

Preview of Award 1042341 - Annual Project Report

Cover

Federal Agency and Organization Element to Which Report is Submitted:	4900
Federal Grant or Other Identifying Number Assigned by Agency:	1042341
Project Title:	BPC-AE: Computing Alliance of Hispanic-Serving Institutions
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Submitting Official (if other than PD\PI):	Ann Q Gates Principal Investigator
Submission Date:	08/01/2013
Recipient Organization:	University of Texas at El Paso
Project/Grant Period:	09/01/2010 - 08/31/2015
Reporting Period:	09/01/2012 - 08/31/2013
Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)	Ann Q Gates

Accomplishments

* What are the major goals of the project?

The major goals of the projects are listed below:

1. To institute a sustainable infra-structure that supports CAHSI's continued impact.
 - 1.1 Establish the cyber-infrastructure (CI) to support collaborations, resource discovery and sharing, professional development, and expanded participation.
 - 1.2 Enhance collaborative research and education infrastructure at CAHSI institutions.
 - 1.3 Establish a methodology/framework for adoption of CAHSI best practices and their dissemination, including K-12 initiatives.
 - 1.4 Align CAHSI goals & contributions to local, state, & national priorities and initiatives
 - 1.5 Align CAHSI educational goals with student skills that industry values
2. To become recognized as an organization that affects decision-making, policy, & cultural change
 - 2.1 Establish mutually beneficial collaborations, in particular those with advocacy groups.
 - 2.2 Involve upper administration at CAHSI institutions in discussions about the value of diverse thought, experiences, and approaches with respect to students, faculty, and research.
3. Incubate the next generation educational tools that prepare students for success in STEM

- 3.1 Provide a framework to systematically nurture and shepherd the development, evaluation, and dissemination of effective pedagogical interventions aimed at enhancing K-12 students' understanding of STEM-related foundational concepts.

*** What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?**

Major Activities: The activities associated with ARG initiatives are reported in this section. For the activities associated with objectives, see the Specific Objectives section.

CS0

Since 2007, TAMUCC has offered a CS0 course targeting incoming freshman who do not demonstrate the math maturity to register in the CS1 course. Beginning in 2009, any incoming freshman CS major who does not qualify to register for CS1 is automatically registered in the CS0 course.

The Media Propelled Computational Thinking for Math Classrooms (iMPaCT-Math) program continues through the efforts of Dr. Eric Freudenthal, CAHSI Computer Science Faculty at UTEP. The iMPaCT projects started as an intervention for entering college students, and have evolved to a family of interventions integrated within a variety of math, engineering, and computer science classes, initially at the college level, and now in high schools. High school students at ninth grade are being engaged in playful programming activities through their Algebra I courses which reinforce their grasping of essential math concepts and introduces them into programming at the same time.

ARG

CAHSI has presented seven ARG Fundamentals and Advanced Workshops to faculty across different disciplines and institutions. For example, Dr. Christina Sobin (UTEP Psychology) adopted the ARG model at UTEP. She included the ARG model as part of her R15 proposal and for the student plan for participation since her laboratory follows the ARG model. Dr. Dana Richter-Egger (University of Nebraska Omaha Chemistry) has adopted the ARG model within the Math-Science Learning Center (MSLC). In addition, he incorporated the ARG cooperative team building elements into the courses he taught this year. The model has been highly effective for developing cooperative learning team-skills among MSCL staff.

ARG is being integrated into undergraduate research courses at UPRM, Indiana University, and other universities. It is also being used in the classroom. UPRM is currently coordinating a new ARG training this upcoming August 2013 for the SACNAS UPRM Student Association and the IEEE Women in Engineering Student Association. The ARG training to be provided will be regarding Project Management and Cooperative Groups. Dr. Nayda Santiago stated that students using ARG will behave in an ethical manner, be aware of cooperation, and present in a professional manner.

CSU-DH had a summer ARG program with 20 student participants ranging from freshman to Senior and majoring in Computer Science or Computer Technology.

CSU-SM, CAHSI adopter funded through NSF SACI project, is focused on continuing ARG with 3 students, based on research surrounding information extraction from patient electronic medical records. This will include: reading papers on information extraction from electronic medical records; designing, implementing and testing algorithms to extract specific information such as treatments; and designing, writing and presenting a report on work done.

UTPA, CAHSI adopter funded through NSF SACI project, supports 5 students for ARG activities. They expect to produce at least four conference papers, publications in the coming year. Students will have the opportunity to present their research at national conferences such as SACNAS, Tapia Celebration, and/or Grace Hopper Celebration.

Miami Dade College, CAHSI adopter funded through NSF SACI project, continued ARG this year by supporting 5 students on existing research projects, including mobile skin cancer identification, automatic traffic video analysis, mobile automatic resistor decoding, and mobile phone audio aids. Ten conference publications are expected before the end of the year. Additionally, the newly institutionalized research methods course will be offered in the fall 2013 term for STEM majors.

PLTL

UTEP offered a total of 16 lab sections and 2 data structures courses that integrated Peer Team Learning during the fall 2012 and spring 2013 semesters. PLTL is institutionalized at UTEP. This semester, all of the peer leaders developed PLTL activities that required students to solve problems on the board as a group and individually. All peer leaders felt that the students' communication increased with this activity. Peer leaders close involvement with the instructors on a weekly basis was a great way to be able to prepare and visualize the needs for future PLTL sessions. Peer leaders believe that it is essential to attend the classes to be able to provide continuance to the course content. In relation to CS2, PLTL sessions were planned to reinforce understanding of specific course content. Some sessions were developed to reinforce concepts from CS1. In relation to CS3, the PLTL review sessions were coordinated by the instructor with the peer leader on a weekly basis. CS3 provided extra credit to students attending

From Fall 2007 through Spring 2012, with the exception of one semester without funding, Phyllis Tedford was leading the PLTL program at TAMUCC. All sections of CS1 and CS2 are assigned a pair of peer leaders. There are generally 14 peer leaders during the fall semesters and 12 peer leaders during the spring semester. Beginning in Fall 2011, 10 of the peer leaders were funded by the Title V Office at TAMUCC; the others were funded by the NSF LSAMP program. Feedback from both the peer leaders and the students in the sections has always been positive. With Ms. Tedford's retirement, the PLTL program was continued during the 2012-13 academic year, but modified to serve more as supplemental instruction with PLTL activities and held outside of class. The program has received approvals from students and faculty alike. This will be continued with Title V funding and NSF LSAMP funding.

Currently, there are two sections of PLTL being offered at Miami Dade College in conjunction with COP2270 (C Programming for Engineers). MDC will be evaluating the impact of PLTL compared to those sections of COP2270 that do not have PLTL embedded in the course.

CSU-DH is offering voluntary PLTL. They are seeking grant funding and institutionalization of the effort. Dr. Mohsen Beheshti from CSUDH attended the PLTLIS conference in Houston at UHD and has become a member of this international society. PLTLIS 2014 will be hosted by CSUDH on May 29.

MentorGrad

CAHSI's mentoring framework supports students at the critical stages in the academic pipeline: the transition from high school to college, from college to graduate school, and from graduate school to the professoriate. All CAHSI institutions and new adopters are implementing MentorGrad

FellowNet

At UTEP, FellowNet is being institutionalized through the Provost Office and Graduate School. UTEP has developed a mailing list for the students interested in FellowNet. UTEP's efforts in 2012 resulted in one GRFP awarded and two Honorable Mentions. A UPRM student received a GEM Fellowship and will attend Georgia Tech. A female ARG student was accepted to Columbia University as a PhD student in the CLUE (Center for Unconventional Electronics) with a full fellowship.

Specific Objectives: **Obj. 1.1: Establish Cyber infrastructure - CI Project:** CAHSI is focusing on establishing a foundational cyber-infrastructure (CI) to build online collaborations as mechanisms to share data and resources to support CAHSI's efforts to broaden participation. NMSU and UTEP are leading the CI project by using Semantic Web technology as the technical groundwork. The project uses semantic annotations for each CAHSI initiative to identify learning outcomes, target audience, purpose, and other relevant information. The goal of this project is to be able to automatically or semi-automatically assemble educational resources filtered by specific groups of students with specific learning outcomes. NMSU has developed two base ontologies: one describes the principles of computational thinking, which capture CSTA K-12 CS Standards and a comprehensive collection of concepts and principles; the other for describing CS0 and PLTL components using the Sharable Content Object Reference Model (SCORM). A project meeting with NMSU and UTEP faculty and students was held on March 2013 to discuss project status and next steps. The team concluded that the ontology needs additional analysis to make sure that the project is scalable. A follow-up workshop is scheduled for August 2013 to finalize the core ontology.

Obj. 1.2: Enhance Collaborative Research and Education Infrastructure: The CAHSI team uses IBMSmartCloud, an online collaboration tool for sharing information in the Cloud, managing project deadlines and tasks, documenting meetings, tracking collaboratively developed documents, and conducting remote online meetings. The CAHSI community has expanded its use to add sub-communities to support online interaction with CAHSI: SACNAS planning, ARG adopters and workshops, SACL adopters, and evaluation. In addition, IBMSmartCloud is being used for review of fellowship applications (FellowNet).

Obj. 1.3: Establish a Methodology for Adoption and Dissemination:

Diverse methods have been used by the CAHSI institutions to promote and implement CS0, ARG, and PLTL and also to broaden the impact of our efforts to new adopters. The CAHSI website provides overviews of each of the initiatives along with contact information. Departments are institutionalizing the CAHSI initiatives and at the same time broadening the impact of CAHSI efforts beyond the original institutions. Adoption is supported through workshops. There have been several CS0 workshops led by CSU-DH and FIU; ARG Fundamentals and Advanced workshops have been led by UTEP, UPRM, UNO, and Indiana University; and PLTL workshops led by UH-D for national dissemination.

Obj. 1.4 and 1.5: Align CAHSI goals & contributions to local, state, & national priorities, and CAHSI educational goals with student skills that industry values: CAHSI is a member of the *Excelencia in Action* initiative which reinforces its leadership among a network of institutions that work to increase Latino student success. By working with *Excelencia*, CAHSI provides input and receives notice of critical national efforts, e.g., issues on financial aid design and delivery that led to the publication "Using a Latino Lens to Reimagine AID Design and Delivery."

NMSU and UTEP have aligned its K-12 initiatives with other programs, by sharing expertise, leveraging resources, and developing joint events. Some of these alignments include: National Girls Collaborative Project (NGCP) – NMSU CAHSI representatives lead the New Mexico Chapter of the NGCP; Computer Science Collaborative Project (CSCP); NMSU CAHSI representatives are part of the leadership team of the Engaging Latino/a Students branch of CSCP. UTEP leads the regional competition for the NCWIT Awards for Aspirations in Computing.

Dr. A. Gates from UTEP and Dr. N. Santiago from UPRM collaborated with Y. Lu, from Google University Programs, Dr. R. Romano and S. Zizumbo from the Hispanic Googlers Network (HGN) on a pilot Google+CAHSI Outreach Freshman Program. Its purpose is to engage Google with freshman CS students from two CAHSI schools (UTEP and UPRM) to reduce the attrition out of CS and build a community with CS freshmen and Google through academic and social engagement. The attendees participated in team building exercises and talks about career aspirations. This program created an online community that tied students together throughout the year with scholarship opportunities.

UTEP and UPRM are part of the new NCWIT Extension Services project to increase participation of women undergraduates in computing and engineering. The support of research-based practices will facilitate recruiting and retention efforts. UTEP's focus is on community college transfers, and UPRM is focusing on recruitment of high school female students for computer engineering, electrical engineering and mechanical engineering.

Obj. 2.1 Establish mutually beneficial collaborations: UTEP led an effort to collaborate with CAHSI and other institutions to disseminate ARG through the NSF CCLI Type 3 program. The collaboration includes CSU-DH, IU, JSU, TAMU-CC, and UPRM. In addition, CAHSI institutions are working with CSU-DH under the direction of M. Beheshti to collaborate on the CyberWatch West, an NSF ATEC. CAHSI provided a letter of support for the work of Watsonville

TEC, a community-driven out-of-school program designed to increase the interest and capacity of youth and their families in information technology. The new grant, called "Computer Science (CS) for the Social Good: Using Near-Peers to Engage Latino/a Students," expands the existing TechTeach program. CAHSI supported a new NSF BPC "Expanding Computing Education Pathways" (ECEP), a joint follow-on to the Massachusetts-based CAITE and of "Georgia Computes!" CSU-DH submitted two NSF proposals: STEP and WIDER that use CAHSI initiatives (PLTL, ARG, CS0) to increase majors in STEM. Dr. N. Santiago has been invited to be part of the CREST grant on Material Science to train faculty and students using the ARG model. CAHSI provided a letter of support to Texas State University on a proposal to integrate parallel computing in the undergraduate curriculum. The proposal was funded this year. Dr. Apan Qasem will organize a workshop in conjunction with CAHSI at UPRM once the project moves forward. In addition, CAHSI is in the process of completing an MOU with Northeastern Illinois University and TSU to join CAHSI.

Obj. 2.2 Involve upper administration at CAHSI institutions: A. Gates was an invited speaker to the NSF-Sponsored Engineering Education Workshop Part II – Extending the Dialogue to Corporate America on March 24-25, 2013 as part of CAHSI's goal to involve upper administration within CAHSI institutions. The workshop was led by M-SESTUP, an alliance of deans from HSIs/HBCUs/MSIs. Based on the interest from that meeting, CAHSI organized a planning meeting in June 2013 to discuss a proposed structure for a strategic alliance with representatives from M-SETUP and corporate America. The next steps are to prepare a two-page document that articulates the differentiators and value proposition for corporations, and to launch the alliance in early spring.

Obj. 3.1: Provide a framework to systematically nurture and shepherd the development, evaluation, and dissemination of effective pedagogical interventions: Activity will be begin in fall 2013.

Significant Results: CAHSI has made progress in the past year in reaching its goals of *creating a sustainable infrastructure* to continue its impact, and to *become recognized as a national organization that affects decision-making and cultural change* at the local, regional, and national levels. CAHSI is creating a sustainable infrastructure and building organizational capacity through its work in developing a healthy pipeline of diverse students in computing. Over half of the CAHSI institutions held a training in the past year (4 of 7, 57%) and more than half (4 of 7, 57%) boast at least 25% of their undergraduate faculty participate regularly in CAHSI initiatives and training, while the other 3 have partially fulfilled this goal. Having a cadre of involved faculty is essential for sustainability beyond the years of the CAHSI grant. In the past year, the majority of schools participated in some form of outreach work that built on CAHSI initiatives, primarily CS-0, to deliver computing content to K12 audiences (5 of 7, 71%). The same proportion of schools have seen innovation in pedagogical practice in the past year (5 of 7, 71%). These innovations involved adding new languages to the CS-0 course, developing new lessons for PLTL, and experimenting with new learner-centered pedagogies, such as flipped classroom work, supplemental instruction, and paired programming. Continued pedagogical innovation at the campus level bodes well for maintaining student-centered, healthy computing learning environments.

CAHSI has made progress in financial sustainability efforts as well—60% of outreach programs are fully funded by outside sources, and 100% of CS-0 efforts are sustained without CAHSI support, while PLTL and ARG remain for the most part at least partially funded by CAHSI (60% and 67%, respectively).

CAHSI is extending its national reach as seen in the Alliance Impact indicators in national and regional leadership, extended influence through new adopters, and continued efforts to collaborate across institutions via new programming and research. Leadership and support of CAHSI in higher education and STEM education organizations is spreading across CAHSI principal investigators. Four CAHSI faculty members from four institutions serve as CAHSI delegates to national and regional organizations interested in improving and diversifying the computing workforce. These organizations include SACNAS, M-SETUP, Microsoft, Excelencia in Education, PLTL International Society, and Cyber Watch West. CAHSI scored 3 out of 3 on this metric, having representation within more than 5 national or regional policy venues.

Five of the seven CAHSI founding members had research proposals/projects developed across CAHSI schools, a “moderate/needs improvement” score on the rubric. Nearly all schools had developed a research or program proposal that leveraged CAHSI, for a total of 16 proposals across institutions. In some cases, proposals would extend CAHSI initiatives like PLTL to other departments within an institution, would promote student researchers through ARG, or introduce proven mentoring strategies to undergraduate and graduate education environments.

CAHSI has continued to be a national resource for disseminating initiatives that promote student success in computing. In the past year, 15 out of 62 new adopters of CAHSI initiatives responded to a survey about their practices and outcomes in the prior reporting period. All of the survey respondents had adopted ARG, one expressed interest in adopting PLTL, and another expressed interest in CS-0. Three adopters were using ARG in the classroom, one was using it for student development workshops, and 13 adopters were using it in research groups. In all, ARG adopters had impacted 134 students in research experiences, 350 students in coursework, and 80 students in workshops in the past year.

CAHSI members have continued to disseminate their practices beyond the Alliance. Fourteen faculty members participated in an ARG Fundamentals workshop delivered at Miami-Dade College on June 11-12, 2013. Attendees reported substantial increases in their understanding of the ARG model from the workshop. Prior to the workshop, participants rated their understanding of the ARG model as a 2.57 on a 5-point scale (between “a little” and “some” understanding). After the workshop, participants rated their understanding as a 4.57 on a 5-point scale (between “good” and “a lot of” understanding). One-hundred percent of attendees “definitely” plan to use the ARG model with students.

Key outcomes or
Other achievements:

CAHSI has provided broad, intensive support to students at all educational stages. The original seven CAHSI departments provided 11,070 hours of introductory computing content to undergraduate students in 2012-13; nearly 75% were Hispanic or other underrepresented minority students. The PLTL initiative gave the equivalent of 9,975 hours of undergraduate-led instruction to

computing students; 66% of these students were Hispanic or other underrepresented minorities. Affinity Research Groups provided at least 6,000 hours of undergraduate and graduate participation in computing research to at least 40 students; 65% were Hispanic or other underrepresented minorities.

CAHSI supported students in achieving their graduate school goals. Fifteen out of 29 annual meeting attendees who responded to surveys (52%) reported that they had applied for a scholarship fellowship, or internship in the past year, and twelve of these students had successful applications. Some of the successful students were granted a fellowship from the American Association of University Women, a software engineering internship at Google, an internship at Lawrence Livermore national lab, a Methodist scholarship for Hispanic students, and NSF REU opportunities. Through the support of the fellow-net program, one student obtained a National Science Foundation Graduate Research Fellowship, and another student received an honorary mention for the NSF GRFP award.

CAHSI continued to contribute to the national production of Hispanic computer scientists and engineers. In 2012, there were 1319 Hispanic BS graduates in CS, CE, and CIS in the nation, 167 of those Hispanic BS graduates were from CAHSI departments (US mainland schools only). Thus, CAHSI graduated 13% of the CS/CE/CIS Hispanic baccalaureates in the US.

CAHSI departments have consistently stayed above the national average in MS degrees in computing. In 2012, 15,449 students in the US graduated with MS degrees in CS, CE, and CIS; 24% of national MS computing graduates were women, and only 3% were Hispanic in 2012. In contrast, 124 students in CAHSI departments graduated with MS degrees; 28% of these CAHSI graduates were women, and 23% were Hispanic (US mainland schools only). In contrast, 24% of national MS computing graduates were women, and only 3% were Hispanic in 2012.

CAHSI has contributed to the degree production of Hispanic computing PhDs. In 2012, 37 doctorates were awarded in CS and EE to Hispanics, and CAHSI produced 4 of those graduates (US mainland schools only). In 2012, six doctorates were awarded to Hispanics in CS nationally, and CAHSI produced two of those graduates.

CAHSI has made progress in building a sustainable infrastructure to continue its joint efforts as well. Regarding sustainability of the CAHSI annual meeting, the CAHSI alliance scored in the “moderate/needs improvement” category on the organizational capacity rubric (2 of possible 3). The organization is entering its second year of a five year agreement with SACNAS to share site space, receive administrative support in processing CAHSI student travel, and get access to content in exchange for providing computer science leadership, technical content, and faculty mentors for the SACNAS conference.

A study of CAHSI’s partners and potential partners was conducted to investigate whether CAHSI has become recognized by policy, industry, and other leaders as a national organization that affects decision-making and cultural change at the local, regional, and national levels. Professionals interviewed were asked about their impressions of the CAHSI organization, including strengths of the organization as a whole. Data from interviews and collaborative meetings indicate that national leaders perceive that CAHSI

employs scalability effectively, has a **strong network with a learning culture**, and **exhibits care for students**. Non-profit organizers, industry representatives, and institutional delegates alike saw the value of CAHSI as one of **scale** (60% of interviewees)—the intentional cross-training of CAHSI members in multiple initiatives to bolster impact was viewed as a best practice that could be developed further across new schools and disciplines. Interviews with CAHSI partners and potential partners from multiple sectors describe what they view as a “**learning culture**” in CAHSI’s approach to computing education (40%). Partners found CAHSI to **exhibit care for students** (40%) in their organizational activities and communications. These leaders also described CAHSI as a “**proven model of success**” (60%) and CAHSI leadership and faculty as **experts regarding computing education for underrepresented populations** (80%). CAHSI was described as an organization with a strong reputation. Partners and potential partners describe CAHSI as an organization that has **established credibility** (60%) as well. They referred to CAHSI practices as “best” or “proven” practices for increasing Hispanic student success in computing. In some cases, these leaders were looking forward to learning from CAHSI’s experiences to improve their own student success, while others viewed CAHSI as a good candidate for industry funding based on a strong track record. A potential organizational partner described a strategy for growth as one that builds upon the success of CAHSI to expand in new disciplines and develop new, testable promising practices.

Other achievements include the involvement of Dr. O. Sirisaengtaksin and M. Nakamura from UHD in the Peer Led Team Learning International Society (PLTLIS). They hosted the 2nd Annual Conference in Houston, TX. Among the topics presented were: The Mechanics of Implementing a PLTL Program, Module Development for Peer-Led Workshops, Student Academic Performance in PLTL Workshops, Peer Leader Recruitment and Training, Leadership Development and Communities of Practice, Active and Collaborative Learning, Professional Development with PLTL, Sustaining Campus PLTL Programs, Implementation Strategies in STEM, and Other Disciplines, and Evaluation and Assessment. PLTLIS 2014 will be hosted by CSUDH next year.

Faculty Highlights

Dr. Mohsen Beheshti from CSUDH is collaborating on the development of a new BS program in Information Technology to be offered in spring 2014.

Dr. Patricia Lopez, CAHSI board member, STEM advocate, and co-founder of grassroots organization Latinas in Computing is showcased in Chapter 8 of *Innovation in a Reinvented World* (Essential Element #7: Innovation & Invention).

Drs. Lopez and Gates are featured in the Coalition to Diversify Computing Latinas in Computing, Summer 2013 Edition.

Dr. Ann Gates, CAHSI PI, and Patricia Lopez, CAHSI Board of Advisors Member are also featured in the Anita’s Quilt – Threads of Inspiration website (<http://anitasquilt.org/welcome/>) as part of a campaign to motivate and empower women through stories from other women.

*** What opportunities for training and professional development has the project provided?**

2012-2013 ARG Implemented Courses:

UPRM Courses: Dr. Nayda Santiago: ICOM5047-Computer Engineering Design: 63 students; INEL5195-Electrical Engineering Design: 31 students; ICOM4215-Computer Architecture and Organization: 19 students; ICOM/INEL 4998-Undergraduate Research: 31 students.

UTEP Courses: Dr. Ann Gates, Dr. Natalia Villanueva, and Claudia Casas: CS4310-Software Engineering I: 35 students; CS4342: Database Management: 80 students; CS3195: Junior Professional Orientation: 64 students.

University of Nebraska-Omaha Courses: Dr. Dana Richter-Egger: 18 Course sections and labs: 30-75 students per section

Indiana University: Maureen Biggers: 4 course sections/REU cohorts (approximately 70 students total)

2012-2013 CAHSI Faculty Development workshops:

Title: The CS0 COP-1000: FIU Summer Pre Computer Programming Dual Enrollment Course

Presenter: Mayelin Felipe **Venue:** FIU **Date:** June 24 to August 12, 2013

Title: CS0 workshop: Courses for Attracting Majors, Pre-CSI, and Computational Thinking **Presenters:** M. Beheshti, CSU-DH, and J. Halasa, Ph.D. Student, Center for Science Engagement **Venue:** NEIU **Date:** November 16, 2012

Title: PLTL workshop: Peer Led Team Learning in Computer Science **Presenters:** M. Nakamura, Instructor; O. Sirisaengtaksin, Ph.D., Professor; B. Holtkamp, Peer Leader; and M. Greenlee, Peer Leader UHD. **Venue:** NEIU **Date:** November 16, 2012

Title: The Affinity Research Group Model: Creating and Maintaining Effective Research Teams. **Presenters:** A. Gates, N. Santiago **Participants:** Conference participants including 3 undergraduates, 3 graduates, 1 postdoc, 5 faculty, and 1 industry member. **Venue:** SACNAS **Date:** October 11-14, 2012

Title: ARG Fundamentals Professional Development Workshop **Presenters:** A. Gates, PhD, UTEP; E. Villa, PhD, UTEP; D. Richter, PhD, UNO **Participants:** The workshop had 12 faculty attendees representing various colleges and departments from different universities including one community college: UTEP, CS; UPR-RP, CS; Laredo Community College; Triton College, CIS; UTEP, Teacher Education; and Miami Dade College, School of Engineering and Technology. **Venue:** Miami Dade College **Date:** June 11-12, 2012

Title: ARG Math Science Learning Center Staff Workshop **Presenters:** Dana Richter, University of Nebraska-Omaha **Participants:** Specifically for MSLC undergraduate student staff to develop their cooperative and communication skills. This half-day workshop focused on team building and communications skills development. **Venue:** UNO **Date:** June 11-12, 2012

Title: CS0 COP-1000: FIU Summer Pre Computer Programming Dual Enrollment Course **Presenters:** M. Felipe **Venue:** FIU Engineering Center **Date:** June 24-August 12, 2013

Title: ARG Advanced Professional Development Workshop **Presenters:** A. Gates, PhD, UTEP; E. Villa, PhD, UTEP; N. Santiago, PhD, UPRM. **Participants:** The workshop had 11 faculty attendees representing various colleges and departments from different universities including: UTEP, CS; UPRM, ECE; UPR-Polytechnic, EE; UPRM, CE; UPRM, Nursing; Rochester Institute of Technology, SE; UPR-Bayamon, Electronics; UPRM, General Engineering; UPRM, BA; and UPR-Arecibo, CS. **Venue:** UPRM **Date:** August 1-2, 2012

Title: ARG Fundamentals Professional Development Workshop **Presenters:** A. Gates, PhD, UTEP; E. Villa, PhD, UTEP. **Participants:** 5 UTEP faculty attendees represented various colleges and departments including Psychology, Health Sciences, Cyber-ShARE Center, English, and CS. **Venue:** UTEP **Date:** July 16, 2012

Title: ARG Fundamentals Professional Development Workshop **Presenters:** A. Gates, PhD, UTEP; E. Villa, PhD, UTEP; G. Perea, PhD. Youngstown **Participants:** The workshop had 12 faculty attendees representing various colleges and departments from UTEP (Department of Teacher Education, Computer Science, Civil Engineering College of Science, Office of Research and Sponsored Projects, and Psychology department. Also, we had attendees from other universities and department including University of British Columbia, Computer Science Department; California State University – San Marcos, Computer Science Department; Clemson University, School of Computing, and Texas A&M –Corpus Christi, Department of Life and Sciences. **Venue:** UTEP **Date:** June 25-26, 2012

2012-2013 CAHSI Student Development Workshops

Title: Research Opportunities in Electrical and Computer Engineering **Presenters:** Dr. M. Goryawala and Dr. M. Adjouadi (provided at the CATE Center) **Venue:** FIU **Date:** May 30, 2013

Title: Creating a Research Poster **Presenters:** N. Santiago, PhD **Venue:** UPRM **Date:** April 18, 2013

Title: Graduate Fellowship Workshop **Presenters:** A. Gates, J. Wiebe, and L. Echegoyen from UTEP **Venue:** UTEP **Date:** March 28, 2013

Title: Tips for Tenure for Engineering and Computing Faculty **Presenters:** Dr. M. Adjouadi,, ECE, Dr. A. Agarwal, MME, Dr. A. Chowdhury, CEE, Dr. R. Iyengar, Director School of CIS, Dr. R. Jung, Chair BME, Dr. A. Mirmiran, Dean and Professor, College of Engineering & Computing **Venue:** FIU **Date:** March 27, 2013

Title: Poster Critique I **Presenters:** N. Villanueva, PhD and Patricia Esparza **Venue:** UTEP **Date:** March 13, 2013

Title: Elevator Speech **Presenters:** N. Villanueva, PhD and P. Esparza **Venue:** UTEP **Date:** March 13, 2013

Title: Technical Presentations and constructive critique. **Presenters:** N. Santiago, PhD **Venue:** UPRM **Date:** March 7, 2013

Title: Defining Core Purpose: Defining the core purpose of each research group. **Presenters:** N. Santiago, PhD **Venue:** UPRM **Date:** March 5, 2013

Title: Project Management in Research **Presenters:** N. Santiago, PhD **Venue:** UPRM **Date:** February 7, 2013

Title: Introduction to ARG: Introduction to the Affinity Research Group Model and its components. **Presenters:** N. Santiago, PhD **Venue:** UPRM **Date:** Jan 31, 2013

Title: Writing Technical Papers (Material prepared by Manuel Jimenez) **Presenters:** N. Santiago, PhD **Venue:** UPRM **Date:** November 15, 2012

Title: Unconscious Bias and Stereotype Threat (Material prepared by Lecia Barker) **Presenters:** N. Santiago, PhD **Venue:** UPRM **Date:** November 13, 2012

Title: Graduate Fellowship Follow-Up Workshop **Presenters:** A. Gates, , J. Wiebe, A. Tirres, L. Corral **Venue:** UTEP **Date:** October, 26, 2012

Title: Soft Skills: Time Management for Research **Presenters:** N. Santiago, PhD **Venue:** UPRM **Date:** September 27, 2012

Title: Communication Skills: Posters **Presenters:** N. Santiago, PhD **Venue:** UPRM **Date:** September 20, 2012

Title: Understanding Research **Presenters:** N. Santiago, PhD **Venue:** UPRM **Date:** September 14, 2012

Title: Graduate Fellowship Workshop **Presenters:** A. Gates, PhD, J. Wiebe, PhD, A. Tirres, L. Corral, PhD **Venue:** UTEP **Date:** September, 7, 2012

* How have the results been disseminated to communities of interest?

Over a ten month period, evaluators analyzed website visits for which there was metro area analytic data to better understand website use. Only visits from the 50 states were included in the analysis. From September 2012 through June 2013, 32% of the 2,577 visits analyzed were from CAHSI metro areas. Monthly averages ranged from 22-40%. While the total number of visits declined slightly from last year, (4,340 visits this year compared with 4,664 in the 2011-2012 year) it is possible the extended use of the CAHSI Facebook page in the 2012-2013 year led to a slight change of website use. From September 1 through June 30th of 2013, the CAHSI Facebook page became a major source of information dissemination, with 191 discrete messages posted. The site drew responses in the form of “likes” and “comments” for 70% of the posts, and an average of 133 individuals were marked as reading each post. A content analysis of the Facebook postings revealed the following: 23% (43) were about undergraduate summer and spring internships and REUs; 15% (28) professional development for advanced professionals (post baccalaureates to faculty); 12% (23) articles and resources related to computing and/or underrepresentation; 12% (23) CAHSI successes (articles promoting CAHSI, etc.); 12% (22) other (unrelated activity, jokes, local events, logistics); 10% (20) computing conference announcements, 10% (19) undergraduate student professional development; 9% (17) advanced professional opportunities; and 5%(9) scholarships.

CAHSI departments boast eight staff and faculty members who have produced peer-reviewed, published or presented work regarding computer science education in the past year. Faculty members are trying new efforts beyond the CAHSI initiatives (e.g., game development assignments, flipped classroom experiences, online PLTL) indicating a new set of practices might be culled for future CAHSI dissemination. Education-related works were found in SIGCSE, ASEE, the Journal of Computing Education in Colleges, Grace Hopper, IEEE Fuzzy Systems conference, and SACNAS. CAHSI scored in moderate/needs improvement on this element of the alliance impact evaluation rubric, though missed the highest rubric score by a small margin.

CAHSI has been listed in the national Examples of Excelencia database as an effective national initiative that accelerates Hispanic student success at the baccalaureate level and Excelencia in Education’s publication “The Top 25 Institutions Graduating Latinos in Science, Engineering, and Math (STEM) by Academic Level – 2009-10.” The publication, authored by Deborah Santiago, co-founder and vice president for policy and research at Excelencia in Education, and Megan Soliz, research assistant at Excelencia in Education, links college completion with U.S. workforce needs. CAHSI is listed in the Academic Support category for evidence of effectiveness in CAHSI’s efforts to increase the number of Hispanic students who enter the computing workforce, support and retention of Hispanic students and faculty, and development of competitive research programs.

CAHSI also disseminates through its collaborators and workshops. At the SACNAS 2012 meeting, J. Fernandez chaired the “Conversations with Scientists” (CWS) session. This session provides open discussions about industry career opportunities for students in science and engineering. Industry professionals and Computer Science faculty gather with student attendees to engage in informal round-table discussions about careers in computer & information sciences (computer science, information science/systems, informatics). The personal connections made at CWS set the stage for ongoing mentorship & support throughout the conference.

Selected dissemination efforts are listed below:

- Dr. Nayda Santiago represented CAHSI at the committee creating a Women of Color Track at Grace Hopper 2012. She has disseminated the ARG model through the Instituto de las Comunidades (Institute for Community Development) and through the Center for Professional Development.
- Dr. Ann Gates presented a CAHSI Flash Talk and spoke on the Lessons Learned Panel at the CE21/BPC PI meeting on January 14-15, 2013.
- Dr. Ann Gates, as a member of the IEEE-Computer Society Educational Activity Board, attended the IEEE-CS leadership meeting on February 5, 2013 to promote building a Broadening Participation special technical community.
- Drs. Malek Adjouadi and Ann Gates presented at the M-SETUP meeting in Miami, FL on March 7-9, 2013. M-SETUP focuses on the recruitment, retention, and advancement of underrepresented minorities who graduate

with engineering and computing degrees at Urban/Public MSIs by providing a "Grass-Top" approach (Dean and Upper Administration) with engagement of corporate America. Gates presented the keynote talk on CAHSI and proposed ways in which CAHSI can coordinate M-SETUP.

- Hispanics in STEM Careers Expo-TAMU-CC: 7 CAHSI students, along with other CS students, set up a booth with information regarding CS programs, as well as provided information regarding undergraduate research
- The SOAR Program, along with the help of K. Escobar & Dr. J. Fernandez, organized a STEM activity for Hispanic Heritage Month. The event, Hispanics in STEM Careers Expo, provided information booths for STEM programs on campus, as well as a Q&A session with Hispanic professionals who have careers in STEM. The goal was to show students some of the different routes they could go with a STEM degree.
- Island Days: 10 BPC students from TAMU-CC spoke to about 500 hundred parents and high school students about what the university has to offer.
- FIU Engineering Expo 2013: Over 1200 students from Miami Dade and Broward County Schools (elementary, middle and high schools) came to the FIU Engineering Center for an inter-active, multi-faceted program lasting 5 hours. After the opening ceremony, groups of 20 students are led by undergraduate engineering student volunteers to visit the various research and teaching labs and participate in "hands on" events and contests. Students visited Dr. Adjouadi's CATE facility where they were engaged in discussions that emphasized the fact that engineers and computer scientist are involved in real-world applications in general and in healthcare issues in particular.

* What do you plan to do during the next reporting period to accomplish the goals?

CAHSI will continue its activities associated with the grant's objectives with a focus on sustainability. In particular, CAHSI will finalize the strategic planning document to form a partnership with M-SETUP and corporate America. It will also begin work on Objective 3.1: Provide a framework to systematically nurture and shepherd the development, evaluation, and dissemination of effective pedagogical interventions aimed at enhancing K-12 students' understanding of STEM-related foundational concepts.

Supporting Files

Filename	Description	Uploaded By	Uploaded On
Figure Map of CAHSI Collaborators and Partners 2013.pdf	Map of CAHSI Collaborators and Partners for 2013	Ann Gates	08/01/2013
CAHSI Alliance Impact Rubric.pdf	Rubric presenting impact of CAHSI Alliance.	Ann Gates	08/01/2013
CAHSI Percent of Hispanic BS Computing Grads CAHSI and National Comparison Data 2002 2012.pdf	Graph comparing CAHSI percent of Hispanic BS Computing graduates and national data 2002-2012.	Ann Gates	08/01/2013

Products

Journals

Goryawala, Mohammed; Guillen, Magno R.; Gulec, Seza; Barot, Tushar; Suthar, Rekha; Bhatt, Ruchir; McGron, Anthony; Adjouadi, Malek (2012). An accurate 3D Liver Segmentation Method for Selective Internal Radiation Therapy Using a Modified K-Means Algorithm and Paralell Computing. *International Journal of Innovative Computing Information and Control*. 8 (10A), 6515-6538.

Status = PUBLISHED; Acknowledgment of Federal Support = Yes

Sun, Binjian; Berl, Madison M.; Burns, Thomas G.; Gaillard, William D.; Hayes, Laura; Adjouadi, Malek; Jones, Richard A. (2013). Age association of language task induced deactivation induced in a pediatric population. *NEUROIMAGE*. 65 23-33.

Status = PUBLISHED; Acknowledgment of Federal Support = Yes

A. M. Guzman, M. Goryawala, J. Wang, A. Barreto, A. ; J. Andrian, N. Rische, and M. Adjouadi (2013). Thermal Imaging as a Biometrics Approach to Facial Signature Authentication. *IEEE Journal of Biomedical and Health Informatics*. 17 (1), 214-222.

Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Villa, E., Gates, A., Kephart, K., Hug, S., and H. Thirty (2013). Affinity Research Groups in Practice: Apprenticing Students in Research. *Journal of Engineering Education*. TBD TBD.

Status = AWAITING_PUBLICATION; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Hug, S., Villa, E. & Thiry, H. (2014). Mastering new narratives in the computing fields: Case studies of Latinas' professional practice. *Journal of Ethnographic and Qualitative Research*. TBD TBD.

Status = UNDER_REVIEW; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Books

Book Chapters

Thesis/Dissertations

Conference Papers and Presentations

Q. Zhou, M. Goryawala, M. Cabrerizo, J. Wang, W. Barker, R. Duara, M. Adjouadi (2013). *Combining Anatomical Biomarkers With Neuropsychological Data For Multidimensional Classification Of Alzheimer's Disease*. The 17th International Conference on Image Processing, Computer Vision, & Pattern Recognition. Las Vegas, USA..

Status = PUBLISHED; Acknowledgement of Federal Support = Yes

N. Ward, K. Richart-Ruiz (2013). *Patterns of Importance Variation in Spoken Dialog*. 14th Annual SIGdial Meeting on Discourse and Dialogue. Metz, France.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Garcia, R., King, S. (2013). *Virtual Reality on an Android Device*. 9th Annual LSAMP Symposium. Bryan, TX.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Lalmansingh, M., King, S. (2013). *Mobilizing a Virtual World through a Mobile Device*. 9th Annual LSAMP Symposium. Bryan, TX.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Trombly, A., Mahdy, A. (2013). *Multiple Practices for Mobile Application Development*. 9th Annual LSAMP Symposium. Bryan, TX.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Garcia III, R., Mahdy, A. (2013). *Towards Remotely Managing Wireless Sensor Networks Using Mobile Devices: Developing the Application*. 9th Annual LSAMP Symposium. Bryan, TX.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Reyes, M., King, S. (2013). *Mobilizing a Virtual World through a Android Device*. 9th Annual LSAMP Symposium. Bryan, TX.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Reyes, M., King, S. (2012). *Mobilizing a Virtual World through a Android Device*. SACNAS Conference. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Warfield, E., King, S. (2013). *Modeling the Eye Muscles for Realistically Animated Expressions*. 9th Annual LSAMP Symposium. Bryan, TX.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Wang, Xue; Wu, Jin; Wang, Jin; Adjouadi, Malek; Wang, Y; Tan, L; Zhou, J (2013). *Super-resolution Analysis for Passive Microwave Images Using FIPOCS*. Fifth International conference on Machine Vision (ICMV 2012): Computer Vision, Image Analysis and Processing. Wuhan, China.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Kolev, B., Navas, J., Boadi, Antonia (2012). *A Report on the New Age of Money Laundering*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Herrera, B., Boadi, Antonia (2012). *Multi-Agent System to Simulate an Attack on a Southern California Amusement Park*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Navas, J., Kolev, B., Boadi, Antonia (2012). *Investigating the Feasibility of Near Field Communication Vulnerabilities*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Price, S., Boadi, Antonia (2012). *AUV Model and Simulation Using Java Real-Time to Detect Mines and Obstacles*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Alvillar, D., Boadi, Antonia (2012). *Monitoring Social and Virtual Networks for Nefarious Activities*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Baez, M., Boadi, Antonia (2012). *Automated Programs to Detect Hidden Messages in Social Networks*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Moody, C., Roesger, M., Beheshti, M. (2012). *Augmented Reality Utilizing Microsoft XBOX Kinect: Simple Motion Tracking and Threat Detection*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Guzman, A., Adjouadi, M., Barreto, A., Andrian, J., Rische, N. (2012). *A Biometric Application for Thermal Facial Signatures and Templates Using Mid-Wave Infrared Images*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Lizarraga, G., Wang, J., Cabrerizo, M., Adjouadi, M. (2012). *Data Mining Applied to FMRI Clinical Data*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Delgado, J., Salah Eddin, A., Sadjadi, M., Adjouadi, M. (2012). *Deadline-Driven Medical Job Scheduling on Virtualized Systems*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Chen, J., Nesiba, N., Dana, J., Galves, R. (2012). *Young Women in Computing: Expanding into a Multifaceted Outreach Program*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Gorbet, B., Fernandez, J. (2012). *A Model For the Use of Cloud Computing in a Structural Gene Annotation Workflow*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Goedjen, M., Holtkamp, B., Hernandez, V., Sirisaengtaksin, O. (2012). *Rapid IOS Applications Development*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Landron, B., Santiago, N., (2012). *Developing A Cross-Platform Hyperspectral Image Analysis Library with GPU Support*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Pena, J., Jimenez, M., Malave, L., Morales, L. (2012). *Automated Characterization of Transient Threshold Voltage Shifts in MOSFETs*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Tosado, J., Santiago, N. (2012). *Offline Dependent Speech Recognition for Android*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Gonzalez-Gil, M., Bollman, D., Marquez, D., Rodriguez, D. (2012). *An FPGA Implementation of Fast Finite Field Multiplication*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Ortiz, R., Wang, W. (2012). *Video Games for Use in Brain-Computer Interface Systems*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Rivera, J., Valera, J., Camelo, A., Marquez, D., Rodriguez, D. (2012). *A Hardware/Software Framework for MIMO -OFDM Waveform Design for Underwater Acoustic Communications*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Gonzalez, J., Bartolomei, D., Santiago, N. (2012). *Development of a Time Scheduling System Through Cloud Computing Technologies*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Becerra, A., Duffany, J. (2012). *Understanding Mobile Malware Through Reverse Engineering*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Ocasio, M., Ho, S.M., Marquez, E. (2012). *Security-Enabled Technology Acceptance Model: Business Security Concerns in the Adoption of Virtual Storage*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Samadian, H., Masihi, E., Chinaei, A., Schutz, M. (2012). *Multi-Robot Planning on Predefined Roadmap with Simultaneous Moves*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Castillo, K., Marquez, D., Camelo, A., Valera, J., Rodriguez, D. (2012). *FPGA Implementation of Digital Modulators For Underwater Communications*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Gallardo, E., Teller, P. (2012). *Stereo Matching Under Speckle Noise*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Ochoa, O., Gates, Ann (2012). *Consistency Checks of System Properties Using LTL and Buchi Automata*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Parra, E., Villanueva-Rosales, N. (2012). *Evaluating Semi-Automatic Ontology Matching and Alignment Tools for the UTEP's Expertise System*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Pena, M., Villanueva-Rosales, N. (2012). *EON: An Owl Ontology to Collect, Expose, and Disseminate University of Texas at El Paso's Faculty Research Areas of Expertise*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Ramos-Beauchamp, A., Rodriguez, J., Arce, R. (2012). *Accelerating a Mutational Robustness Algorithm Using FPGAS*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Maldonado-Sanchez, A., Ortiz-Ubarri, J., Santos, E., Rodriguez, J. (2012). *Netflow Data Visualization Framework Using Custom Queries*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Rivera, E., Orozco, E. (2012). *A Web Server Application: A Functional Language Approach*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Bonilla, J., Orozco, E. (2012). *Computing Strongly Connected Components of Graphs and Their Periods Using a Pregel Model*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Rivera, N., Rivera, Y., Laurens, I., Labrador, M. (2012). *Energy Consumption Characterization of Privacy Perserving Algorithms for Participatory Sensing Systems*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Zayas, E., Arce, R. (2012). *Porting of HDL Laboratory Experiences to Verilog*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Garcia-Lebron, R., Koutis, I. (2012). *Affinity Graphs from Effective Conductances*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Miller, N., Robba, F., Perera, G., Cummins, J. (2012). *Detecting Malicious Transmissions using the NETFPGA Open Research Platform*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Duntley, G., Sola, J. (2012). *Traffic Dynamics for the Roundabout vs Traffic Lights Simulator*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Velez, J., Sierra, A., Pou, J., Cruz, A. (2012). *A Survey of Wireless Attacks Against IEEE 802.11 Based Networks*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Gonzalez, N., Cruz, A., Duffany, J., Ortiz, J. (2012). *Data Mining Social Media Networks For Terrorist Event Indicators*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Diaz, O., Cruz, A. (2012). *Solving Cryptarithmic Problems with Multi-Threading and Sequence Validation Algorithm*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Sztainberg, M., Huag, L., Del Valle, L., Iacobelli, F., Gonzalez, P. (2012). *Using Technology to Detect and Track Disease Outbreaks*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Villanueva-Rosales, N., Gates, K., Guillen-Castrillo, R., Solorio-Tirado, L. (2012). *Computer Science and Technology Creating a Healthy World*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Perera, G., Benzel, T., Thuel, S., Beheshti, M. (2012). *How Safe Are We from Cyber Attacks? Protecting Our Infrastructure and Computers from Intruders*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Fernandez, J., Lyste, K., Seneca, D., Smith, R., Tijerina, A. (2012). *Geographic Information Systems and Contributions to Preserving Tribal Lands*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Gates, A., Santiago, N. (2012). *The Affinity Research Group Model: Creating and Maintaining Effective Research Teams*. SACNAS. Seattle, WA.

Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Thiry, H. and S. Hug (2013). *Building Effective Cross-Institutional Collaborations to Share Practices that Promote Student Success*. American Association of Colleges and Universities (AAC&U) Student Success and the Quality Agenda conference. Miami, FL.

Status = OTHER; Acknowledgement of Federal Support = Yes

Other Publications

Technologies or Techniques

Nothing to report.

Patents

Nothing to report.

Inventions

Nothing to report.

Licenses

Nothing to report.

Websites

Title: CAHSI Website

URL: <http://www.cahsi.org>

Description: From September 2012 through June 2013, 32% of the 2,577 visits analyzed were from CAHSI metro areas. Monthly averages ranged from 22-40%. While the total number of visits declined slightly from last year, (4,340 visits this year compared with 4,664 in the 2011-2012 year) it is possible the extended use of the CAHSI Facebook page in the 2012-2013 year led to a slight change of website use.

Title: CAHSI Facebook Page

URL: <https://www.facebook.com/groups/CAHSIAlliance>

Description: From September 1 through June 30th of 2013, the CAHSI Facebook page became a major source of information dissemination, with 191 discrete messages posted. The site drew responses in the form of "likes" and "comments" for 70% of the posts, and an average of 133 individuals were marked as reading each post. A content analysis of the Facebook postings revealed the following: 23% (43) were about undergraduate summer and spring internships and REUs; 15% (28) professional development for advanced professionals (post baccalaureates to faculty); 12% (23) articles and resources related to computing and/or underrepresentation; 12% (23) CAHSI successes

(articles promoting CAHSI, etc.); 12% (22) other (unrelated activity, jokes, local events, logistics); 10% (20) computing conference announcements, 10% (19) undergraduate student professional development; 9% (17) advanced professional opportunities; and 5%(9)scholarships.

Other Products

Nothing to report.

Supporting Files

Filename	Description	Uploaded By	Uploaded On
SACNAS2012 Group.pdf	CAHSI Group Photo at the SACNAS 2012 Conference	Ann Gates	08/01/2013
ConversationwithScientists.pdf	CAHSI Photos during the Conversations with Scientists session at the SACNAS 2012 Conference	Ann Gates	08/01/2013

Participants

Research Experience for Undergraduates (REU) funding

Nothing to report.

What individuals have worked on the project?

Name	Most Senior Project Role	Nearest Person Month Worked
Claudia V Casas	Other Professional	12
Freudenthal Eric	Faculty	1
Olac Fuentes	Faculty	1
Shirley Moore	Faculty	1
Mary K. Roy	Faculty	1
Patricia Teller	Faculty	1
Rodrigo Romero	Faculty	1
Chris Kiekintveld	Faculty	1
Natalia Villanueva	Faculty	1
King Scott	Faculty	1
Longzhuang Li	Faculty	1

Name	Most Senior Project Role	Nearest Person Month Worked
Ahmed Mahdy	Faculty	1
Ann Thorn	Faculty	1
Mitsue Nakamura	Faculty	1
Antonia Boadi	Faculty	1
Jianchao Han	Faculty	1
Kazimierz Kowalski	Faculty	1
Lisnel Morales	Faculty	1
Huiping Cao	Faculty	3
Karen Villaverde	Faculty	1
Felipe Mayelin	Other Professional	1
Rocio Guillen	Faculty	1
Miguel Alonso	Faculty	1
Andres Figueroa	Faculty	1
Heather Thiry	Consultant	1
Ongard Sirisaengtaksin	Co PD/PI	1
Nayda Santiago	Co-Investigator	1
Nestor Rodriguez	Co PD/PI	1
Enrico Pontelli	Co PD/PI	1
Graciela Perera	Faculty	1
Sarah Hug	Consultant	1
Ann Q Gates	PD/PI	1
Sangeeta Gad	Faculty	1

Name	Most Senior Project Role	Nearest Person Month Worked
John D Fernandez	Co PD/PI	1
Stephanie Strange	Other Professional	1
Krystal Escobar	Other Professional	2
Mohsen Beheshti	Co PD/PI	1
Malek Adjouadi	Co PD/PI	1
Esau Mena	Undergraduate Student	6

What other organizations have been involved as partners?

Name	Location
A4RC— Alliance for the Advancement of African-American	Indiana University
Anita Borg Institute for Women and Technology	Palo Alto, CA
CMD-IT	Texas A&M University
CRA Coalition to Diversify Computing (CDC)	Washington, D.C.
CS Ed Week 2012	Washington, D.C.
Computer Science Collaborative Project (CSCP)	Lynnwood, WA
CyberWatch West	Walnut, California
Excelencia in Education	Washington, D.C.
Golden Evaluation and Policy Research	Golden, CO
Google	Mountain View, CA
Hispanic Scholarship Fund Institute	Gardena, CA
Latinas in Computing (LiC)	Palo Alto, CA
Microsoft	Redmond, WA
NCWIT	Boulder, CO
Northeastern Illinois University	Chicago, IL

Name	Location
SACNAS	Santa Cruz, CA
Society for Professional Hispanic Engineers (SHPE)	Los Angeles, CA
Team for Research in Ubiquitous Secure Technology (TRUST)	Berkeley, CA
Texas State University	San Marcos, TX
The GEM Consortium	Alexandria, VA
The IBM Academic Initiative (AI) program	Armonk, NY
Young Women In Computing	Las Cruces, NM

Have other collaborators or contacts been involved? Y

Impacts

What is the impact on the development of the principal discipline(s) of the project?

CAHSI serves as a national resource for disseminating initiatives that promote Hispanic student success in computing, including recruitment, retention, and advancement. CAHSI holds at least two All-Hands meetings per year, as well as an Annual Meeting. At these meetings, CAHSI initiatives are discussed and the members discuss challenges/successes. Members also describe new initiatives for adoption by other members.

The Alliance provides opportunities for members to collaborate on research projects and proposals. Example areas in which CAHSI members are pursuing collaborations include: cyber-security (CSU-DH, NEIU, UTEP, TAMU-CC), data management (UTEP, NMSU, CSU-SM), computing in health/biomedical (FIU, UTEP, MDC, CSU-SM).

Please refer to the Accomplishments/Significant Results for further discussion on impact.

What is the impact on other disciplines?

Nearly all (4 of 5) CAHSI initiatives have materials available online that would support at least initial implementation of CAHSI initiatives in new locations and new disciplines, though the default has been to include materials primarily from the lead institution. Materials include lesson plans, sample workshop resources and reference manuals; however, diversifying these materials across institutions is needed to showcase the multitude of approaches to the initiatives. CAHSI scores 2 out of 3 on this metric on the alliance impact rubric. CS-0, PLTL, ARG, and Fellownet (4 of 5, moderate to needs improvement on the rubric) are crossing departmental barriers at CAHSI schools, as STEM faculty, deans, and in some cases university presidents see the value in CAHSI initiatives for STEM students at HSIs. Four schools have evidence of institutional support that extends beyond the CAHSI department in which CAHSI initiatives are leveraged for student success across campus. For example, the President's office at CSU Dominguez Hills collaborated with local CAHSI leadership to develop a National Science Foundation proposal to extend adapted versions of CS-0 (e.g., physics-0) and PLTL initiatives across other STEM departments. CAHSI is considering a partnership with a group intent on changing the demographics of engineering graduates over the next decade- they held one meeting during the 2012-2013 year to consider collaboration options (moderate/needs improvement on rubric).

In 2012, adopters of CAHSI initiatives came from a variety of disciplines within and outside of STEM. On a survey of new adopters, 8 out of 15 respondents (53%) reported that they were from Computer Science or Electrical and Computer Engineering. The rest of the adopters were from Psychology, Nursing, Geoscience, Food Science, and campus administration.

What is the impact on the development of human resources?

CAHSI has provided broad, intensive support to students at all stages of their degrees. Assuming a 15 week semester, the original seven CAHSI schools provided 11,070 hours of introductory computing content to 246 students in 2012-13, nearly 75% were Hispanic or other underrepresented minority students. The PLTL initiative gave the equivalent of 9,975 hours of undergraduate-led instruction to 665 computing students; 2/3 of PLTL students were Hispanic or other underrepresented minorities. Affinity Research Groups provided at least 6,000 hours of undergraduate participation in computing research (assuming a 10 hour commitment over 15 weeks), nearly 2/3 of these students were Hispanic or other underrepresented minorities. CAHSI focuses attention on Hispanics as well as female students—with the exception of ARGs, CAHSI's representation of women in its initiatives outpaces the enrollment numbers at CAHSI schools and the national average of women undergraduates in computer science. Nearly one-quarter of the participants across all CAHSI initiatives were women.

Students' aspirations in computing were influenced by their participation in Affinity Research Groups. Overall, 94% of ARG students report that they feel more prepared for graduate school because of their ARG experience. In addition, 82% of ARG students reported that they are more likely to attend graduate school because of their research experience. CAHSI students involved in Affinity Research Groups (ARGs) continue to outpace their national peers in NSF research experiences for undergraduates (REUS) in rates of academic presentation and publication. Most ARG students (73%) reported that they attended a professional conference, while only 23% of the national sample of REU students had done so. Using Fisher's Exact Test, this difference in attendance at professional conferences is a significant difference, $p=0.00001$.

Students gained the skills, knowledge, and confidence from ARGs that they will need in graduate school and the computing workforce. Students reported positive outcomes on all the Undergraduate Research Student Self-Assessment (URSSA) gains scales (between 3.0 and 4.0 on the 4.0 point scale, or between "good" and "great" gain). Students' highest gains were in intellectual growth (mean=3.47 out of 4.0) and personal growth (mean = 3.54 out of 4.0). Students' scores in personal growth indicate that they gained confidence in their abilities and a greater interest in computing. For instance, 94% of students gained confidence from their research experience that they could do well in future computing courses.

The CAHSI symposium at SACNAS had a substantial impact on students' aspirations in computing. In all, 59% of students who completed the survey reported that their knowledge of career pathways increased "a good deal" or a "great deal" from the CAHSI symposium. Also, 75% of students marked that the symposium had increased their interest in graduate school "a good deal" or a "great deal." Annual meeting attendees had taken concrete steps to pursue graduate school; twelve students (41%) reported that they had taken the GRE in the past year, and thirteen students (45%) had applied to graduate school in the past year. Fifteen out of 29 students (52%) reported that they had applied for a scholarship fellowship, or internship in the past year, and twelve of these students had successful applications. Some of the successful students included a fellowship from the American Association of University Women, a software engineering internship at Google, an internship at Lawrence Livermore national lab, a Methodist scholarship for Hispanic students, and NSF REU opportunities. One student was awarded a National Science Foundation Graduate Research Fellowship and another student received honorary mention.

CAHSI has consistently graduated large numbers of Hispanic baccalaureates in computing. For instance, in 2012, there were 1319 Hispanic BS graduates in CS, CE, and CIS in the nation, 167 of those Hispanic BS graduates were from CAHSI departments (US mainland schools only). Thus, CAHSI graduated 13% of the CS/CE/CIS Hispanic baccalaureates in the US. CAHSI's overall BS degree production has been on a slow, downward trend

(e.g., 278 total BS degrees in 2009, 245 total BS degrees in 2012), but has stayed relatively even in the past several years.

Yet CAHSI graduation of Hispanics has slowly trended upward in recent years (e.g., 150 Hispanics BS degrees in 2009, 167 Hispanic BS degrees in 2012). After a low of 27 female BS graduates in 2011, CAHSI awarded 41 BS degrees to women in 2012. Overall, in 2012, 68% of bachelor's recipients in CAHSI departments were Hispanic and 17% were awarded to women. Nationally, 7% of BS computing degrees in CS/CE/CIS were awarded to Hispanics and 14% to women.

CAHSI's slight dip in BS graduation rates reflects national trends in these three majors. Nationally, the comparison set of departments drawn from the National Center for Education Statistics IPEDS database graduated 50% of the number of BS students as they did in 2002; while in contrast, CAHSI graduated 65% of its 2002 total.

Master's degree completions in computing have risen steadily in the US since 2002. CAHSI has mirrored this trend, although CAHSI departments have consistently stayed above the national average in MS degrees in computing. For instance, 15,449 students in the US graduated with MS degrees in CS, CE, and CIS in 2012, representing a 25% increase from 2002. In 2012, 124 students in CAHSI departments graduated with MS degrees, representing a 41% increase from 2002. Additionally, 28% of these CAHSI graduates were women, and 23% were Hispanic (US mainland schools only). In contrast, 24% of national MS computing graduates were women, and only 3% were Hispanic in 2012.

Hispanics and women remain severely underrepresented in computing doctorates. However, CAHSI is contributing to the degree production of Hispanic computing PhDs. For instance, in 2012, 37 doctorates were awarded in CS and EE to Hispanics, and CAHSI produced 4 of those graduates. In 2012, six doctorates were awarded to Hispanics in CS nationally, and CAHSI produced two of those graduates. Thus, CAHSI produced 33% of the Hispanic CS PhDs in 2012, although this largely reflects the extremely low representation of Hispanics in the national pool of computing doctorates.

What is the impact on physical resources that form infrastructure?

Nothing to report.

What is the impact on institutional resources that form infrastructure?

Leadership and support of CAHSI in higher education and STEM education organizations is spreading across CAHSI members. Four CAHSI faculty members from four institutions serve as CAHSI delegates to national and regional organizations interested in improving and diversifying the computing workforce. CAHSI scored 3 out of 3 on this metric, having representation within 5 venues. As CAHSI develops collaborations, CAHSI members participate in the leadership of the partner organizations (e.g., SACNAS, Excelencia in Education).

CAHSI is considering a partnership with M-SETUP, a group of engineering deans intent on changing the demographics of engineering graduates at their institutions over the next decade. They held one meeting during the 2012-2013 year to consider collaboration options (moderate/needs improvement on rubric). While the consortium is relatively new, it would provide a higher education policy voice in that its members hold leadership roles in engineering schools across the country. While CAHSI prides itself on its "grassroots" origins and practice at the departmental level, organizing an alliance with a more powerful, engaged group of like-minded academics could support CAHSI's mission in new ways. In addition to political power, the consortium is engaging industry support that builds on dean's previous relationships with supporters, potentially widening the funding pool for CAHSI's future sustainability.

Other potential avenues for alliance impact that have begun to surface this year are: leadership in the Cyber Watch West community and leadership in the PLTL international society. CAHSI faculty will host the PLTL annual conference for the second year in a row in 2014—attendees span multiple institutions, disciplines, and countries, giving CAHSI an opportunity to share results and experiences with faculty and students across the globe.

Similarly, Cyber Watch west is a community of institutions working on cyber security research and curricular development. As CAHSI has multiple institutions engaged in this research area, and institutions affiliated with Cyber Watch have expressed interest in CAHSI, cross institutional collaborations that expand impact may be fruitful with this group.

What is the impact on information resources that form infrastructure?

CAHSI has been creating the Semantic Web infrastructure to support discovery of CAHSI practices and community building.

What is the impact on technology transfer?

Nothing to report.

What is the impact on society beyond science and technology?

The institutionalization of the CAHSI initiatives has led to the expansion of the program beyond Computer Science for both PLTL and ARG. The ARG model is being adopted in programs beyond science and engineering. As described in earlier sections, faculty from disciplines such as Psychology, Health Sciences, English, Teacher Education are successfully implementing ARG practices. CAHSI has been seeking funding to expand its initiatives beyond computing through training and other means of dissemination.

Changes

Changes in approach and reason for change

Nothing to report.

Actual or Anticipated problems or delays and actions or plans to resolve them

Nothing to report.

Changes that have a significant impact on expenditures

Nothing to report.

Significant changes in use or care of human subjects

Nothing to report.

Significant changes in use or care of vertebrate animals

Nothing to report.

Significant changes in use or care of biohazards

Nothing to report.

Special Requirements

Responses to any special reporting requirements specified in the award terms and conditions, as well as any award specific reporting requirements.

Nothing to report.