ATL&S Institute
Alliance for Technology, Learning, & Society

Alliance for the Advancement of African-American Researchers in Computing

Evaluation Overview Report

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Report Contents

1 Background

1.1 Project Objectives

The project's objectives paraphrased from the original proposal and evaluators' understanding of their expected outcomes are:

1. Strengthen undergraduate computing curricula; *this is expected to improve competitiveness of HBCU students' graduate applications and therefore likelihood of admission; it is also expected to lead to greater student retention.*
2. Recruit undergraduate and master's students into majority institutions' graduate programs using the "dual feeder" model; *bringing undergraduates into masters' programs within the context of the research partnerships is expected to improve competitiveness of masters' students' applications to majority programs and create a sense of belonging in an intellectual community of computing researchers.*
3. Develop and institutionalize two-way research, graduate education, and teaching partnerships; *this is expected to provide research experiences, role models, and visibility of research careers for undergraduate and master's students in HBCUs.*
4. Facilitate academic faculty, rather than industry, careers through participation in the networks of people who participate in the activities intended to accomplish the objectives of 2 and 3, industry collaborations, and participation in professional societies; *these activities are expected to cement the identity of academic researcher as well as provide both human and financial resources to junior faculty.*

1.2 Evaluation Goals and Activities

The evaluation has been conducted by the ATLAS Assessment and Research Center at the University of Colorado, Boulder. Lecia Barker led the evaluation; Tim Weston conducted most data collection and analysis. Evaluation goals have been formative, summative, and descriptive. Formative evaluation has been intended to strengthen project planning and implementation through 1) collection of data to inform project planning and decisions; and 2) consultation on research and evaluation studies of projects with similar goals. Summative evaluation is intended to track progress of the project. Documenting implementation in terms of what works and what does not work is intended to support institutionalization and replication. Taking a systemic approach to the settings in which student outcomes are expected to derive, we have focused to date on the following evaluation activities:

- Developed a baseline profile of HBCU institutions, through interviews or surveys with 45 faculty members at the five HBCU partners (including Dillard University, which is no longer part of the project). Questions asked about their general research activities, interaction with students, participation in REUs (or other undergraduate research), and their instructional methods.
- Examined records, syllabi, and websites from each institution.
- Administered pre- and post-surveys to summer REU participants.

- Administered "update" survey to faculty.
- Developed (but not administered) survey for master's students to understand graduate school decisions.
- Participated in most leadership team meetings, both teleconference and face to face, to understand and document issues, concerns, activities, and barriers and pathways to goal achievement.

Activities, dates, participants, and purpose of data collection effort are shown in Table 1. Each of the sections below outlines the evaluation efforts for the first three project objectives. It is too early to assess the fourth objective in this phase of the project.

Table 1: Formal Data Collection Overview

Activity	Time	Participants	Information
Faculty survey	10/06	45 faculty from 5 institutions	Ongoing professional activities, teaching activities, # students in REU's and other research related activities
Faculty interviews (Principal representatives)	9/07, 11/06	7 faculty from 5 participating institutions	Program activities
Faculty surveys (Principal representatives)	10/07, 5/07	7 faculty from 5 participating institutions	Program activities
Record search	5/07	(Records)	Demographic information about programs
REU survey (pre/post)	6/07 – 8/07	REU students from 3 participating institutions (pre: N=15; post: N=5)	Changes in attitudes/plans pre/post from REU
October 2007 pre-meeting survey	10/07	8 principal investigators	Undergraduate recruitment and retention practices; technology capability; graduate recruiting practices
March 2007 pre-meeting survey	3/08	15 principal investigators and faculty	Update on participants from each year; research pod activities; perception of value of research course for pod members; estimates of students who apply to/are accepted by graduate programs

1.3 Participants

Project participants are shown in Table 2 below. These are participants that have been directly involved either as principal investigators, in summer research, or in research pods. The reorganization appears to have increased the number of participants, particularly undergraduates. Additional undergraduates are involved in the research methods course led by Virginia Tech (not shown in table). Jackson State is the only institution not formally involved in the course.

Table 2: Project Participants Estimated by Project Year for Each Institution

Institution		Faculty/Other	PhD Students	Master's Students	Undergrads
Bennett College	Year 1	1			1
	Year 2	2			1
Dillard University	Year 1	1			
	Year 2				
Georgia Tech	Year 1	5			1
	Year 2	2			
Jackson State	Year 1	2			1
	Year 2	3		1	4
Norfolk State	Year 1	2			2
	Year 2	5			3
North Carolina A&T	Year 1	2			5
	Year 2	5		4	9
UNCFSP	Year 1	1			
	Year 2	2			
University of Colorado*	Year 1	3			
	Year 2	3			
Virginia Tech	Year 1	>4			1
	Year 2	>4	2		

2 Strengthen Undergraduate Curricula

Curricular reform has been discussed as a means of improving retention in undergraduate programs as well as for improving graduate applications.

2.1 Recruitment of Undergraduates and Retention Practices

The baseline profile developed for each participating HBCU institution asked about three general types of activities that are shown by research to increase student retention: faculty-student interaction, pedagogical and other methods that require student-student interaction (e.g., pair programming, tier or peer mentoring), and research experiences (research experiences are addressed in Section 3). These interviews and surveys† also asked what initiatives were planned at each school. The responses by institution are shown in

Table 3 below (see also Appendix A for percentage responses to survey items by institution). Most of the schools already have in place at least some of the practices that retain students. However, most group work is done in capstone courses and is related to design rather than research.

* Does not include evaluation staff.

† The interviews and surveys asked the same questions. It was more effective for some respondents to reply by telephone.

There is opportunity for increasing opportunities for student collaborative or cooperative learning. Faculty from several institutions have participated or plan to participate in workshops offered by the STARS Alliance for pair programming, peer-led team learning, and media computation. Graduate programs have expressed mild concern, however, that if curriculum changes, undergraduate applicants will not have the appropriate coursework for admissions or will have to take additional courses at the graduate institution.

With respect to recruitment of undergraduates into the computing program, some, but not all, of the institutions have active outreach components.

Table 3: Baseline Profile Detail: Practices that Lead to Retention

Institution	Curricular Practices	Initiatives Planned 2006
NCA&T	1) Some collaborative work in courses 2) Capstone courses have long-term projects, presentations	Students attend REUs
Norfolk State	1) Pair programming 2) Collaborative work emphasized in upper division courses 3) Projects in upper division courses.	Two new curriculum strands proposed Students in REUs
Jackson State	1) Projects, presentations, posters	Students attend REUs
Dillard	1) Case studies 2) Development courses with collaborative work 3) Projects, presentations, posters	Students attend REUs
Bennett	1) Collaborative work in courses 2) Projects, both group/individual 3) Some service learning 4) Presentations/posters	New Curriculum proposed Students attend REUs

Table 4: Undergraduate Recruitment and Retention Practices, October 2007

Institution	Practices Reported	Interested in Implementing
NCA&T	Pair programming Peer-led team learning Peer mentoring Undergrad recruitment	Faculty-student mentoring Alumni network
Norfolk State	Pair programming Peer-led team learning Faculty-student mentoring Undergrad recruitment	Alumni network
Jackson State	Undergrad recruitment Peer mentoring	Alumni network Faculty-student mentoring Peer mentoring
Bennett	Undergrad recruitment Peer-led team learning	Faculty-student mentoring Peer mentoring

2.2 Partnership for Curricular Redesign

Participating in the alliance meant access to resources tiny Bennett College would otherwise be unlikely to obtain. Working with Michael Smith and Clayton Lewis as consultants, Byong Lee, Bennett College, led a significant redesign of Bennett's undergraduate computer science curriculum. Clayton Lewis and Gerry Dozier are members of Bennett's visiting committee to evaluate the newly revised curriculum. Tables 3, 4, and 5 show many shared goals where institutions could partner.

2.3 Systematic Analysis of Curriculum for Graduate Admissions

To date, no systematic investigation of the curriculum of the computing programs in any of the majority or HBCU institutions has been conducted for assessing the comparative strength of programs for making strong graduate applications. Such an analysis might use as a standard the ACM Computing Curricula recommendation overview report from 2005.[*] However, an informal "tallying" of coursework required by each majority institution for graduate admissions has been conducted by Elizabeth Jessup (University of Colorado) and is shown in Appendix B. Reformatted and filled in, this could be used to match undergraduates and master's students with graduate programs; further, it could be enhanced by showing faculty research strengths (beyond pods) for each institution so that prospective students would know which institutions would be a better fit for their research interests.

3 Recruiting Students into Research Careers

3.1 Baseline Results

In surveys and interviews, faculty reported the following research-related activities in and out of classrooms with their students:

- About half of faculty are involved in student research projects, either by advising students directly or arranging for students to go to other institutions. At least some of their students participate in either on- or off-campus research opportunities, during the summer or during the academic year.
- Each school rated very highly in actively advising and preparing students for graduate school.
- There was substantial variation in the type of research-type activities faculty require of students in the classroom. These activities include creating and presenting a poster, submitting an abstract, and reading research articles.
- Outside of class, faculty were also involved in research-related activities, including tasks like collaborating with students on or editing an article for journal submission, help with posters, etc.

[*] Computing Curricula 2005: The Overview Report can be found here: http://www.acm.org/education/education/curric_vols/CC2005-March06Final.pdf

Table 5 summarizes faculty self-reported practices related to research by HBCU.

Table 5: Student Involvement in Research, Faculty Surveys (October, 2006 and October, 2007)

Institution	Student Research Involvement	Encouraging Participation	
		In place	*Desired*
NCAT	1) 10-12 students in NSF-REUs from CS, 35-40 students from ECE in some form of undergraduate research. 2) Students participate in Louis Stokes program 3) Instructors help prepare students for conference presentations/posters, advise students on future graduate study 4) Instructors work with students on funded research 5) Students do volunteer projects involving research	Formal program	Grad infosessions Research symposium
Norfolk State	1) 4 – 5 Students go to NSF-sponsored REUs, 20 –25 in other undergraduate research internships. 2) Instructors do informal research with undergraduates 3) Weekly colloquia, speakers 4) Course about joining computer science profession (students told about grad school) 5) Faculty help students w/ papers, advise about grad school	Formal program Grad infosessions Research symposium	
Jackson State	1) 25 – 30 students do REUs or internships 2) 2-3 students get paid for doing research during the school year 3) Ad hoc colloquia, not regular. 4) Juniors/ Seniors required to participate in some form of research. 5) Faculty help students w/ papers, advise about graduate school.	Formal program Grad infosessions Research symposium	
Dillard	1) Faculty help students w/ papers, advise about graduate school. 2) 2-3 students in REUs. 3) Preparation of students to participate in engineering competitions.	Formal program Research symposium	
Bennett	1) 2 – 3 students participate in REUs 2) Monthly meetings with majors to distribute information about graduate school 3) Students visit Georgia Tech 4) Science division meetings inform students about graduate school 5) Faculty help students w/ papers/presentations, advise about grad school		Formal program Grad infosessions Research symposium

3.2 Results of Year One Summer Undergraduate Research Experiences

Fifteen students from nine campuses participated in the summer REU project. REU students were hosted on the three majority campuses. Fourteen of the 15 students completed the pre-survey. Highlights from the pre-survey include:

- Profile. Thirteen of the 14 respondents indicated that this was their *first* undergraduate research experience. Two were sophomores, five were juniors, and seven were seniors. Most had only a little experience with research, but had studied statistics or formal research methods. Most had substantial experience with written and oral communication.
- Future Plans. Ten of the 14 stated that they were likely or very likely to seek a job after graduating with their bachelor's degree and all had been involved in career preparation activities. Nevertheless, 13 of 14 intended to apply to a graduate program in STEM in the next five years. Half the students indicated a Ph.D. and half a master's as their highest intended degree.
- Understanding Graduate Admissions, Research Careers. While these students have high degree aspirations, they indicated little knowledge of how to prepare for graduate programs or even the qualifications for admissions. The report somewhat better understanding of the life of a graduate student and academic careers.

While all 15 students completed their pre-surveys, only five students responded to the post-survey. Obviously this is a problematic result, since it is impossible to draw any reasonable conclusions about increased intentions to apply to graduate programs as a result of the project. This can be rectified for the next summer project by asking faculty to repeatedly email their student advisees with a survey link. In addition, since students are also participating in research pods during the academic year now, the students will have a greater sense that they are participating in a cohesive project.

Of the five post-survey responses, student descriptions of experiences were positive and indicated that the experience helped then to clarify career plans, including plans to attend graduate school. Highlights include:

- Involvement in Research Activities. Four of five students spent 15 or more hours per week involved in research activities. Time spent with faculty advisor was much more variable across the students; one advisor was apparently too busy to be involved and this student rates their learning on a number of research-related activities much lower than the others. Most students reported that their participation in the REU program helped them somewhat or a great deal (three-point scale, with not at all being the third) with a long list of research learning outcomes.
- Graduate School Planning. Similar to participation in research learning activities, four of five students received some or a great deal of guidance on graduate school plans, such as selecting and applying to a graduate school and maintaining work-life balance. Four of five gained a great deal of understanding about the qualifications for graduate admissions.
- Future Plans. While we cannot assume this handful of students is representative, it is surprising that four of five of them intended to go directly to graduate school after graduation. This contrasts with only two of the 14 pre-survey respondents indicating they were unlikely to seek a job directly upon graduation. Three students indicated that the REU experience was an important influence.

3.3 UNCFSP, Faculty Collaboration for Encouraging Research Careers

During this second year of the project, in collaboration with professionals from the United Negro College Fund Special Projects, faculty on both the majority and minority campuses have collaborated to produce a poster for informing students of the benefits of a research career. It is recommended that focus groups be held to provide understanding of the effectiveness of the materials for different groups.

4 Research and Teaching Partnerships

The first faculty survey showed a discrepancy in the majority and minority faculty's ability to participate in research. While the majority faculty's work is primarily research, 60 percent of the minority faculty indicated in the 2006 survey that they spend 25 percent or less time on research. This is because they have substantial other duties. As John Kelly stated at one meeting, they "turn the lights on in the morning and take the trash out at night." Faculty involvement in research is shown in Appendix A. HBCUs had different levels of research partnerships, too. With the exception of Bennett College, all the HBCUs were involved in research partnerships with other universities, industry, national labs, and government or military organizations. A sample of partnerships at the beginning of the project is shown in Table 6.

The A4RC has provided the opportunity for the three majority and four minority institutions to collaborate in new research partnerships in a structured, ongoing way. It will be an interesting study to observe how these new mini-organizations function and the degree to which they can be sustained. Students and faculty will be surveyed at the end of the academic year to understand the overall satisfaction with the experience, the degree to which it cemented or increased students' intentions to go to graduate school, and several other outcomes; ideas on what should be improved and what should stay the same will also be elicited.

Table 6: Baseline Faculty Participation in Research, October 2006

Institution	Research Partnerships
NCAT	Institutional partnerships with Virginia Tech, University of Michigan, IBM. Internships with Nasa, Sandia, Eli Lilly.
Norfolk State	Partnership work with sensors with several companies
Jackson State	Department of Defense, University of Minnesota, Army, Access to Visualization center, University of Mississippi, Raytheon
Bennett	None

4.1 Joint Curriculum: Research Methods Course

Led by Virginia Tech, faculty are offering joint curriculum on research methods. The course covers research methods, the steps to becoming a professor, types of research careers, applying to graduate school, and issues of work-life balance. In addition, students conduct a real research project with their pod in this structured research environment. Such a course may give students the edge needed today for admission to graduate programs in light of the dominance of international students applying. According to anecdotal evidence from computing faculty, international students are frequently specially groomed for graduate study and apply with high test scores and publications in hand. This is much less common for American students.

Faculty participants of pods were asked about the value added of the research course for undergraduates, master's students, and faculty. While there were few responses due to the branching nature of the question and Jackson State's inability to participate this term, preliminary evidence suggests that the course is viewed as helpful for faculty mentor/advisors to help structure projects for students and to determine how much they know about research; helpful for graduate students to understand the nature of research and the steps involved; helpful for graduate students to structure projects for themselves; helpful for graduate students to structure projects for undergraduates; and helpful for undergraduates to understand the nature of research and the steps involved. These questions will be revisited in student and faculty surveys at the end of the academic year.

4.2 Collaborative Proposal Wriring

More evidence of a research partnership is in the form of proposals being co-authored by the institutions involved which would not have happened without participation in this project. Norfolk State and Virginia Tech are collaborating on a research proposal, which may create momentum among other participants.

5 Evaluation Next Steps

The revision of the project processes calls for a new evaluation plan. The evaluation became short-staffed during fall, 2007. A national search for an evaluator was conducted, but due to the nature of soft money funding, two candidates declined the job offer. Recently a highly qualified consultant with strong interest in the project was contacted. She is likely to accept a contract to continue the evaluation.

Appendix A: October, 2006 Baseline Faculty Survey

INTERVIEW/SURVEY ITEM	BENNETT	DILLARD	JSU	NCA&T	NSU
FACULTY DUTIES					
What percentage doing research: none	.00	.00	.00	.00	.00
What percentage doing research: 1-25%	1.00	.33	.86	.64	.50
What percentage doing research: 26-50%	.00	.17	.14	.36	.25
What percentage doing research: 51-75%	.00	.33	.00	.00	.25
What percentage doing research: 76-100%	.00	.17	.00	.00	.00
Publication expectations: minimum number	.00	.17	.43	.55	.25
Publication expectations: infrequently	.00	.67	.50	.36	.75
Publication expectations: teach full time, no pub	1.00	.33	.00	.09	.00
Publication expectations: Other	.00	.33	.07	.09	.25
Are you involved in REUs? Yes	1.00	.83	.43	.18	.25
Are you involved in REUs? NO	.00	.17	.57	.73	.50
Involved: I am head of REU lab	.00	.00	.07	.00	.00
Involved: I collaborate with other faculty w/ REUs	.00	.67	.07	.27	.00
Involved: I advise students working in REUs	1.00	.67	.43	.09	.50
Involved: I arrange REU internships for students at other institutions	1.00	.33	.29	.00	.25
Involved: I work at a different institution doing REUs	.00	.00	.07	.00	.00
RESEARCH PROGRAM TYPES STUDENTS PARTICIPATE IN					
Summer on campus	1.00	.50	.36	.27	.75
Summer off campus	1.00	.67	.36	.00	.75
Summer private company	1.00	.67	.29	.09	.75
Academic year on campus	.00	.50	.14	.18	.50
Academic year off campus	.00	.33	.00	.00	.25
Academic year private company	.00	.33	.00	.09	.50
FACULTY RESEARCH-RELATED REQUIREMENTS IN CLASS					
Required poster in class	1.00	.50	.14	.09	.75
Required abstract in class	1.00	.83	.14	.09	.50
Required students to read research papers	1.00	.67	.43	.45	.75
FACULTY RESEARCH-RELATED REQUIREMENTS OUTSIDE OF CLASS					
Attended conference with students	1.00	.83	.43	.55	.50
Helped prepare students for presentation/poster	.00	.83	.64	.64	1.00
Collaborated on journal article	1.00	.67	.43	.55	1.00

INTERVIEW/SURVEY ITEM	BENNETT	DILLARD	JSU	NCA&T	NSU
Helped edit student journal article	.00	.33	.29	.18	.00
Helped edit article	.00	.50	.21	.09	.00
OTHER FACULTY RESEARCH-RELATED ACTIVITIES					
Advised undergrads about grad school	1.00	.83	.93	.82	1.00
Helped prepare students for grad school	1.00	.83	.57	.64	.75
Organized colloquia to inform/prepare students for graduate school	1.00	.67	.21	.09	.25
Participated in colloquia to inform/prepare students for graduate school	1.00	.33	.14	.18	.50
FACULTY INVOLVEMENT IN RESEARCH PARTNERSHIPS					
Involved in research partnerships with other universities	.00	.67	.64	.73	.75
Involved in research partnerships with industry	.00	.17	.21	.27	.25
Teaching partnerships with other institutions	.00	.67	.00	.09	.00
FACULTY TEACHING METHODS					
Lecture	1.00	1.00	.93	.91	1.00
Discussions	1.00	1.00	.79	.82	1.00
Email questions before class	1.00	.67	.29	.18	.00
Individual projects	1.00	1.00	.93	.73	1.00
Groups working on projects in class or lab	1.00	.83	.57	.64	.75
Groups working together to answer questions in class	1.00	.50	.36	.36	.75
Groups conducting joint exercises in class	.00	.17	.14	.55	.50
Groups required to work on projects outside of class	1.00	.50	.29	.36	.25
Student presentations	1.00	1.00	.43	.82	1.00
Posters	1.00	.33	.21	.09	.00
Guest speakers	1.00	.83	.07	.36	.50
Lab work: Students follow predetermined instructions/protocols	1.00	1.00	.57	.45	.50
Lab work: Students design and conduct their own studies	.00	.17	.43	.27	.25
Individual work in class	1.00	.50	.36	.36	.75
Use of Internet discussion boards for homework assignments	.00	1.00	.07	.27	.00
Students engage in service learning/projects for the community	1.00	.50	.00	.18	.00

Appendix B: Doctoral Admissions Requirements (Elizabeth Jessup)

Area	Course	Colorado	Virginia Tech	Georgia Tech
Computer Science	Hardware	X		X
	Programming Languages	OR		X
	Operating Systems	--	X	X
	Data Structures	X	X	
	Algorithms	OR		X
	Theory	--		
	Area	UD		
	Database			X
	Networks			X
	Human-Computer Interaction			X
	Adv DS		X	
Mathematics	Calculus 1		X	
	Calculus 2		X	
	Discrete Mathematics		X	
	Linear Algebra		X	
	Probability/Statistics		X	
	Other	3 semesters		none

Notes on Admissions Requirements

Colorado

Math--The applicant's academic background should include at least three semesters of mathematics at the level of sophistication of calculus or above, courses such as calculus, differential equations, linear algebra, probability, statistics, and abstract algebra. The courses should indicate that the applicant has achieved the mathematical maturity expected of an upper-level mathematics undergraduate.

CS--At least five one-semester courses in Computer Science that are beyond the introductory level are required. These are intended to demonstrate the applicant's breadth of basic Computer Science knowledge in the areas of computer hardware, software, and theory. The courses should include the equivalent of the following University of Colorado offerings:

Hardware Requirement: ECEN 2120 (Computers as Components).

Software Requirement: Any one of CSCI 3155 (Principles of Programming Languages) or CSCI 3753 (Operating Systems).

Theory Requirement: CSCI 2270 (Computer Science 2: Data Structures) and either CSCI 3104 (Algorithms) or CSCI 3434 (Theory of Computation).

Other Area Requirement: One upper division course (i.e., one at the junior/senior, 3000/4000 level) in another area of Computer Science. These areas include artificial intelligence, databases, numerical computation, parallel processing and software engineering.

More advanced versions of all courses are acceptable. Courses classified in the Other Area Requirement may occasionally be substituted for courses classified in the Hardware, Software or Theory Requirement. However, the courses in the Hardware, Software and Theory Requirements

are prerequisites to many of the graduate-level offerings and applicants who are admitted lacking their equivalent will usually be required to make them up.

Georgia Tech

MS--Students entering the program must demonstrate a core competency in computing equivalent to undergraduate-level courses in the following areas: systems, design and analysis of algorithms, formal languages and automata theory, databases, networking and communications, computer architecture, and human-computer interaction.

Virginia Tech

Equivalent to two years of undergraduate training in Computer Science, including at least (a) an introductory course on programming and beginning data structures (typically referred to as "CS2"), (b) a sophomore or junior-level course in data structures (i.e., something that goes beyond the data structures content normally expected from a standard "CS2" course), and (c) a course in operating systems. In addition, we expect background in Mathematics to include courses in Linear Algebra, Discrete Mathematics, Statistics, and at least one year of Calculus.

Appendix C: Institutional Support (Partial Data)

This section is an appendix because the presentation is partial, including only two institutions. The section will be completed for an annual report.

Institutional support will here be defined as providing resources (human, financial) to either students or faculty specifically to accomplish the goals of the project. Verbal support, while appreciated, often amounts to approval for being involved above and beyond the regularly expected activities. In contrast, human and financial resources come with an opportunity cost, whereby the participant could be doing something else instead. The following is at least a partial list of ways institutional support has been shown for the project:

North Carolina A&T

- Computer Science faculty are presently involved in research partnerships and research pods, without grant funding.
- Administrative overhead (Dr. Kelvin Bryant) for the project is heavy. Grant funding does not cover the amount of time he is putting into the project.

University of Colorado

- Bobby Schnabel, former Director of ATLAS Institute, has participated in numerous planning meetings and other leadership activities, without grant funding.
- The Coleman Institute sponsored a Norfolk State student poster presentation at the Coleman Conference in October, 2008.
- Computer Science Department faculty served as faculty advisors to three students during summer 2007, without grant funding.
- The Summer Multicultural Access to Research Training (SMART) program made room for three extra students so that they would have peers, friends, and a social life during their summer program.

Virginia Tech

The annual faculty evaluation at Virginia Tech includes a specific section on diversity. The numerous activities in which Virginia Tech faculty have been involved with the A4RC project are well-represented and valued in the annual evaluation process.

- Scott McCrickard served as co-PI for the Virginia Tech portion of A4RC. While the grant funded part of his activities, it could not possibly cover all of them. Dr. McCrickard's activities were approved by his chair and count toward teaching and service.
- Dennis Kafura participated in all of the A4RC planning meetings and most conference calls. He organized departmental participation in A4RC activities, successfully inspiring many faculty and students to participate in events. He collected statistics on departmental diversity. He arranged financial support through departmental funds for

A4RC students and mentors to attend the Tapia Conference. Dr. Kafura performed these activities without grant funding.

- The list of participants directly and indirectly involved with the project from Virginia Tech is too long to include here. Their participation has been sanctioned by the Computer Science Department as well as the provost as acceptable activities for promotion and tenure cases, most without funding from the grant.