CAHSI Annual Meeting January 2009

Supplemental Evaluation Report

Recruiting, Retaining, and Advancing Hispanics in Computing

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Executive Summary

The goals of the annual CAHSI conference include: engaging in cross institution collaborations, providing opportunities for students and faculty networking, serving as a forum for advanced discussion of computing and computing careers, and disseminating CAHSI’s interventions to an outside audience.

Attendees received surveys after each of 6 workshops during the January annual meeting. Surveys were collected and analyzed by workshop. A month after the CAHSI event, attendees received an invitation to take an online survey, to address their attitudes and opinions about the CAHSI event as well as to ascertain how the meetings influenced attendees’ subsequent behaviors regarding engagement with CAHSI or CAHSI members, and advancement in their computing professions or studies.

According to survey responses, participants gained knowledge and awareness of career and educational opportunities. The majority of participants also found the workshops to be relevant to their career interests and goals. Workshop interactions also enhanced attendees’ professional networks and helped them to establish beneficial relationships with colleagues.

Following the January event:

- Two-thirds of the professionals made contact with a faculty member they first met at the CAHSI meetings (69%, 23 professionals);
- Fifty-eight percent of responding faculty and industry professionals stated they contacted peers about CAHSI interventions described at the meeting;
- Students contacted other students following their participation at the January 2009 meetings (52%, 26 students). To a lesser degree, students made contact with faculty (27%, 13 students) and industry professionals (22%, 11 students);
- Over one third of students continued learning about computing following the conference; 19 of the student respondents said they searched for additional research articles or materials written by CAHSI speakers (38%);
- CAHSI students near the beginning of the career path have applied for scholarships (26%, 13 students), inquired about graduate school opportunities (46%, 23 students), and applied for graduate school (12%, 6 students); and
- One third of professionals (31%, 10 professionals) mentioned contacting students for research opportunities, and nearly half contacted a student regarding more general matters (44%, 14 professionals).

Students, faculty, and computing professionals extended the life of the conference by making use of contacts they made at the CAHSI meeting, applying for scholarships, and continuing their learning their further literature research. Evaluation instruments describe a robust conference schedule that aided in student and faculty professional development and enhanced social networks for participants.
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1 Introduction

1.1 Program Overview

The Computing Alliance of Hispanic-Serving Institutions (CAHSI) is a partnership of seven higher education institutions and the Hispanic Association of Colleges and Universities, with the mission of increasing the number of Hispanics pursuing bachelors and advanced degrees in computing. The methods of goal attainment include the implementation of several interventions that address the key causes for under-representation of Hispanics in computing. These interventions support the recruitment, retention, and advancement of Hispanic undergraduate and graduate students and faculty in the computing, information sciences, and engineering (CISE) areas, and are integrated across three critical educational transitions: high school to college; undergraduate to graduate study; and graduate study to the professoriate. The seven CAHSI higher education institutions are:

- California State University at Domingo Hills (CSU-DH)
- Florida International University (FIU)
- New Mexico State University (NMSU)
- Texas A&M University at Corpus Christi (TAMU-CC)
- University of Puerto Rico at Mayaguez (UPR-M)
- University of Houston-Downtown (UHD)
- University of Texas at El Paso (UTEP)

1.2 Goals of the Alliance Interventions

The evaluation assesses the degree to which the Alliance’s interventions are individually successful in their goals of recruiting, retaining, and advancing students in computer science.

**Recruitment through CS-0:** Increasing student familiarity with and motivation to study computer science, provide confidence and encouragement for pursuing a computing major. CS-0 is a three-unit course in introduction to computer programming and concepts designed to better prepare students for success in computer science. The CS-0 courses are realized differently at each institution implementing the course, which will permit comparative analysis of methods and produce ideas for customizing or adapting for other universities. Generally speaking, students with little to no prior background in computing enroll in the course. They are provided with the opportunity to learn the basics of programming concepts and develop problem solving and systematic reasoning skills while becoming familiar with a programming environment.

**Retention through Peer-Led Team Learning:** Developing a sense of community and belonging among students while providing meaningful, timely academic support. PLTL provides academic and social support to CS students in gatekeeper courses, or the courses that tend to deter students from remaining in the major. As a part of PLTL, peer leaders provide timely assistance to students for concepts that the students have identified as unclear or difficult. The process requires the instructor to adjust lectures accordingly and the peer leader to conduct a
session to address the concerns. Peer tutoring consists of faculty-supervised, one-on-one tutoring by students who have successfully completed and excelled in the course. Peer tutors provide direct assistance with the course concepts, programming, and other assignments in a manner accessible to the student.

**Affinity Research Groups: Engendering understanding of research and research careers as well as a sense of belonging in a research community.** Affinity Research Groups (ARGS) are a model for undergraduate research development that provides both undergraduate and graduate students with opportunities to learn, use, and integrate the knowledge and skills required for research with those required for cooperative work.

**Development Workshops: Supporting graduate studies, completion of the Ph.D. and promotion and tenure for junior faculty.** Development workshops are designed to provide graduate students and faculty with effective skills to succeed in their careers and studies. Development workshops provide opportunities: (a) to disseminate information about “survival in graduate school and academe,” (b) for discussion of critical issues to career success, (c) for creating mentoring communities, and (d) for establishing cohorts of students and faculty with common goals. *This report focuses on this intervention.*

### 1.3 Purpose of Evaluation

The purpose of the evaluation is five-fold:

- To inform the ongoing work of the Alliance so that year-to-year improvements can be made and to support the development of model programs for adoption by other higher education institutions;
- To determine the extent to which the short and long-term goals of the Alliance’s four main interventions have been achieved;
- To establish short- and long-term tracking of student outcomes (completion of CS undergraduate and graduate degrees, tracking of students throughout intervention courses and experiences, commitment to research careers);
- To provide an evaluation model which can be used by other institutions who adopt these interventions in the future; and
- To provide information that supports the success of the Alliance as a partnership.

### 2 Overview of the CAHSI Annual Meeting

#### 2.1 Description of the event

The goals of the annual CAHSI conference include: engaging in cross institution collaborations, providing opportunities for students and faculty networking, serving as a forum for advanced discussion of computing and computing careers, and disseminating CAHSI’s interventions to an outside audience.
2.2 Data collection for evaluation
Attendees received surveys after each of 6 workshops during the January annual meeting. Surveys were collected and analyzed by workshop. A month after the CAHSI event, attendees received an invitation to take an online survey, to address their attitudes and opinions about the CAHSI event as well as to ascertain how the meetings influenced subsequent attendees’ behaviors regarding engagement with CAHSI or CAHSI members, and advancement in their computing professions or studies. Surveys were sent via email invitation, with 5 email reminders occurring over the following weeks. The delayed response was employed to avoid the “halo effect”, in which participants tend to mark experiences as highly enjoyable when they have little time to reflect upon the experience.

2.3 Demographics of attendees
This year, the CAHSI annual meeting was attended by 74 students (54%), the majority of whom were undergraduate students. They represented the following twelve universities:

- California State University - Dominguez Hills
- Florida International University
- Inst. Tecnologico y Estudios Superiores Monterrey
- New Mexico State University
- Texas A&M University - Corpus Christi
- University of Central Florida
- University of Houston - Downtown
- University of Puerto Rico - Mayaguez
- University of South Florida
- University of Texas at El Paso
- University of Toronto
- Youngstown State University

The conference was also attended by numerous faculty, computing professionals, non-profit professionals, and industry representatives.
2.4 Demographics of survey respondents

Eighty six individuals responded to the post survey, sent nearly month after the event in San Francisco in January of 2009. This number represents 64% of those who registered for the conference. The proportion of women and men from who we gleaned demographic data was close to even, indicating that the CAHSI annual meeting attracted a greater proportion of women than is traditionally found in computing professions.

The vast majority of attendees, according to survey results, identified themselves as Hispanic; specifically, 91% of students and 81% of computing professionals stated they were Hispanic, or 87% overall. Nearly 10 percent of respondents were Caucasian. Five additional ethnicities were represented, though the small numbers of non-Hispanic students made comparisons impractical.
3 Overall Satisfaction with the CAHSI Meetings

3.1 Meeting met, exceeded attendees’ expectations
The majority of survey respondents state that their expectations of the CAHSI annual meeting were met (42% or 36 respondents) or exceeded (23%, or 20 respondents). Not surprisingly, students were less likely than computing professionals or academics to have expectations regarding the conference prior to their attendance in January of 2009 (15%, 8 students, compared with 9%, 3 professionals). Seventeen students and two professionals felt the conference did not or did not completely meet their expectations. Participants’ ratings did not differ significantly by gender.

3.2 Continued attendance expected from majority of attendees
Most students plan to attend the next annual CAHSI meeting (62%, 32 students), though for some the scholarship will be vital to participation. An additional nine (17%) students were unsure if they would attend based on the timing of the conference, while seven would not attend again, and 3 were unsure if the conference would be worth their while in future years.

Computing professionals were more likely to state they planned to return to CAHSI in 2010 (82%, 28 professionals), and again scholarships for participation would influence the decision for a portion of professionals. Two professionals would not attend the conference again, while for four professionals, the timing would dictate their participation in future events.

3.3 CAHSI attendees recommend the conference to peers
Students and faculty were nearly equally likely to recommend the CAHSI annual meeting to peers: 81% of students and 85% of professionals responding to the survey indicated their agreement to this statement, representing 42 students and 29 professionals.
3.4 Suggestions for future CAHSI conferences
Survey respondents were asked to provide suggestions for future CAHSI events, based on their experiences at the 2009 event. Attendees mentioned the following:

- Logistical concerns (regarding food, transportation, site), recommending a more centralized location where participants were free to move about and purchase food when needed (9)
- Need for increased interaction during presentations, recommending shorter time slots and more opportunities for discussion with presenters (5)
- Social activities, recommending CAHSI-sanctioned social events for increased networking opportunities with those from other institutions (13)
- Taking advantage of meeting location, recommending CAHSI sanctioned tours to provide break from conference and to cut back on absenteeism (4)
- Need for greater publicity, as many attendees were members of CAHSI institutions (2)

4 Detailed Workshop Evaluation: What works in computing professional development

4.1 Overview
Six workshops were held at the third annual CAHSI meeting. The first workshop, “Applying to graduate school and scholarships,” was led by Michele Lezama and Jacqueline Thomas of the GEM consortium, and Paco Flores of the Hispanic Scholarship Fund. Rafeal Arce-Nazario, of the University of Puerto Rico at Río Piedras, led the second workshop, “Algorithm partitioning for distributed hardware architectures.” Ann Gates, of the University of Texas at El Paso, and Luis Martinez, of the Scripps Research Institute prepared students and faculty to become advocates in “Becoming a CAHSI advocate.” A team of government, academic, and industry researchers provided various perspectives on obtaining funding for research in a workshop entitled, “Selling yourself and your ideas.” In the fifth workshop, Sandra Ramos Thuel of Alcatel-Lucent, discussed the nature of industry and academic research and the skills required to succeed as a computer science researcher. The final workshop, “Data management techniques in cyberspace,” was led by Manuel Rodriguez, of the University of Puerto Rico at Mayaguez.

4.2 Workshop participants were predominantly Hispanic
The workshops were well attended; several of the workshops had well over 25 participants who responded to surveys. The workshop series served a mix of undergraduate and graduate students, as well as junior faculty and postdoctoral researchers. Participants were predominantly Latino/a. One-third of workshop attendees were female. Many participants attended multiple workshop sessions.

4.3 CAHSI workshops were a unique professional development experience
Less than one-third of attendees had received similar professional development training in other venues, although a few participants noted that their other training had been less clear and specific. Those receiving similar training had done so through the Grace Hopper conference, National Science Foundation-sponsored events or conferences, Computing Research Alliance-Women, CAHSI, or SACNAS.

4.4 Workshops presentations were organized and clear

Overall, the vast majority of attendees found the workshops to be well organized with effective presentations and adequate materials and resources, as evidenced in tables 1 through 3. In addition, participants’ open-ended comments indicated that workshop presenters were knowledgeable, organized, engaging, and provided useful information about a variety of topics.

Table 1. The workshop presenter clearly delivered the workshop material.

<table>
<thead>
<tr>
<th>Workshop</th>
<th>% of agree or strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop 1: Applying to graduate school and scholarships</td>
<td>87%</td>
</tr>
<tr>
<td>Workshop 2: Algorithm partitioning for distributed hardware architectures</td>
<td>86%</td>
</tr>
<tr>
<td>Workshop 3: Becoming a CAHSI advocate</td>
<td>97%</td>
</tr>
<tr>
<td>Workshop 4: Selling yourself and your ideas</td>
<td>80%</td>
</tr>
<tr>
<td>Workshop 5: Industry and academic research: Are they different beasts?</td>
<td>86%</td>
</tr>
<tr>
<td>Workshop 6: Data management techniques in cyberspace</td>
<td>96%</td>
</tr>
</tbody>
</table>

Table 2. The workshop was well organized.

<table>
<thead>
<tr>
<th>Workshop</th>
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</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Workshop 3: Becoming a CAHSI advocate</td>
<td>89%</td>
</tr>
<tr>
<td>Workshop 4: Selling yourself and your ideas</td>
<td>80%</td>
</tr>
<tr>
<td>Workshop 5: Industry and academic research: Are they different beasts?</td>
<td>85%</td>
</tr>
<tr>
<td>Workshop 6: Data management techniques in cyberspace</td>
<td>95%</td>
</tr>
</tbody>
</table>

Table 3. I was satisfied with the amount of resources in the workshop.

<table>
<thead>
<tr>
<th>Workshop</th>
<th>% of agree or strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop 1: Applying to graduate school and scholarships</td>
<td>84%</td>
</tr>
<tr>
<td>Workshop 2: Algorithm partitioning for distributed hardware architectures</td>
<td>76%</td>
</tr>
<tr>
<td>Workshop 3: Becoming a CAHSI advocate</td>
<td>91%</td>
</tr>
</tbody>
</table>
4.5 Workshops fostered collegial interactions and expanded professional networks

The workshop series also contributed to attendees’ professional development as computer scientists. Almost all participants found the workshops to be relevant to their career interests and goals. Collegial interactions during the workshops also enhanced participants’ professional networks. Tables 4 through 6 demonstrate the value of the workshop series for participants’ career paths and professional networks.

Table 4. The workshop topic was relevant to my studies/career.

<table>
<thead>
<tr>
<th>Workshop</th>
<th>Topic</th>
<th>% of agree or strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop 1</td>
<td>Applying to graduate school and scholarships</td>
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<td>89%</td>
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<td>Workshop 4</td>
<td>Selling yourself and your ideas</td>
<td>67%</td>
</tr>
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</tr>
<tr>
<td>Workshop 6</td>
<td>Data management techniques in cyberspace</td>
<td>86%</td>
</tr>
</tbody>
</table>

Table 5. My interactions with colleagues in this workshop contributed to my professional development.

<table>
<thead>
<tr>
<th>Workshop</th>
<th>Topic</th>
<th>% of agree or strongly agree</th>
</tr>
</thead>
<tbody>
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<td>Industry and academic research: Are they different beasts?</td>
<td>88%</td>
</tr>
<tr>
<td>Workshop 6</td>
<td>Data management techniques in cyberspace</td>
<td>90%</td>
</tr>
</tbody>
</table>

Table 6. The workshop enhanced my professional network of colleagues.

<table>
<thead>
<tr>
<th>This workshop enhanced my professional network of colleagues.</th>
<th>% of agree or strongly agree</th>
</tr>
</thead>
</table>
Workshop 1: Applying to graduate school and scholarships   75%
Workshop 2: Algorithm partitioning for distributed hardware architectures   78%
Workshop 3: Becoming a CAHSI advocate   85%
Workshop 4: Selling yourself and your ideas   67%
Workshop 5: Industry and academic research: Are they different beasts?   82%
Workshop 6: Data management techniques in cyberspace   90%

4.6 Attendees would recommend the workshop series to colleagues

By and large, participants found the workshop series to be valuable to their professional development. The majority of attendees would recommend the workshops to colleagues and compared the workshops favorably to other professional development experiences, as evidenced in Tables 7 and 8.

Table 7. I would recommend this workshop to colleagues.

<table>
<thead>
<tr>
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<th>% of agree or strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
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<td>86%</td>
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<td>84%</td>
</tr>
<tr>
<td>Workshop 6: Data management techniques in cyberspace</td>
<td>86%</td>
</tr>
</tbody>
</table>

Table 8. Compared to other professional development experiences, how would you rate this workshop?

<table>
<thead>
<tr>
<th>Workshop</th>
<th>% of good or excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop 1: Applying to graduate school and scholarships</td>
<td>93%</td>
</tr>
<tr>
<td>Workshop 2: Algorithm partitioning for distributed hardware architectures</td>
<td>57%</td>
</tr>
<tr>
<td>Workshop 3: Becoming a CAHSI advocate</td>
<td>89%</td>
</tr>
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<td>Workshop 6: Data management techniques in cyberspace</td>
<td>87%</td>
</tr>
</tbody>
</table>
4.7 Workshop series helped participants to achieve professional goals

The workshop series as a whole provided attendees with invaluable information, advice, and resources; networking opportunities, introduced them to new areas of research and extended their knowledge about the computing field.

Workshops 1 and 4 (“Applying to graduate school and scholarship” and “Selling yourself and your ideas”) were particularly successful in providing attendees with essential information and resources they will need as they navigate the career path of a computer science researcher.

*It helped make me aware of the resources available to apply for graduate school.* (workshop 1 participant)

*It gave me the right ideas and resources to better my journey to graduate school.* (workshop 4 participant)

Workshop 3 (Becoming a CAHSI advocate) greatly increased participants’ professional networks through active, collaborative workshop activities. Attendees appreciated the exchange of ideas and collaboration fostered in the workshop.

*Allows me to broaden my network and make great connections* (workshop 3 participant)

*It enhanced my ability to network* (workshop 3 participant)

Workshops 2 and 6 (“Algorithm partitioning for distributed hardware architectures” and “Data management techniques in cyberspace”) introduced participants to new areas of research and expanded their knowledge of computing concepts. A few participants gained ideas for research questions or dissertation topics. Attendees also noted that the workshops helped to build their professional networks of researchers interested in similar topics.

*It introduced me to a new area of research* (workshop 2 participant)

*I have a better understanding of technical work being done* (workshop 6 participant)

Finally, workshop 5 (Industry and academic research: Are they different beasts?) provided a glimpse into the professional practice of researchers. Attendees also noted that they gained awareness of the differences between research in academe and industry.

*Gave me an insight into a researcher’s life* (workshop 5 participant)

4.8 Recommendations: Continued opportunities for interaction, summaries of key points, and presentation of background material for difficult computing concepts
Attendees recommend that workshop facilitators shorten the length of individual presentations to allow more time for interaction among colleagues. Several workshops incorporated group activities and interactive discussions and attendees found these so valuable, they felt that workshop facilitators could allow even more time for collegial discussions. Attendees also felt that, while the workshops were informative, workshop facilitators sometimes provided too much detail. Focusing on a few key points and summarizing main ideas will help reinforce the “take-home” message for participants. In particular, some attendees in workshop #2 desired preliminary material or more background information to explain difficult computing concepts to the audience.

4.9 Using online resources to expand workshop dissemination

CAHSI workshop participants had several ideas for online dissemination of the workshops. They most often recommended that video clips of presentations and workshop interactions be made available on the CAHSI website or on YouTube. Participants also recommended that PowerPoint slides and workshop hand-outs be posted online.

4.10 Conclusions

Overall, the CAHSI professional development workshops provided young scholars, at the undergraduate, graduate, and junior faculty levels, valuable insight into the professional practice of computer scientists. Participants gained knowledge and awareness of career and educational opportunities. The majority of participants also found the workshops to be relevant to their career interests and goals. Workshop interactions also enhanced attendees’ professional networks and helped them to establish beneficial relationships with colleagues.

5 Building the CAHSI Community: Actions of Students Following the Conference

5.1 Communication with CAHSI Members

Students who responded to the CAHSI meeting survey were most likely to contact other students following their participation at the January 2009 meetings (52%, 26 students). To a lesser degree, students made contact with faculty (27%, 13 students) and industry professionals (22%, 11 students). Additionally, 11 students volunteered to become CAHSI advocates at their schools.
5.2 Student Professional Development

Over one third of students continued learning about computing following the conference; 19 of the student respondents said they searched for additional research articles or materials written by CAHSI speakers (38%), and nearly all had also read those materials (36%, 18 students).

5.3 Advancement in Computing Professions

5.3.1 Academic advancement

CAHSI students are advancing their academic careers following participation in the January meetings across the academic computing pipeline. Students near the beginning of the career path applied for scholarships (26%, 13 students), inquired about graduate school opportunities (46%, 23 students), and submitted application for graduate school (12%, 6 students). Also, advanced students sought academic positions following their time with CAHSI (14%, 7). Percentages are reported in comparison to all student respondents, though it is important to note that none of the students would be in a position to complete all listed activities.
5.3.2 Industry Advancement

Over one third of students who responded to the survey have since searched for corporate careers following the CAHSI meetings based on information received at the conference (34%, 17 students). Also based on information from CAHSI, students applied for industrial professionals (20%, 10 students).

Figure 5: Students’ Reported Activities Following CAHSI Event—Academic Advancement

Figure 6: Students’ Reported Activities Following CAHSI Event—Industry Advancement
6 Building the CAHSI Community: Actions of Faculty/Professionals Following the Conference

6.1 Extended Participation in CAHSI

Computing professionals were asked to describe the activities in which they had engaged in extending participation with CAHSI the month following the January CAHSI meeting. According to participants, most of this activity occurred at home institutions—58% of responding faculty and industry professionals stated they contacted peers about CAHSI interventions described at the meeting. A slightly smaller percentage of computing professionals contacted faculty at CAHSI institutions (39%). In both cases, one fifth of respondents indicated this item was “not applicable”, because they were not affiliated with a university or were already involved at CAHSI institutions. Nine individuals (29%) volunteered to become a CAHSI advocate at their institutions.

CAHSI intends to develop formal and informal networks of computing professionals, particularly for Hispanics in the field. Following the January event, two-thirds of the professionals responding to this survey stated they had made contact with a faculty member they first met at the CAHSI meetings (69%, 23 professionals). A smaller proportion contacted an industry representative following participation in CAHSI (46%, 15 professionals).
6.2 Professional Development

CAHSI aims to promote the development and refinement of professional knowledge in the computing fields, during and beyond participants’ time at the annual meeting. Many computing professionals who attended CAHSI later continued to learn more about speakers’ computational areas of expertise by searching for (46%, 15 professionals) and reading (58%, 19 professionals) research articles and materials written by CAHSI presenters. This seeming discrepancy between searching and reading materials may have occurred because faculty asked presenters directly for reading materials, rather than having the need to search for the materials from internet or library sources.

6.3 Facilitation of Student Advancement
To a smaller degree, professionals facilitated student advancement following the January CAHSI meeting. Industry and academic professionals contacted students less often than they did other professionals, though nearly one third of survey respondents (31%, 10 professionals) mentioned contacting students for research opportunities, and nearly half contacted a student regarding more general matters (44%, 14 professionals).

![PROFESSIONALS FACILITATE STUDENT ADVANCEMENT](image)

Figure 10: Professionals’ Reported Activities Following CAHSI Event—Facilitation of Student Development

### 7 Discussion

The purpose of this report is to describe the experiences of students, faculty, and computing professionals who attended the February 2009 CAHSI Annual Conference held at the Google headquarters. The majority of participants plan to attend next year. Students, faculty, and computing professionals extended the life of the conference by making use of contacts they made at the CAHSI meeting, applying for scholarships, and continuing their learning their further literature research. Evaluation instruments describe a robust conference schedule that aided in student and faculty professional development and enhanced social networks for participants.