm is seemingly endless. During the 2006-2007 academic year, four undergraduate students participated in the program, focusing their efforts on reaching out to inspire young girls to become the next generation of computing professionals. These young women participated in a variety of opportunities throughout the year such as a guest speaker series that included a talk about technology and education given by Diana Oblinger, a web development seminar with NC State SLC students, an undergraduate research seminar, and a workshop on writing abstracts for research projects. The SLC students also collaborated with a local mentoring group – Women and Math Mentoring – that pairs eighth grade girls nominated by their math teachers with local women who have careers in math and science related fields.

"The STARS SLC program has given me an opportunity to take my interest in the logic and patterns behind music to a whole new level and learn how to share this rather obscure topic with other people (ages 12 to 65+). I also found the workshops that I attended applicable to areas outside my academic life."
The STARS Leadership Corps at Meredith College

The mentor groups from this program participated in a day of math- and computer science related activities on Meredith College’s campus known as Sonia Kovalevsky Day. Several of the day’s workshops were presented by Meredith’s SLC students. The program served approximately 70 eighth grade girls. Feedback from the day indicated that the middle school girls participating in the program really benefited from the interaction with the SLC students because they could relate to them on a level different from their adult mentors. The girls also indicated that they were excited to see the kinds of things they could be doing in the future as college students.

In addition to these activities, each of the SLC students selected and completed a leadership project for the year. One student selected a project working with a local chapter of the Girl Scouts to develop workshops for their summer camp. Using the Girl Scouts’ selected camp theme of “magic,” she is developing computer science related workshops designed to capture the interest of these young girls and encourage them to pursue computer science as a field of study. This student will continue with the SLC program again next year and hopes to pursue incorporating these workshops and others into a recruiting program targeted at local area schools. The remaining SLC participants selected undergraduate research projects for their leadership assignments. The research titles included: Random Generation of Melodies Using Computer Algorithms, Research with Cryptography, and Exploring Sudoku. As an outreach component, these students developed and presented interactive workshops related to their research as part of Sonia Kovalevsky Day. These workshops were very successful and many of the adult participants commented on how impressive and inspirational the presenters were. In addition, these students will present their research to their peers and members of the Meredith College community on April 26th as part of Meredith’s Celebrating Student Achievement Day. Our SLC students have had a great time working together while developing their personal leadership skills and reaching out to the community to encourage others to pursue computer science. Sadly, we are losing two of this year’s participants to graduation - both students have plans to attend graduate school next year. Our other two participants will continue with the program next year and are looking forwarded to building on this year’s experience to develop additional programs that will benefit the field of computer science.
5.3 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.
5.4 The STARS Leadership Corps at Georgia Institute of Technology

Alliance Member
Georgia Tech
College of Computing

Coordinators
Giselle F. Martin
Not pictured:
Dr. Maureen Biggers
Alicia Richhart

Partners
• Morehouse College Department of Computer Science
• Girl Scouts of Atlanta
• Georgia Tech College of Computing – Institute of Computing Education
• North Atlanta High School
• Georgia Board of Education
• Atlanta Women’s Foundation

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Georgia Tech SLC students engage in undergraduate research opportunities, professional development workshops, outreach and recruitment efforts to attract the most talented students into the field.

“I am excited about the impact that computing has on people around the world. Everything that you do in the field affects so many people. What is also exciting is how technology continues to get better and better. Who knows when the next best thing is going to be created and who is going to create it.”

- Jeffrey D Starker II
Junior CS Student
SLC Member, Augusta, GA

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www.cc.gatech.edu
5.5 The STARS Leadership Corps at Florida State University

Alliance Members
Florida State University
College of Information, Information Technology
College of Arts and Sciences, Department of Computer Science

Coordinators
Dr. Lawrence Dennis  Dr. Lois W. Hawkes
Dr. Mia Liza A. Lustria

Partners
• FSU Career Center
• FSU College of Business, MIS program
• FSU National High Magnetic Field Laboratory
• Leon County Charter School of Arts and Sciences, Leon County School System
• High School High Tech, Ability First.org
• FSU Student Disability Resource Center
• CompUSA training, FSU Computer Store

http://www.starsalliance.fsu.edu

SLC Description and Outcome
For the Spring 2006-Spring 2007 period, the FSU STARS 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.

Spring and Summer Semesters of 2006
The FSU-SLC scholars were divided into three teams to identify different activities that represent the three BPC areas of concern: recruiting, retention, and bridging. 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. FSU-SLC Scholars involved on the recruiting team helped prepare STARS Alliance marketing materials for presentation and dissemination to consortium partners during the kickoff summer workshop in August 2006. FSU-SLC scholars also helped prepare prototypes of the STARS Alliance website. 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 2006
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 and projects they planned to implement in the Fall Semester of 2006.

Fall Semester 2006
In the Fall Semester of 2006, several FSU-SLC scholars spearheaded a semester-long program to mentor 16 gifted middle schoolers from the Charter School of the Arts and Sciences. This involved working with small groups of students on various computing projects such as web authoring or programming Alice or Lego Mindstorms on a weekly basis. This was a collaborative project that required pooling resources of the College of Information, Department of Computer Science, the School of Computation, and the National High Magnetic Field Laboratory, and commitment of professionals or graduate students in each of the areas for the duration of the project. Overall, student mentees demonstrated more interest in computing and IT degrees and increased confidence in computing at the end of the program.
In November 2006, the SLC hosted a "Computing Careers Night" at FSU. This gave the SLC team opportunity to plan an event to increase awareness about computing and IT degrees and careers.

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Various speakers from both the academe (e.g., FSU Admissions Office, College of Business, College of Information, Department of Computer Science, and the Career Center) and industry (e.g., BearingPoint) were invited to participate in the event. The evening was well attended with many presenters pleased with the contacts they made, and participants picking up university admissions and specific computing information from the departments. Guests included FAMUSLC scholars, high school students and their parents, undergraduate students, counselors, and local teen group sponsors/leaders. The FSU computer Store and Comp USA Training section provided gifts for the participants.

**Spring Semester 2007**

Currently, FSU-SLC has several projects ongoing and in various planning stages. First and foremost is the continuous recruiting effort for future SLC scholars as the majority of our students are either graduating or moving on to graduate school. We have developed several recruiting tools (e.g., flyers and posters) for this purpose and have been talking to various IT and CS classes about BPC and the STARS Alliance. A group of SLC scholars has taken on the project of conceptualizing and developing the FSU STAR website to showcase various SLC activities, student and faculty profiles, etc. using accessible design. Another group of students is also working in various capacities to assist a local neighborhood revitalization project with regard to their information technology needs. We have developed a partnership with the Community Neighborhood Renaissance Partnership on various IT projects concerning the Apalachee Ridge Technology Learning Center – a community center devoted to serving the computing needs of a largely African-American neighborhood. A small team of SLC students is designing a prototype website for the learning center which will be used to showcase digital media products that will be developed by youth during their yearly summer

1. FSU-SLC at the 2006 STARS Alliance SummerWorkshop. 2. 16 Gifted Middle school students fromSAS participate in our mentoring program. 3. Thegang at work in the IT lab. 4. “Web Designers” fromSAS present their semester project. 5. SLC team puttingon Computing Careers Night with over 100 areahigh school and college students, teachers and guidancecounselors in attendance.
Digital Media Camp. Another group of SLC students is currently re-working and cleaning up the network structure of the learning center and developing documents to help their largely volunteer staff maintain the network.

Also, in the works is a plan to provide basic technology skills training or mentoring to students with disabilities through a partnership with *High School High Tech* which is organized by Ability First. The latter helps prepare students with disabilities to develop high-tech knowledge and skills to equip them for various IT-related positions. A team of SLC students is currently working on a plan (e.g., program structure, participants and procedures) for a college student mentoring program. This program is supported in part by the Computer Science Department, the Women in Computing Society, Access, and the Association of Computing Machinery student chapter. Additional student groups are being recruited to represent the minority groups and persons with disabilities on campus. The SLC is assisting the Student Disability Resource Center at FSU to locate computing tools for the disabled to assist in studying math, science and technology topics. Current tools for reading such as *Kurzweil 3000* does not handle mathematics or computer code. *JAWS* has spell and read modes but does not shift easily between them as needed for instructional math and computer science texts. This makes the learning of this material costly when human readers must assist students. The use of *MathGenie* will be tested for use when the software becomes available again. The SLC is in the planning stages of a service learning program, by developing a “*Microsoft Certified Refurbisher*” shop, with Lutheran Social Services of North Florida. It is intended to give students the opportunity to develop policy and procedures pursuant to an organization, and to provide IT assistance, training, and technology to non-profit organizations and for disadvantaged populations. Organizational planning will be taking place during the Summer Semester of 2007 and participation with the project as a training platform for mentees will take place during subsequent semesters. Students participating in this program will be evaluated and receive service learning credits on their transcripts.

**FSU Leadership Awards 2007**

This year, the following STARS Leadership Corps scholars were awarded various leadership and service awards by Florida State University:

**Sean A. Pittman Award** - Willie Jackson, II  
Awarded to one FSU student who has demonstrated outstanding leadership and dedication to the student body, university, and community with significant contributions to the welfare and support of African-American students, and who has a cumulative GPA of 2.5 or above.

**Student Seminole Award** - Daniel Casale  
Awarded to 12 FSU students who have made special contributions to the University in the areas of leadership and service, and who have cumulative GPAs of 2.5 or above.

**Who’s Who** - Anthony Miller, Daniel Casale, Willie Jackson,II  
Awarded to 93 upperclassmen and graduate students whose academic standing, participation in extracurricular activities, and community service are decidedly above average.

**FSU Humanitarian Award** - April Johnson  
Awarded to students who have demonstrated outstanding service to the community.

**FSU Outstanding Senior Scholar** – Daniel Casale  
Awarded to outstanding FSU honor students who have cumulative GPAs of 3.5 or above.
5.6 The STARS Leadership Corps at Florida A & M University

Alliance Member
Florida A&M University
Computer and Information Sciences
Department

Coordinators
Dr. Jason T. Black
Dr. Edward L. Jones
Davida A. Jones

Partners
• Association for Computing Machinery (ACM), FAMU Chapter
• Tallahassee / Big Bend Boys and Girls Clubs
• Florida A&M University High School
• Apalachee Ridge Neighborhood Technology Center
• Florida/Georgia-Louis Stokes Alliance for Minority Participation (FGLSAMP)
• FAMU Trio Programs (Upward Bound)
• Leon County School Board
• Wakulla County School Board

www.cis.famu.edu/~famustars

SLC Description and Outcome
The STARS Leadership Corps at Florida A&M University is made up of 9 undergraduate students and 3 graduate students, and has worked to become a significant and esteemed organization on FAMU’s campus. Since its inception, the FAMU SLC centered its activities around recruitment, retention, outreach, and mentoring. The FAMU SLC registered as a campus organization in Summer of 2006, and elected officers who have served remarkably. During the summer, planning began on the development of a workshop series designed to expose high school students and college freshmen to the definition of computer science, careers in the field, types of research opportunities available, and the importance of graduate school. In addition, the SLC visited the local Boys-and-Girls Club in Tallahassee, where members spoke with over 50 students on three occasions about why they should consider computer science as a career. During the Fall semester, the effort to outreach to local high schools and community colleges increased, with visits to five local high schools to speak to juniors and seniors, as well as two visits to Tallahassee Community College, to speak with students in the Information Technology department. An additional goal of these visits was to recruit students to attend our CS 101 Workshop Series. There were two such workshops held in the Fall, with 12 and 17 students attending them respectively. The first workshop centered on exposure to CS and IT, with seminars and discussion groups held on relevant topics. Additionally, students learned about ALICE and how to program in 3-D gaming environments, as well as participated in a hardware workshop, where they were required to take apart and reassemble a computer. The second workshop focused more on programming with courses in Java for Mobile Environments (J2ME) and HTML/XML. In each session, SLC students interacted with the participants to develop mentoring relationships. Additional activities during the Fall semester included corporate development and service learning activities. Under corporate development, the SLC began to seek out projects to complete for local (both on and off-campus) groups...
needing technology to enhance their businesses. In this effort, the SLC students developed several applications for the FAMU Booster Office and participated in the development of an online Teacher’s Certification testing site. More such activities are being sought at the time of this report. During the Spring semester, the efforts of the FAMU SLC centered mostly on recruiting for STARS, with the SLC holding get-togethers, tutoring sessions, seminars about CS and STARS, and other outreach sessions. Several new students have been added to the fold, and more are submitting applications weekly. Additionally, the SLC continued to visit local schools, with 3 more visits occurring during the month of April, and is scheduled to travel to Pensacola to visit the Junior College there in April. Finally, the SLC has built a relationship with the Apalachee Ridge Neighborhood Technology Center, which is a neighborhood-based site for adult and student education and learning. The SLC is planning to implement a curriculum sending students to the center at least twice a month to conduct tutoring, seminars, workshops, and classes on technological topics. The FAMU SLC is very excited about how this activity will develop and plans to implement it even after the life of the STARS Alliance.

“Being in STARS gives you an opportunity to implement ideas and plans to improve the field of technology. There's a sense of satisfaction knowing that you've made a change in someone's life or thought process about our field.”

– Richard Marcus, Senior

“STARS has been beneficial to me by giving me a chance to be a positive role model to other college students in our department as well as the high school juniors and seniors in the local area”.

– Osedra Siler, Senior
5.7 The STARS Leadership Corps at Landmark College

Alliance Member
Landmark College
www.landmark.edu/stars
Team Website (unofficial):
www.landmarkslc.org/wiki

Coordinators
Stephanie Kresseen
Lorri LaMagdelaine
Dr. Steve Fadden
Julie Strothman

"Landmark College SLC students learn how to use eye tracking and usability applications to conduct their own eye tracking research. Current research interests include exploring how computer-based distractions and interruptions influence memory and learning for students with learning disabilities and attention disorders."

Goals of Landmark SLC

The Landmark SLC is dedicated to learning more about the diversity of how computing and technology is used across multiple fields and domains. Of particular interest is how technology can be used to improve our understanding and support for people with learning disabilities and attention disorders. SLC members participate in monthly computing workshops, regular team research meetings, and weekly team lunches to discuss computing, technology, and related research.
SLC Description

Seven students participate in Landmark’s SLC, with interests that range from education and communications to business and physical rehabilitation. Each student is enrolled at Landmark College in Putney, VT, one of the only colleges in the country that exclusively serves students with learning disabilities and attention disorders. The Landmark College SLC provides students who do not major in computing or technology disciplines with the opportunity to learn about technology and computing concepts, research opportunities, and future career possibilities. Because Landmark College is an Associate’s-granting institution that offers degrees in general studies (liberal arts) and business studies, the SLC provides students with opportunities to learn about computing and technology that would not otherwise be possible. Because Landmark is one of the nation’s only institutions of higher education that exclusively serves students with learning disabilities and attention disorders, the interests of Landmark SLC members include understanding how computing and technology can be used to improve education and access for others who struggle with learning.

SLC Challenges and Outcomes

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 more 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 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 on Sundays. We have also had to scale back the ambitious agenda initially set forth by our students, to ensure that our group would not be overwhelmed and put their academic performance at risk.

Outcome

In the 2006-07 academic year, our seven SLC members have participated in a number of opportunities to learn about computing, including a monthly series consisting of these workshops:

- Information assurance and computer security
- Telecommuting
- Computer-based graphic design
- Database basics
- Eye tracking technology/usability evaluation

Landmark SLC members collaborated on a research project in the Universal Design and Usability Lab (“UD Lab”) at the Landmark College Institute for Research and Training (LCIRT). As students worked together, they decided to develop their own wiki site to help share materials and communicate assignments. This wiki site was developed and maintained by our SLC students, and while it is currently not part of our official SLC web presence, it may be integrated with it in
the future. As the first students at the college to use the equipment in the UD Lab, SLC students first spent time working with eye tracking equipment and usability software to understand its use, and then developed training materials for use by the entire Landmark community. Our students then conducted their own research project, collaborating with LCIRT personnel and each other to generate research hypotheses, develop stimulus materials, schedule and run participants through the study, and analyze the data and develop conclusions. As a result of their SLC activities, we now have more students at Landmark College who know how to use the UD Lab equipment for research than faculty and staff! SLC members are planning future activities that will enable them the opportunity to develop more training, and offer workshops to additional faculty, staff, and students at the College, as well as to members of our local community. Several SLC members are now exploring their own research topics that can be explored through the use of usability applications and eye tracking technologies. We are also building on this momentum to evaluate the feasibility to develop additional computing and technology opportunities for middle- and high-school students with disabilities in our region.

5.8 The STARS Leadership Corps at University of South Florida - Lakeland

**Alliance Members**
USF Lakeland
Diversity Office
USF Lakeland
Information Technology Department.
University of San Francisco
College of Professional Studies

**Coordinators**
*Dr. E. Nathan Thomas, III*
*Carlos Fossi*
*Dr. Art Karshmer*

**Partners**
- Polk Community College Lakeland IT Department
- Polk Community College Winter Haven
- Polk Community College Collegiate High School
- USF Lakeland Engineering Department
- Polk County School District
- Kathleen Senior High School
- Family Fundamentals
- Word Alive Ministries Community Service Corporation
- Central Florida Business Diversity Council

SLC Description and Outcome
The USF Lakeland Star has four major components: 1) Conducting Identity-based Mentoring using the Thomas Principles; 2) Institutionalizing STARS by collaborating and partnering with Polk Community College, the Polk County School District, local businesses, and community agencies; 3) Training STARS Alliance institutions on Identity-based mentoring; and 4) Teaching MathGenie to high school and college educators to support students with disabilities and diverse learning styles. Note: Lakeland is in Polk County.

Mentoring Program
The USF Lakeland Identity-based mentoring program has been named TEAM Success, Teach Educating And Mentoring Success. Compared to the other STARS programs, the campus Diversity Office houses the STARS SLC. Through a joint partnership with the USFL IT Department, Carlos Fossi, STARS Advisor helped four students start TEAM Success. During their first year they participated in the STARS Celebration, IT Colloquiums, conducted a meet and greet with faculty to help support new students who desired IT and Engineering as a major, attended meetings to help recruit and institutionalize STARS with area businesses and Polk Community College students, participated in bi-monthly meetings to learn and implement the Thomas Principles, developed program activities, and supported each other academically and socially to increase their family bond and success in the classroom. From this experience Marco Aguilar and Claudy Fenelon will be graduating May 2007 and have decided to attend graduate school at USF Lakeland and remain members of the STARS family. To help students develop a stronger identity and sense of belonging in Technology, Jonathan Banks, VP Bank of New York Client Division was a keynote panelist for the Diversity Month (April) Young and Gifted Panel Discussion. Mr. Banks spoke to students and community members about technology in banking, how he got involved in IT, and his journey to become a VP at an early age. Sharing his story of success inspired educators, students and community members. As a result, a mother who didn’t attend college and wanted more for her children, was so inspired by the panel discussion she requested to have both of her sons participate in STARS. Both students will participate in STARS for the 2007-2008 academic year.

Institutionalizing STARS in Polk County
Institutionalizing STARS in Polk County started at the January STARS workshop in Tampa, Florida. The meeting at USF Lakeland brought over 30 key leaders together from the community to discuss sustaining STARS through partnerships, funding, collaboration, and resource sharing to prepare students in computing and technology nationally but locally along Interstate Four, the high tech corridor which spans from Tampa to Orlando with Lakeland in the middle. Since this initial meeting, Cliff Bennett with Polk Community College IT department has involved USF Lakeland and STARS in meetings that involved Technology Directors from Polk counties’ leading industries (i.e., Publix, Lakeland Regional Medical Center). These meetings resulted in PCC and USFL developing a joint curriculum (AS to BS degree) to better match the needs of the local businesses, which also includes improving the soft skills of students. Strong relationships have also been developed with the Polk County School District to focus on developing the math skills of students in middle school. To promote mathematics and technology among middle school students, a five day summer program is being designed for summer 2007. This program will involve STARS mentors, PCC staff, and local businesses to help increase math skills, exposure to technology careers, and students’ desires to be in technology jobs. The school district is very excited about implementing the Thomas Principles through the STARS mentors. They recognize the influence the principles
can have on student soft skills and career choices.

**Training STARS Alliance on Identity-based Mentoring**

The STARS January 2007 workshop in Tampa, Florida started the process for alliance institutions to learn and understand the importance of formal mentoring and the application of the Thomas Principles (Identity Development, Psychological Support, Social Support, Academic Support, Sense of Belonging, and Leadership Development). This workshop has helped alliance members define the type of identity (i.e., values) STARS students should embody. More importantly, the Alliance wants to use this mentoring model as a demonstration project to help other universities. At USF Lakeland, student mentors are being trained on each Thomas Principle so each principle can be transferred to students they mentor during the middle school summer workshop. Mentors will continue to develop their soft skills by conducting activities fall and spring semester to reinforce the students’ summer workshop experience.

**MathGenie**

In Fall of 2006, Dr. Karshmer relocated to the University of San Francisco. This allowed STARS to establish MathGenie Labs at USF Lakeland and University of San Francisco. Becky Skipper is coordinating the implementation and outreach aspects of the MathGenie lab at USF Lakeland. This includes creating on-line forums for educators, organizations, and companies who address technology to the visually impaired and individuals with diverse learning styles. Paul Stanley is supporting Becky as Dr. Karshmer’s contact to help with the technical and operating system of the MathGenie program. Dr. Karshmer’s lab in San Francisco has two computers that use Microsoft XP and one that uses Microsoft Vista. Plans are being developed to conduct training seminars with students, middle school teachers, and educators.

"Do you have computer LOVE…..Nate,.....you know we DO?"

- Nate Thomas
6. Discussion and Recommendations

Based upon the student and Alliance member feedback, we believe that we are achieving the goals of recruiting new students into computing, retaining and bridging for students, as well as creating a sustainable project with long term information dissemination. Although at this stage in the project, we are unable to measure certain outcomes, the initial findings suggest that we are progressing according to the planned measurements.

In summary, our collective accomplishments from the first year of implementation are:

- **Steering Committee**
  - Regular teleconferences for planning & update

- **STARS Celebration**
  - Successful Annual Conference held in August 06-07
  - Approx. 120 students, 25 faculty at each

- **STARS Leadership Corps**
  - 2 universities implemented in Summer 2006
  - All implemented in Fall 2006, Spring 2007

- **Workshops**
  - Pair Programming, Mentoring, IBPC: Jan & Aug 2007
  - CSDT: Aug 2007
  - Qualitative methods workshops Aug 06-07, April 2007

- **Web portal**: StarsAlliance.org

- **Evaluation**
  - Instrument development and implementation
  - IRB exploration: may obtain waivers for K-12 outreach evaluation
  - Interviews & Training

- **Outcomes**
  - Alliance Outcomes: Increased student enrollment in computing and IT programs
  - Increased student awareness about computing and IT
  - Increased student readiness to enter computing and IT graduate school and workforce
  - Increased participation of undergraduates entering computing and/or IT graduate school or workforce
  - Increased graduate rates of computing and IT students
  - Increased persistence and declaration of students majoring in computing or IT
  - Increased college adjustment and GPA for students in computing or IT
  - Sustained Alliance Efficacy
  - Institutionalize Alliance Partnerships
  - Increased national awareness of effective practices for Alliance development
  - Serve as a model and repository for BPC

- **Dissemination**
  - Grace Hopper Celebration, Oct 2006
SIGCSE presentation to computing K-12 teachers, funded by Microsoft
- Presentation at NIU, August 2007
- Panel at GHC 2007
- Panel & Birds of a Feather at Tapia 2007
- Paper at Frontiers in Education 2007

In review of the first year of implementation, the Alliance has faced several notable challenges which will require our attention in Year 2. At the Alliance level, communication has been strong, yet we will be focused on implementing communication tools for the coming year to ease in information distribution. Lists of action items will be generated at all Alliance meetings, to ensure follow up from membership. The Steering Committee will select a Board for oversight. At the evaluation and institution level, the Evaluation Team plans to track reporting from each institution and demonstration project through the use of a newly implemented database, and maintain scorecards for accountability measures across the Alliance.

The focus of the Evaluation Team for the future of the Alliance will be to continue the current data collection and analyses for year to year comparisons. In addition to using the current methods for formative and summative evaluation of the overall Alliance and its Demonstration Projects, the Evaluation Team plans to gather, analyze, and report longitudinal data.
7. Conclusions

The members agree that while our goals are lofty, the mission of the STARS Alliance is deeply important to the educational, professional, social and global communities. The commitment from our members has been instrumental in the successful progress from start up to first year program implementation. In the upcoming year, we look forward to streamlining alliance wide communications through the use of project management tools. We also plan to seek opportunities and ways that alliance participation fosters faculty career development.

Overall, the STARS Celebration is a highly successful endeavor. In particular, students and faculty 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.

The initial contributions from the alliance can be exhibited in the areas of academic research, professional partnerships, outreach to education and human resource development for computing, and public policy. We view the contributions as successful means for continued recruitment of both students and faculty, to ensure the project sustainability.

SLC outreach activities have provided marketing to K-12 schools on computing education and careers, educational presentations and activities, and student mentoring. Community projects have enabled SLC students to provide technical services to nonprofit organizations.

SLC outreach activities noted above are designed to create a pipeline of future college students, although specific enrollment data is not available at this time. Students and faculty are involved in research and teaching initiatives, such as TMVI and Paired Programming. The STARS Alliance website is designed to educate K-12 students, guidance counselors, and parents on computing careers and educational opportunities.

Ongoing data collection and analysis will enable future student and faculty publications targeted to contribute to the research base for public welfare, policy, health and safety.

The collective efforts of the Alliance have provided opportunity for student and faculty development. We believe these efforts are facilitating the goals of the Alliance and are making significant contributions to the computing profession, as well as to educational pedagogy. These contributions impact the development of individuals, of campuses, of communities and of the discipline through our unique combination of qualitative and quantitative research and service. The Alliance looks forward to continued growth and further impact as we progress into our next academic year.
8. References


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9. Appendices

A. Concept Models: Alliance and SLC
B. Evaluation Measurements Timeline
C. Institutional Review Board Protocol
D. Pre SLC Survey
E. SLC Midterm Survey
F. SLC Post Survey
G. SLC Program Evaluation Survey
H. Alliance Steering Committee Survey
I. Faculty Survey
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N. Database Maps: Demonstration Projects, Faculty Liaisons
O. Campus Climate Survey (Student)