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women &

INFORMATION  
TECHNOLOGY

# ROADSHOW-IN-A-BOX:

## Capitalizing on Models for Outreach



*Roadshow-in-a-Box* is a complete set of resources developed for colleges and universities wanting to establish or enhance their roadshow outreach programs. It draws on the wisdom and practices of a variety of successful roadshow programs that focus on recruiting for diversity and put trained student presenters in a leading role. The Box includes program advice, templates, and sample materials to aid your efforts in every aspect of a sustainable roadshow program. Components include: Controlled Message, Support, Ongoing School Partnerships, Trained Student Presenters, Program Activities, and Evaluation and Tracking.



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## ENCOURAGING GIRLS TO VIEW COMPUTING AS A COMPELLING SUBJECT OR CAREER PATH



In a recent study<sup>1</sup> of 3,500 middle school girls, only 1.2% listed computer-related jobs as a career aspiration. This reality more likely speaks to young women's lack of awareness than a genuine dislike. It makes sense to introduce computing in a compelling way so girls understand core concepts, the integral role of technology in modern society, and career opportunities.

## AT-A-GLANCE

### ROADSHOWS — AN ELEMENT OF THE CHANGE PROCESS

A roadshow outreach program is an inclusive, activity-based classroom experience that gives K-12 students an exciting introduction to computing. Many college and university computer science departments are “taking the show on the road” to inform and recruit youth with roadshows. Undergraduate students, “near peers” to their intended audience, train to present lively, personalized, hands-on — and most importantly — *memorable* learning experiences that students remember as they start imagining their future.

### ROADSHOW-IN-A-BOX: CAPITALIZING ON MODELS FOR OUTREACH

*Roadshow-in-a-Box* is a complete set of resources developed for university and college faculty, staff members, or advisors who want to develop or enhance their own roadshow outreach programs. *Roadshow-in-a-Box* draws on the wisdom and practices of a variety of university roadshow programs that share a focus on recruiting for diversity.

### IMAGINE THE POSSIBILITIES

Many adults recall an experience in youth that set them on their career path. *Roadshow-in-a-Box* provides the resources you need to design a memorable and motivating program.

<sup>1</sup> Barker, L. J., Snow, E. S., Garvin-Doxas, K. & Weston, T. (2006). Recruiting middle school girls into information technology: Data on girls' perceptions and experiences from a mixed demographic group. In McGrath Cohoon, J. and W. Aspray (Eds.) *Women and information technology: Research on under-representation*. Cambridge, MA: MIT Press, 115-136.

## WHAT'S IN THIS BOX?

*Roadshow-in-a-Box* comprises six components that can be used in any order. Look for advice, templates, and sample materials to aid your efforts in each component.



### Controlled Message

- » Research behind recruiting young women and key messages to infuse into roadshow presentations and activities.

### Support

- » Advice for gaining institutional support, leveraging existing efforts, and getting funded.
- » Presents examples of programs of different scope and their associated program costs.

### Ongoing School Partnerships

- » Advice on selecting, engaging target audiences.
- » Recommends how to shape the message accordingly.
- » Presents advice for making contact, planning events, and sustaining relationships.

### Trained Student Presenters

- » Guidance for building effective student teams.
- » An associated *Training Guide* prepares student presenters for a variety of classroom contexts.

### Program Activities

Roadshows often have two parts: A slide presentation for introducing computing and then a hands-on activity to anchor the learning.

- » Model slideshow presentations and interactive learning experiences are presented to help staff and student presenters design an effective program.
- » An associated *Program Activities Guide* provides six activities.

### Evaluation and Tracking

- » Advice and supporting tools for evaluating the program in order to improve it and show presenters, the school, potential donors, and peers the kind of impact the outreach program is having.

## GETTING STARTED

Visit [www.ncwit.org/roadshow](http://www.ncwit.org/roadshow) to download components for a custom “roadshow” program.

# INTRODUCING “ROADSHOW” OUTREACH — AN ELEMENT OF THE CHANGE PROCESS

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Current enrollment in U.S. colleges and universities is on the rise, yet undergraduate enrollment in many departments of computer science, software engineering, computer engineering, and other computing-related studies continues to decline. What’s more, fewer than 10% of undergraduate computing students nationally are women. Institutions of all kinds are “taking the show on the road” to inform K-12 students about the high demand and influential career opportunities in computing. A “roadshow” program can be a low-cost, low-risk start to increasing enrollment and diversity in computing.

A roadshow involves visiting local schools to introduce students and teachers to computing with a compelling, engaging, and accurate presentation. Roadshows can reach both youth and the adults who influence their decisions. To many young people (and their teachers), computer science is a mystifying field with little-known topics; many equate computing to programming. In addition, many people believe that only certain types of people are suited to major in computing. Roadshows help to correct misconceptions with information about the work of computing professionals, the pathways to computing careers, and the prospects for jobs.

When interested adults — especially “near peers” — present new possibilities, they plant seeds that grow when students begin contemplating their future. *Roadshow-in-a-Box* provides everything you need to know to create an undergraduate-led roadshow program. It is also possible to use the wisdom compiled here to inform presenters from many different

groups, including graduate students, staff, or faculty. In addition to reaching students, roadshow programs can be presented to parents (e.g., PTA meetings), counselors, and other groups.

Recruitment through roadshows is unlikely to solve single-handedly the problem of underrepresentation of women and minorities in computing. Multiple complex and interacting factors influence student enrollment and retention. Before launching any initiative to increase diversity in computer science, it helps to assess the conditions under which change is most likely to take hold. We recommend institutions take a broad view of the change process, and before using *Roadshow-in-a-Box*, consider the many factors that influence women’s representation in computing. To focus your attention, please refer to the following NCWIT-produced resources:

- » *How Can You Re-Engineer Your Undergraduate Program to Increase Women’s Representation in Computing? Small Steps Toward Systemic Change,*  
[www.ncwit.org/reengineerundergrad](http://www.ncwit.org/reengineerundergrad)
- » *Strategic Planning for Recruiting Women into Undergraduate Computing: High Yield in the Short Term,*  
[www.ncwit.org/recruitingworkbook](http://www.ncwit.org/recruitingworkbook)
- » *Strategic Planning for Retaining Women in Undergraduate Computing,*  
[www.ncwit.org/retainingworkbook](http://www.ncwit.org/retainingworkbook)

### ABOUT *ROADSHOW-IN-A-BOX*

*Roadshow-in-a-Box* draws on the wisdom and practices from a variety of university roadshow programs. These programs share a focus on recruiting for diversity and a reliance on undergraduate students as presenters. Throughout the Box you will find advice and program details from University of Illinois at Champaign-Urbana; Indiana University; The University of Texas at Austin; Carnegie Mellon University; Purdue University; Cornell University; Rice University; University of Colorado at Boulder; Rose-Hulman Institute of Technology; University of North Carolina at Charlotte; University of California, Irvine; University of Alabama at Birmingham; and Texas A&M University.

In May 2008 the Computer Science Teachers Association (CSTA) and the ACM Special Interest Group on Computer Science Education (SIGCSE) brought together experienced roadshow program representatives to examine and share practices and to learn from Professor Lecia Barker, Senior Research Scientist for NCWIT, about the research underlying recruitment of girls into computing. The proceedings from that meeting also inform the contents of this Box.

The Colorado Coalition for Gender and Information Technology (CCGIT) developed and field-tested materials for training students to deliver roadshow programs. The CCGIT's materials are incorporated into the *Training Guide*, as referenced in the *Trained Student Presenters* component of this Box.

NCWIT thanks the contributing institutions for their advice, and CSTA, SIGCSE, and CCGIT for their partnership in this project.

### NOTES:

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## USING *ROADSHOW-IN-A-BOX*

*Roadshow-in-a-Box* has six components that can be used singularly or in any order. Look to each for advice, templates, and sample materials that support your efforts and select accordingly.

Here are the six components and how they can be used.

### CONTROLLED MESSAGE

Read the research behind recruiting young women to understand key messages you will want to express through roadshow presentations and activities.

### SUPPORT

Read advice on gaining institutional support, leveraging existing efforts, and getting funded. Learn about programs of different scope and their associated program costs.

### ONGOING SCHOOL PARTNERSHIPS

Use advice to help you decide which audiences to target and how to shape your message accordingly. Read about making contact, planning events, and sustaining your relationship.

### TRAINED STUDENT PRESENTERS

Learn how to build an effective student team. Use the associated *Training Guide* to prepare student presenters for a variety of classroom contexts.

### PROGRAM ACTIVITIES

We recommend roadshows have two parts: A slide presentation for introducing computing and then a hands-on activity to anchor the learning. Refer to downloadable model slideshow presentations and interactive learning experiences in the associated *Program Activities Guide* as you and student presenters design your program.

### EVALUATION AND TRACKING

Read how to evaluate your program in order to improve it and to show yourself, presenters, your school, potential donors, and peers the kind of impact your outreach program is having.



# CONTROLLED MESSAGE

Just as advertisers use different messages — and different media — with different target audiences, you should think carefully about the messages that are likely to inform and motivate your audiences. In the case of roadshows, your primary audience is K-12 grade students, but within that larger category are groups of students of different ages, learning backgrounds, and life experiences. Did you know that middle-school girls tend to have different career goals than high-school girls? Your secondary audience is the “influencers,” the parents, teachers, and guidance counselors who help students shape their goals and actions. Not all parents are alike, nor do parents, teachers or guidance counselors have the identical goals for or obligations toward students. Consider these realities as you craft your messages.

## WHICH MESSAGES DO ALL AUDIENCES NEED TO HEAR?

Parents, advisors, teachers, financial aid officers, and career services professionals are all unlikely to recommend career trajectories where there are no jobs. Young people, too, hope to earn a decent living — but often not at the expense of happiness. Tell them:

- » **There are good jobs in computing.** The U.S. Bureau of Labor Statistics continues to predict computing jobs as some of the fastest growing and highest paying, despite continued off-shoring of certain types of jobs.
- » **Computing jobs are socially relevant.** Computing today is a component in solving many of the world’s problems.

- » **Computing professionals work in many fields, many industries.** The expertise that comes with academic study in computing is applicable in a wide variety of domains. Computing professionals work in every industry — health, education, business, transportation, etc. In addition, even though individual careers may change track, computing skills will allow students to adapt and still have time for family and friends.
- » **Computing is social and collaborative.** Contrary to stereotype, computing work involves interacting with others and collaborating to accomplish team goals.

## KEY INFORMATION ABOUT GIRLS AND COMPUTING

Understanding key information about girls and computing will help you plan your program, craft an effective message, and design activities that teach and motivate. While girls’ interests and career aspirations are very likely to change as they grow older, aligning your story about the interesting aspects of computing with the existing interests of girls will be the best way to get their attention.

*Please note: Most roadshow audiences are likely made up of boys and girls. The intention here is not to ignore boys' interests, but to ensure your message is especially inclusive of girls. Despite what people hear, very few attitudinal differences between men and women have been supported persistently across 60 years of research. This is not to say there aren't differences during different eras, just that these are learned, rather than innate differences.<sup>2</sup> All the materials of Roadshow-in-a-Box are useful when working with both genders.*

### RESEARCH UNDERLYING RECRUITMENT OF GIRLS INTO COMPUTING

At a meeting of the Computer Science Teachers Association (CSTA) and the ACM Special Interest Group on Computer Science Education (SIGCSE), experienced roadshow program representatives got together to examine roadshow practices and to learn from Professor Lecia Barker, Senior Research Scientist for NCWIT. Dr. Barker presented research underlying recruitment of girls into computing. Her research is summarized on the following pages, as key information and accompanying implications for outreach. A video of her talk can be viewed on the CSTA website at [www.csta.acm.org/Communications/sub/Videos.html](http://www.csta.acm.org/Communications/sub/Videos.html).

### NOTES:

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<sup>2</sup> Fox, M. F. (2008, May). Presentation at the meeting of the NCWIT Social Science Advisory Board.



## KEY INFO

1

***Girls' career interests change as they mature and their interests rarely include computing***

What are the career interests of middle- and high-school girls?

In a recent study<sup>3</sup> of 3,500 middle school girls only 1.2% listed computer-related jobs as a career aspiration.

These interests ranked highest:

- 1 Veterinarian/Work with Animals
- 2 Doctor
- 3 Don't Know
- 4 Engineer (Note: Girls had just completed a four-hour event intended to influence girls to pursue STEM careers. The presentation did not call attention to computer or software engineering in particular.)
- 5 Performance Artist

When college-bound girls taking the SAT in 2006<sup>4</sup> reported their intentions for selecting a college major, only 1% listed computer or information sciences as an intended major. These majors ranked highest:

- 1 Health and Allied Services
- 2 Social Sciences and History
- 3 Business and Commerce
- 4 Education
- 5 Visual or Performing Arts

## IMPLICATION

1

***Implication for outreach: Raise consciousness***

These and other studies' results more likely speak to young women's lack of awareness of computing than a genuine dislike; therefore "consciousness raising" is in order. Further, since girls do have a sense of what they want to do later in life, it makes sense to introduce computing as a promising way to accomplish these goals.

Taking several of the top-ranked careers, essential contributions through computing might be introduced as follows:

- ✂ Veterinarian – diagnostic imaging, technologies for tracking lost pets
- ✂ Medicine – mapping the human genome, nanosurgery, health informatics
- ✂ Engineer – virtual stress-testing of hurricane-proof structures, modeling and computer simulation
- ✂ Visual and Performing Arts – intelligent theater environments, multimedia set design, stage control, animation

When selecting or designing roadshow activities, keep in mind the interests of girls. Embed computational concepts in activities relevant to topics girls care about, and imagine "hooks" that make the activities especially memorable to girls.

<sup>3</sup> Barker, L. J., Snow, E. S., Garvin-Doxas, K. & Weston, T. (2006). Recruiting middle school girls into information technology: Data on girls' perceptions and experiences from a mixed demographic group. In McGrath Cohoon, J. and W. Aspray (Eds.) *Women and information technology: Research on under-representation*. Cambridge, MA: MIT Press, 115-136.

<sup>4</sup> Data provided directly from College Board to NCWIT, 2006

## KEY INFO

2

***Girls respond to encouragement***

Female students are drawn to computer science for many of the same reasons as their male counterparts,<sup>5</sup> yet one significant difference exists. In one study of enrollment in the sciences, the personal influence of family, high school teachers, and other significant adults was a much more prevalent explanation for women's choice of a science major than it was for men's choice of a science major. In general, White and Hispanic women, more than men, are socialized to perform for the approval of others; their confidence is bolstered by encouragement from parents, teachers, and "near peers."

## IMPLICATION

2

***Implication for outreach: Inform girls' influencers and recognize competence***

This finding implies that any outreach effort to girls will be more effective if parents, teachers, and other important adults are also encouraged to believe that computing is a promising career path for young women. Influencers should be informed about career possibilities and encouraged to inform girls about pathways to the careers, including the courses they should take in high school. Influencers need to know: Girls can do this. Your encouragement has a significant impact on the decisions they make. The NCWIT Talking Points Card *Why Should Young Women Consider a Career in Information Technology?* is a resource for parents and other influencers that makes these points in a compelling way. Provide copies for teachers and school counselors, and send copies home for students to share with their parents. See [www.ncwit.org/youngwomen](http://www.ncwit.org/youngwomen).

It is important that girls understand that they are capable of entering a computing pathway. Having young women presenters describe their personal paths into computing demystifies the field, broadens girls' perception of who "belongs," and leaves them with a positive impression, i.e., "This is something I can do." For example, half of all AP Calculus test takers are girls and half of all math majors are women. Making girls aware that computing is a way to use their mathematics knowledge and skills can be an effective message.

<sup>5</sup> Tillberg, H. K., & Cohoon, J. M. (2005). Attracting Women to the CS Major. *Frontiers: A Journal of Women Studies*, 26 (1), 126-140.

## KEY INFO

3

***Computing is a growth field with high salaries***

The U.S. Department of Labor predicts that IT jobs will be among the fastest-growing and highest-paying over the next decade,<sup>6</sup> yet parents, teachers, career counselors, and other influencers may think there are no jobs in the computing sector. (Though they are right that some technical jobs have been outsourced, girls and their influencers need to know the most important and innovative jobs remain stateside.)

In addition, jobs attained with a computing degree enjoy some of the highest entry-level salaries, with only a four-year degree. Shorter time to degree is likely to matter more to parents with limited funds for college.

## IMPLICATION

3

***Implication for outreach: Describe job and salary prospects and time to degree***

Girls and their influencers should be made aware that computing is a well-paid profession requiring a four-year degree. Contrast this with the debt that can be accrued with a law or medical degree. Present comparative salary data to illustrate the relative “value” of a computing degree. Mentioned before, the NCWIT Talking Points Card *Why Should Young Women Consider a Career in Information Technology?* provides useful information, [www.ncwit.org/tp](http://www.ncwit.org/tp).

## KEY INFO

4

***Work style factors matter to young women***

Elizabeth Creamer and colleagues at Virginia Tech found teamwork and flexibility to be important message components for young women.<sup>7</sup> In a survey of work task time allocation,<sup>8</sup> software engineers reported that an average of three hours of an eight-hour workday involved collaboration, teamwork, and communication. Many IT careers offer flexible hours or telecommuting, making it easier to blend career and family.

## IMPLICATION

4

***Implications for outreach: Describe collaborative, flexible careers that make a difference***

Show how work in IT matches women’s preferred work styles. Let girls know computing offers more flexibility than many careers and is therefore more compatible with life with a family.

<sup>6</sup> Bureau of Labor Statistics, Occupational employment projections to 2016. *Monthly Labor Review*. 130(11).

<sup>7</sup> Meszaros, P. S., Creamer, E., & Lee, S. (2009). Understanding the role of parental support for IT career decision making using the theory of self-authorship. *International Journal of Consumer Studies*, 33(4), 392-395.

<sup>8</sup> Williams, L. (2006). Debunking the nerd stereotype with pair programming. *Computer*, 39(5), 83-85.

## KEY INFO

5

***The career path is not understood by young people***

Girls infrequently identify computing as an aspiration so it follows that they are likely unaware of the immediate and longer-term steps one takes to a computing career.

## IMPLICATION

5

***Implication for outreach: Describe middle- and high-school courses, sources of information***

The target audience needs to know both what to do (for instance, continue taking mathematics in middle school; achieve certain test scores and pursue computing-related courses in high school) and from whom to seek guidance (academic and career counselors, computer science teacher, “near peer” mentor such as a university computer science major).

## KEY INFO

6

***“Mythbusting” can backfire***

Some outreach programs attempt to dispel myths about computing, such as the stereotypical image of the solitary programmer or the nerdy computer “geek.” While older adults may have these preconceptions, young people may be introduced to them for the first time by the very people who wish to dispel them (e.g., roadshow presenters).

## IMPLICATION

6

***Implication for outreach: Present an accurate image***

It’s better to move straight into strong, appealing images of computing professionals. Focus on presenting positive role models engaged in interesting, meaningful, and collaborative work.

## KEY INFO

7

***Dilemma: Whether to talk about the small number of women in computing***

Talking about women’s underrepresentation in computing may scare girls off. Yet it would be obviously unethical to not talk about it, especially if asked.

## IMPLICATION

7

***Implication for outreach: Liken women in computing to pioneers in other fields***

Talk about how this field is one of many others that historically have had few women, and how fields do change as women pioneers take on greater roles in them. Compare computing professionals to doctors, lawyers, and astronauts, career fields where women have made great inroads. Talk about what a loss it is for girls who could be interested and for the field when they do not enter.

## SUPPORT

As with other aspects of your schools' recruitment and retention plan, roadshows require a systematic approach. Activities associated with establishing a roadshow program are described here in detail.

### SECURE INSTITUTIONAL SUPPORT

The initiative that leads to the creation of a roadshow program can come from a variety of sources. If it comes from a dean or department chair, institutional support is probably forthcoming. If, and more likely, the initiative for outreach comes from one or two members of a department who are concerned about declining enrollment or diversity, it's likely they will need to campaign for support. By support we mean not only funding but also a commitment to the effort by people with power. Leaders committed to broadening diversity will:

- » Include outreach as one element of a coordinated effort to recruit and retain diverse types of students
- » Support outreach over time, recognizing that one-shot programs do little good
- » Make outreach a priority among competing initiatives
- » Connect those coordinating outreach with resources they need
- » Back the effort by supporting grant applications, signing letters to schools, and making introductions to potential funders

- » Talk about the issues with authority, persuading others inside and outside the department that diversity matters
- » Speak of the initiatives of the department with the dean, provost, and president, as well as with peers at other institutions
- » Ensure that diversity efforts aren't ghettoized, with only women and minorities doing all the diversity work
- » Make outreach work count for tenure and promotion reviews
- » Receive and respond to program evaluation
- » Secure funding (more below on internal and external funding)

In order to garner this kind of support, it may be necessary to educate leaders on topics they have little time to think about, such as emerging views on the value of diversity of thought and a new look at who does computing. A *Sample Letter to Department Leaders* at the end of this section addresses key issues. NCWIT-produced *By the Numbers: Statistics About Women & IT*, [www.ncwit.org/bythenumbers](http://www.ncwit.org/bythenumbers), and research-based Promising Practices, [www.ncwit.org/practices](http://www.ncwit.org/practices), supply helpful information as well.



When you speak to a department chair or dean on the topic of recruiting, be sure to drive home this compelling idea: Recruiting from a more diverse pool of students is a strategic way to boost enrollment. Successful recruitment and retention of students from previously underrepresented groups can go a long way toward resolving the problem of declining enrollment.

Consider drafting a one-page program description and make sure your goals are clearly stated. Share this with department leaders, potential funders, and other key people. The content will be useful for future press releases, newsletters, and other communications.

### LEVERAGE ASSETS

Combine your roadshow program with existing recruitment efforts in the department and the institution. If students learn about computing through a roadshow at their school, then visit the department on a field trip, and then meet you again at a college fair, they will more likely enroll.

Take advantage of institution-wide recruitment and diversity programs. These can be a source of funding and you can use their networks to connect with target schools.

Combine forces with other departments that do outreach. A caution here: Make the computing outreach program distinct from a partner program. One outreach coordinator recalls high-school contact people saying, “But you were just here last week!” She confused the computer science program with that of the engineering department, and students likely shared her confusion.

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<sup>9</sup> Adams, E. (2008, October). *Survey of K-12 Computer Science Outreach Efforts*. Poster session presented at the 24th Annual Consortium for Computing Sciences in Colleges Eastern Conference, Frederick, MD.

### GET FUNDING, DEVELOP A BUDGET

What does roadshow outreach cost? Expenses can vary widely depending on the scope of the program. A startup program involving one faculty member who dedicates volunteer or service hours paired with several students presenting one or two times can cost virtually nothing. Established programs, such as that at Carnegie Mellon University, started this way. Over time the CMU program took off and expanded into today’s program which draws on a talent pool of up to fifty university students and delivers five to ten roadshow programs each semester. Look for funding descriptions of two programs in this section, one a startup program and the other a mature program.

#### FUNDING

Roadshows may require funds for staffing, stipends or incentives for students, food at meetings, printing, postage and office supplies, and transportation. Among fifty institutions queried, funds typically come from a mix of internal and external sources.<sup>9</sup>

At a recent meeting, CSTA and SIGCSE members contributed ideas for leveraging assets and securing internal and external funding. Here is their advice:

It may not be reasonable to wait for funding before you begin. Starting “under the radar” at this informal stage might be a great opportunity to establish key program elements, such as relationships with schools and effective recruitment and training of student presenters. As you share your on-a-shoestring-successes, help leaders imagine what you could accomplish with proper funding. Then, when your program is ready to grow, you can use the following advice from roadshow experts on ways to secure funding.

### Internal funding

- » Alumni frequently give money directly to the department. Look into those accounts and learn what they can be used for.
- » Seek support from the university or college foundation.
- » Speak repeatedly of the need for diversity. The first time a dean or department head hears it from you, it may not sink in. With a cogent argument it is bound to, eventually. Persist until funding arrives.
- » A recruiting office, office of diversity, or office of women's affairs may supply startup funds. This is a good place to begin.
- » Contact advisory boards.
- » Look for others doing outreach in your college or university. Collaborate and share funds.
- » Piggy-back on another program for a year; then ask for your own funding.
- » Within the department or school, don't just look for money; look for used goods and things you can borrow such as laptops, projectors, and audience response "clicker" systems.
- » Watch for every funding opportunity and don't limit your scope to just diversity, outreach, and computer science. Spin your proposal to show how your program fits the funding requirements. For example, show how the program develops participants' interpersonal and presentation skills or helps them fulfill communityservice requirements.

- » Get corporate funds to cover expenses for a year. Prove yourself and show the program is worth funding.
- » Seek a small grant from an external source and ask your department to match it.

### External funding – Sponsors and Grants

Outreach staff at Cornell University note that both local and global businesses want to develop positive identities with potential future applicants and are willing to make financial gifts or at least supply branded giveaways in order to elevate the businesses' presence. Be sure to understand any rules your college's/university's foundation has for seeking financial gifts independently.

Many roadshow programs get significant support from sponsoring institutions. As you identify them, build an asset bank of potential funders. Here are different ways roadshow programs have secured support:

- » Meet corporate funders at educator technology conferences such as Illinois ICE and ISTE NECC. Visit booths and attend vendor-hosted events.
- » Visit technology companies in the vicinity of your institution. Attend community presentations they sponsor, and meet alumni at their work. Parlay the connections you make into introductions to top management and community affairs personnel.

### External funding – Sponsors and Grants — (continued)

- » Foster relationships with alumni. Alumni may contribute to outreach efforts directly, or connect you to people and organizations that will. The Alma Mater likely taps them for donations, but your advantage is that your program addresses issues directly related to their professional interests.
- » Examine internship programs that place students in work and look for natural connections for supporting outreach.
- » Connect with Syssters. Syssters is a discussion forum for women involved in the technical aspects of computing. The list has over 3,000 members in more than fifty countries. This network is woman-to-woman, so approval is needed to confirm that a woman participating is involved in computing.
- » Let a corporation brand your program for money.
- » Even if they do not fund you, a company may supply an employee who can give a talk. This is valuable to your program and maintains the company's relationship with you.
- » Again, if funding is not possible, a company may supply giveaways you can use during outreach.
- » Look beyond technical companies to other business sectors. Large retail, banking, and communications firms (among others) employ large IT workforces and support innovation in computing and IT.

Once you secure funding, keep givers informed. Send a follow-up thank you with photos of participants enjoying the program. Invite key individuals to visit and even participate in the roadshow program. When your impact data is available, describe the positive program outcomes and thank supporters for contributing to your success.

### Grant Funds

Participants in a SIGCSE meeting on roadshow programs recommended these methods for securing grants:

- » Tie the roadshow program into a more comprehensive initiative that can receive NSF or other broadening diversity grants.
- » Join a coalition to seek larger grants. The STARS Alliance (Students and Technology in Academia, Research and Service), a network of 18 colleges and universities, received a \$2 million NSF Broadening Participation in Computing grant to recruit a diverse group of students to earn college degrees in IT, computer science, and other computing fields. The Chic Tech program, part of the “Building Communities” initiative at University of Illinois, Urbana-Champaign, received a \$1 million NSF grant for scaling ChicTech to span six partner schools in Illinois.
- » Partner with another college/university that is different than your own (size, population, community connections, funding, research opportunities, etc.) and apply for a grant together to give your audience a broader view of educational experiences in computing.

### Grant Funds (continued)

- » Seek state funds geared toward STEM or economic development. The University of Texas at Austin wrote a grant and received funding from the Texas Engineering and Technical Consortium and the Texas Workforce Commission.

Here are several grant opportunities that might be right sized for roadshow startups:

- » Anita Borg Pass-It-On Grants: [www.anitaborg.org/initiatives/systers/pass-it-on-grants-program](http://www.anitaborg.org/initiatives/systers/pass-it-on-grants-program)
- » Google RISE (Roots in Science and Engineering) Awards: [www.google.com/corporate/diversity/rise/index.html](http://www.google.com/corporate/diversity/rise/index.html)
- » The NCWIT Academic Alliance Seed Fund: This awards members of NCWIT's Academic Alliance with startup funds (up to \$15,000 per project) to develop and implement initiatives for recruiting and retaining women in computing and information technology. [www.ncwit.org/work.awards.seed.html](http://www.ncwit.org/work.awards.seed.html)
- » Motorola Innovation Generation Grants (Arizona, California, Florida, Illinois, Massachusetts, New York, Pennsylvania and Texas only): [www.motorola.com/content.jsp?globalObjectId=8153](http://www.motorola.com/content.jsp?globalObjectId=8153)

### BUDGET

Program expenses vary depending on the maturity and scale of the program. Among fifteen programs surveyed, most had minimal or no funding and relied on staff and student volunteers. Other programs started this way and then grew over time with funding from the department, grants, or gifts.

Following are descriptions of programs at two institutions that exemplify these stages.

#### Beyond Computing, University of Colorado at Boulder

Three computer science professors on the Diversity Task Force at the University of Colorado at Boulder started *Beyond Computing* in 2006 relying solely on faculty and student volunteers. Until recently, student teams made three or four presentations a year and two professors managed scheduling and coordination, drove students to schools, and treated them to meals and snacks.

In 2009, *Beyond Computing* is poised for growth. By coordinating efforts with the undergraduate recruiter for the School of Engineering they have formed new K-12 school relationships. When the computer science department launched a research project focused on helping K-12 teachers integrate computing concepts into non-computer science classes, this allied effort yielded new student presenters, interactive materials, and even more K-12 school connections. The program recently received a share of an Avon Hello Tomorrow grant and began paying small stipends to student presenters.

**Just Be, Indiana University**

Just Be at Indiana University is an established program that makes ten short trips and two long ones each semester. Below is their annual budget.

Expense Category	Price	Qty	Total	Description
Presenter stipends	\$30.00	20	\$600.00	10 short trips, 2 presenters per trip
Presenter stipends	\$50.00	6	\$300.00	2 long trips, 3 presenters per trip
Phone card	\$20.00	1	\$20.00	for emergencies
Recruitment/Super Practice (1/sem)	\$75.00	2	\$150.00	food for 10-12 people
Training (2/sem)	\$20.00	4	\$80.00	food for 5-8 people
Printing	\$3.00	200	\$600.00	for promotional items
Car rental	\$50.00	12	\$600.00	
Lunch	\$10.00	26	\$260.00	
Coordinator	\$100.00	30 weeks	\$3,000.00	
Manager	\$40.00	30 weeks	\$1,200.00	
<b>TOTAL</b>			<b>\$6,810.00</b>	

Budget Notes: *Just Be* operates on funds provided through a diversity initiative in the School of Informatics at Indiana University. Program staff members are exploring other funding opportunities with Indiana corporations. The *Just Be* Outreach Coordinator is funded through the computer science department. Student honoraria are posted to student bursar accounts in the form of an award. (This avoids the paperwork involved in hiring students as employees and the amount is not taxed as income.) Their printing budget goes toward copying *Just Be* brochures and bookmarks.

*Just Be* receives donated giveaway items such as flashing pins, t-shirts and pens from Google, Microsoft, and Intel. An audience response “clicker” system was loaned and later donated to the program. One computer science professor supplied a retired laptop computer for *Just Be* presentations, and another used expiring grant funds to purchase a portable projector for *Just Be*.

Both *Beyond Computing* and *Just Be* exemplify the ingenuity and commitment required to establish a lasting program. There are many institutions at different stages of program development. See the Acknowledgements at the end of this *Box* for a list of schools that do roadshow outreach. The faculty and staff who lead these programs shared advice for this box and can tell you more about their programs.



### SAMPLE LETTER TO DEPARTMENT LEADERS

*Note: Many computer science administrators set goals for increasing gender and racial/ethnic diversity and will be pleased to have help accomplishing their goals. Customize this letter to your specific situation. Instead of sending a letter, you may wish to use the ideas included here as talking points for a phone call or meeting.*

Dear <Administrator Title, Name>:

Faculty of <Department> would like to establish a “roadshow” outreach program to increase participation of women and minorities in our undergraduate program. We are doing this for both selfish reasons and to make a contribution to the nation’s economic well-being. Our department is suffering from low enrollment and a very homogenous student population. <Insert local longitudinal data here>. According to national SAT “intention to major” data, the number of college-bound male and female students planning to major in computer and information sciences has decreased for the past six years and the proportion of women is decreasing at a faster rate than that of men. Nationally, the continued underrepresentation of women in computing, a pervasive, growing, economically essential, and high-paying field, will have costly consequences. It will increase the economic disparity between men and women, increase the shortcomings in development and design, and increase our dependence on a labor force with homogeneous life experiences that ignores the demographic reality of our increasingly diverse population.

In order to increase enrollment and diversity we wish to design an outreach program that appeals to underrepresented students. Successful recruitment and retention of students from previously underrepresented groups can go a long way toward resolving the problem of declining enrollment.

We have helpful resources to guide the work, including *Roadshow-in-a-Box* from NCWIT, the National Center for Women & Information Technology. We imagine an outreach program can become one element of a larger diversity effort that includes a critical look at inclusive curriculum, pedagogy, student support mechanisms, and social climate.

We ask for your support to move forward with a roadshow outreach program, and request a meeting to discuss our options more fully.

Sincerely,

<Name(s)>

# ONGOING SCHOOL PARTNERSHIPS

## PREPARE YOUR MESSAGE, MAKE CONTACT

To which schools should you take a roadshow program? As you begin, “any that will have you!” may be a good enough answer. However, as much as is possible, try to be strategic about reaching the audiences with whom you will have the largest impact. You may be received with enthusiasm at a school that is trying to increase graduation rates and the number of students going to college. Schools where a high number of students go on to college might be a good choice too, but it may make more sense to meet this same population during their middle- school years, when there are fewer programs competing for their attention. Some roadshow programs focus early efforts on local schools to keep costs down, and when they receive funding they are able to expand their reach to rural and underserved areas.

### Market the program

You needn’t rely on “cold” calls to reach classrooms. Create brochures, mailings, and email “blasts” (approved by the school district of course) to market your program. Be ready for the opportunities through which you meet school representatives face-to-face, such as conferences. Create a flyer, customized bookmark, or business card. These are easy to produce and provide a concise format for basic information. Consider these elements for inclusion in your flyer:

- » Describe your roadshow program.
- » Explain what computer science is.
- » Point out what you can do with a computer science degree.

- » Describe the job outlook.
- » Show course structure with tracks.

Staple a business card to the flyer so individuals have contact information they need to set the wheels in motion.

As soon as you have the resources and time, create a website for your program and add the address to your flyer. Include a brief description of the presentation, some sample slides, pictures of the presenters, and testimonials from teachers who have seen your presentation. Make sure you emphasize that the presentation is free. Include the name of a contact person who can provide more information. Be sure to thank your sponsors.

Here are a variety of websites that advertise outreach programs:

- » ChicTech - University of Illinois at Urbana-Champaign:  
[www.cs.uiuc.edu/outreach](http://www.cs.uiuc.edu/outreach)
- » CSters - Rice University:  
[www.ruf.rice.edu/~csters/outreach.htm](http://www.ruf.rice.edu/~csters/outreach.htm)
- » Just Be - Indiana University-Bloomington:  
[www.cs.indiana.edu/cgi-pub/wic/outreach](http://www.cs.indiana.edu/cgi-pub/wic/outreach)
- » Student Outreach for Computer Science (SOCS) – Purdue University:  
[www.cs.purdue.edu/external\\_relations/k-12\\_outreach](http://www.cs.purdue.edu/external_relations/k-12_outreach)
- » Women@SCS – Carnegie Mellon University:  
<http://women.cs.cmu.edu/What/Outreach>

Your website may not generate K-12 contacts but it is a repository of information that you can refer people to once you have made contact. It is a sign of professionalism and stability. (Include an online form interested parties can use to get started.)

Follow up with phone calls. When kids come to your institution for Saturday computer science club or a field trip, tell them about roadshows and ask them to pass along materials describing the opportunity to their teachers.

### Go where they are

Attending conferences and workshops for school counselors, teachers, and administrators is the single fastest way to make contacts! When Indiana University started *Just Be*, most of their contacts came from presenting to teachers who attended professional development workshops at the university. IU staff also presented at conferences specifically for junior-high and high-school guidance counselors and established contacts with these counselors' schools. Consider submitting a proposal to present a session. Afterward, collect names and contact information from attendees who are interested in your program. Make sure to distribute brochures, contact information, and business cards.

Call or send a follow-up email to any school representative who expresses interest in your program at a conference. Refresh their memory about the program and its value to students. Discuss a potential visit and also give them resources they need to learn more about your program. Direct them to any websites and web forms you use. See *Plan key logistics*, on page 23, for elements to include on your website or with a letter to schools.

### Contact schools directly

Once you identify a promising school, send a letter or call a school administrator and inform them of the program you offer. Recommend that they present the opportunity at a staff meeting or pass your letter along to a teacher leader they know will follow up. Request that they designate a teacher to be your next point of contact, and follow up with a letter or a phone call to that person. A *Sample Letter to Schools* at the end of this section provides talking points that help you communicate the benefits of the program to administrators and teacher leaders.

Computer science or technology teachers are a logical choice, but don't stop there! Contact science, math, and careers teachers as well. A guidance counselor is a key person at the high-school level you might contact. When contacting larger schools, call the chairperson of the math, science, or instructional technology department.

Once you identify a teacher contact, call or write and expect to be patient. Teachers have little prep time and as a middle-school computer science teacher reminds us, "If I'm slow to respond that doesn't mean I'm not interested. I'm just very busy." Acknowledge the limits on their time and keep trying. Here are several ways teachers can be motivated to participate:

- » Look at science, math, and technology standards teachers are required to meet and show how your program addresses these. Beyond computer science standards, many computational science activities relate closely to algebra and science inquiry.

### Contact schools directly (continued)

- » Computing is a logical path for students with an aptitude for science and math. Tell teachers you will help them answer students' age-old question "When are we ever going to use this?"
- » Shine a light on the teacher. Offer to help teachers communicate what this opportunity accomplishes for kids, and publicly thank them for going the extra mile to bring the program to the school. Seek ways they can be acknowledged by parents, administrators, local media, and the school board.
- » Make a human connection. Even when they interact with 150 kids a day, teachers can feel isolated. Meeting another adult who shares an interest in their students' experience can be very gratifying.
- » Offer a program for parents, too. If you present to a PTA, shorten the Roadshow activities part of the presentation and add in useful information for parents.

### More ways to connect

Here are more suggestions for ways to establish initial contact at K-12 schools:

- » Provide an on-line interest form that people who visit your website can fill out to get more information or to schedule a presentation.
- » CSTA: If your school is an institutional member, CSTA can help you promote your program by sending an email blast to a set of targeted teachers in your area. Contact Chris Stephenson, [cstephenson@csta.acm.org](mailto:cstephenson@csta.acm.org), for more information.

- » Admissions Office: Contact your institution's admissions office and let them know what you are doing. They probably send representatives into the local schools and may be able to help get the word out.
- » News media: Contact the media relations people at your school to see if they will compose a press release about your new outreach program. If not, then write your own release and send it to your institutions' student newspaper and your local paper to see if they might be interested in doing a story. If an article does appear, then include a link to the published article on your website.
- » Current students: Find out what high schools your current majors attended and then ask your students to contact teachers who had an impact on them to see if they are interested in scheduling a presentation in their classes.
- » Cold calls: Search the websites of schools in your area. Write to principals, counselors, and department chairs. Keep your letter short and include a link to your project website.
- » Career days: Call schools in your area to ask out about any career days they might be planning. Find out who is organizing the event and volunteer to present.
- » Vocational schools: In many cases secondary-level vocational schools bring in students from across several different school districts so a target student population can be reached in one setting; they may be prime candidates for hosting roadshows.

## PLAN, SCHEDULE THE PROGRAM

After securing an invitation to the school it is time to plan and schedule the program.

### Understand the audience

A one-size-fits-all program doesn't work. Several factors need to be taken into account to develop the right messages and activities, so a thoughtful assessment of audience is in order. Your school host or a guidance counselor can help you understand the context in which your program will be delivered. Learn which student populations you will meet with within the school. Several roadshow programs have created intake forms for receiving teachers to fill out in order to get at critical factors such as audience composition (ages, ratio of boys to girls, relevant social or cultural information), previous experience with technology, and more. See an example from Indiana University's *Just Be* program here: [www.cs.indiana.edu/cgi-pub/wic/outreach/outreach\\_contact.php](http://www.cs.indiana.edu/cgi-pub/wic/outreach/outreach_contact.php).

### Schedule the visit

The program itself should suit the setting and time allocated. Schedule far enough in advance, perhaps a month out, so as to have ample time to select and prepare presenters and refine the program for the local context. One common scenario is to offer one or more (repeated) 50- or 60-minute sessions. If several presentations are scheduled during a one-day visit, plan to send two or three presenters. Scheduling multiple presenters for a long day gives the presenters a chance to create a flow, pick up missing pieces if one of them momentarily forgets an important point, and have a time to rest during the visit.

Consider the presenters' schedules when selecting presentation times and dates. It is helpful to work with a single person at the school who coordinates with other teachers and with the presenters to make sure everyone understands what is happening and when.

### Plan key logistics

Collect key logistical information as you schedule the visit. (Consider creating a form to capture this.) Consider these elements:

- » Contact information: Key contact's name, school, email, phone number, school mailing address
- » Schedule information: Best dates, times, location(s), program duration, whether the program is repeated during the day
- » Audience description: Kinds of groups i.e., math class, 7th and 8th grade mix; all high school, girls only
- » "Day-of" information: Parking, site map, understanding of when, where presenters meet the teacher host, sign in procedures
- » Tech needs: Available technologies (screen, projector, internet access, student computer access), tech support options
- » Introductions to key people: Ask if you might meet the guidance counselors to share information.



## SUSTAIN THE RELATIONSHIP

From the start, imagine each school as a “repeat customer.” Repeated contact pays off, so whether you have a booth at a career day each year or find a regular spot on a teacher’s planning calendar, strive to become a regular part of the school program. If the first experience is a positive one, staff and students will be eager to work with you again. Once in the door, a teacher partner becomes an important ally in motivating other teachers to participate too, either at the same school or through their networks at neighboring schools. Once you find a place on the school’s calendar, foster an expectation that your presentation become a recurring event.

Immediately following an event, contact your teacher partner and ask for critical feedback. (For ideas, see *Formative Evaluation Interview* in the Evaluation and Tracking component of this Box.) The teacher’s assessment of the event and advice for improving the program is invaluable. If possible, maintain the relationship between visits by checking in periodically and relating opportunities for teachers and students.

## NOTES:

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## SAMPLE LETTER TO SCHOOLS

*[Customize this letter to your specific situation.]*

Dear <Principal, Teacher, or School Counselor>:

Students in the <Department> at <Institution> would like to present a program at your school called <Program Name>. This “roadshow” program is designed to motivate youth to imagine careers in computing. We are ready to present one or more <50>-minute sessions of the program to your science, math, or technology classes.

Technical careers in the US will be among the fastest growing over the coming decade, yet participation is dwindling. Also, young women and minority students continue to be sorely underrepresented in technical fields. Together we can turn the tide by helping young people understand that computing is the cornerstone of modern innovation, and that a broad range of individuals — people like them — “do” computing.

Specifically, we believe that the roadshow program will provide the following educational benefits for your students.

- » one
- » two
- » three

The program includes a slide presentation that connects students’ interests to career opportunities, and a fun “programming” activity that teaches the fundamentals of computing. We will discuss local opportunities through which students can develop their interests, ranging from self-directed activities to camps and clubs to two- and four-year post-secondary programs.

We will share all program materials and extension activities with host teachers so they may extend the lessons or share them with colleagues.

Please share this opportunity with your staff. Once interest is established, please appoint one faculty member to serve as the lead for communications and planning.

Thank you for your consideration.

Regards,

<Name>

<Title, Organization>

<Email address>

<Phone number>

<Web site>

# TRAINED STUDENT PRESENTERS

## IDENTIFY STUDENT ROADSHOW PRESENTERS

Social learning theory indicates that “near-peers” influence youth in significant ways. Bandura (1977)<sup>10</sup> suggests “seeing or visualizing people similar to oneself perform successfully typically raises efficacy beliefs in observers that they themselves possess the capabilities to master comparable activities.” When scouting for student presenters, keep in mind the makeup of the student bodies of the schools they will be visiting. Ideal presenters might be “near” to the target audience in several ways: age, ethnicity, gender, interests, and past or present experiences. If possible, select a mix of students, men and women, of varied backgrounds and heritage.

Those who manage or advise roadshow programs make these recommendations for identifying student presenters:

- 1 Instructors are a good resource, especially for the intermediate undergraduate curriculum. They know their students, and are able to identify undergraduates who may be interested.
- 2 Build on existing social contacts. Encourage current presenters to bring their friends to an introductory meeting.
- 3 Appeal to students’ interest in service. Students who understand and appreciate the goals of the program will be motivated to help.
- 4 If service in and of itself is not a draw, offer compensation. Food, money, and credit are three things that motivate all students.

- 5 Get on your department’s orientation schedule or annual welcome event and give a brief presentation. Make the goals of outreach clear and let students know what is in it for them: Participation gives students opportunities to develop curriculum, get involved in their community, and practice presentation skills. It will also help them develop a broader view of computer science and how it relates to society.
- 6 For many students, this kind of activity is a great addition to their resume or curriculum vitae. Acknowledge students who deliver roadshow presentations by giving them a title and job description they can reference later.
- 7 If the institution has a service learning program or a community service requirement, see if participation in an outreach program can fulfill program credit hours. Recruit students who participate in these programs or who need to meet the requirement.
- 8 Create a one-credit course that corresponds with students’ service to the program. For an example course syllabus, see Indiana University’s *Sample Course Syllabus* at the end of this component.
- 9 Confer a graduation medal on those who participate. At University of Colorado at Boulder, 10% of students are awarded a medal for service learning that makes the students stand out from the crowd.

<sup>10</sup> Bandura, A. (1977). *Social Learning Theory*. Englewood Cliffs, N.J.: Prentice-Hall.

## RETAIN PRESENTERS, GROW MORE

- 1 Encourage student presenters to design the presentations so they feel a sense of ownership and commitment to the program.
- 2 Listen to presenter feedback. If presenters say the presentation is boring, don't contradict them. Help them take steps to make it better. This can include changing content, venue or target audience, or presentation elements such as pacing and transitions.
- 3 Keep regular contact. Keep students in the loop, even if they are not on the schedule to give presentations. This may mean having presentation 'play' sessions where students can voice concerns, practice, or work on new material.
- 4 Keep the students in charge. The faculty should be involved in 'institutional knowledge' projects (such as websites and record keeping) but involve students in recruiting, scheduling, and keeping things rolling. One exception to this rule is initial contacts. A professor or school representative is likely to be better received as an initial contact. If you have the resources, hire a work-study person to manage the details of booking and preparing for a visit so as not to overburden your volunteers.
- 4 Set specific and realistic expectations. If visits require an all-day commitment, spread the load.
- 6 Invite students to come together for casual fun. Ask them to invite classmates who might join you for the next season of roadshows.

- 7 Remind students that this work prepares them for future experiences in public speaking. It also teaches undergraduates how to effectively communicate about their field to non-technical audiences. Participating in the roadshow program gives them an opportunity to hone this life skill in a supportive environment.
- 8 Celebrate!

## GET STUDENT PRESENTERS READY

To a great extent, success of a roadshow program rests on the enthusiasm and dedication of its student presenters. Students will feel committed to a program they design and deliver. As you start working with students, share and seek agreement on the goals of the program. Share key messaging points (see the Controlled Message component) and encourage students to plan a program that incorporates these messages in a way that suits their style and their intended audience.

Use the associated *Training Guide* to prepare students for the work ahead. The Guide includes these five training activities:

- » Activity 1: Understanding the Roadshow Approach
- » Activity 2: Broadening Perspectives on K-12 Education
- » Activity 3: Modeling the K-12 Presentation
- » Activity 4: Techniques for Classroom Management
- » Activity 5: Hands-on Activity Practice

These activities and additional materials associated with each are available in the Training folder where you downloaded this Box at [www.ncwit.org/roadshow](http://www.ncwit.org/roadshow).

Finally, you may wish to use these activities and materials to create a formal 1-credit course. See the following *Sample Course Syllabus* for ideas.

### SAMPLE COURSE SYLLABUS

*As you plan the implementation of a roadshow program, you might consider the creation of a course for training the student presenters. Here is a sample to get you started.*

**Indiana University**

**C295 Leadership and Learning**

**Fall 2008**

Instructor	Samantha Foley
Office	LH 415
Office Hours	TBA
Class Times	Tuesday 4:00-4:50 pm
Phone Number	~~~~~
E-Mail	~~~~~

### Prerequisites

CSCI-C211, CSCI-A201, INFO I210, or permission from the instructor

### Corequisite

Enrollment in another CSCI or INFO course

### Course Description

CSCI C295 is a 1-credit, graded class where students work within the community to foster interest, knowledge, and appreciation of the computing sciences by preparing and leading presentations and hands-on activities for children in middle and secondary schools. Not for major credit.

The purpose of this class is to present, develop, reflect on and evolve Just Be, an interactive outreach program designed to present computing as a diverse and exciting field. Students are expected to work in groups on projects to improve the roadshow program and present their work to the class. Evaluation will be based on performance in the classroom and community, self-reflection, and project results.

### Objectives

- » Develop teamwork, communication, presentation, and leadership skills.
- » Experience presenting in the community and in the classroom.
- » Reflect on the importance of outreach.
- » Make a difference in the community.
- » Contribute to the evolution of Just Be.
- » Increase appreciation of the computing sciences and computing community.



### Attendance Policy

Attendance is required. You will receive points for your attendance and participation in class. Talk to the instructor about missed classes.

### Assignments

Required and optional reading materials will be posted on <the course management system>. Assignment submissions and feedback will be conducted here. Check online regularly.

### Course Requirements

#### Outreach

Ten hours of community outreach activities is expected from each student. Practice, coordination, and travel time count towards the ten hours. Typically, one long visit or two short visits will fulfill this requirement. Please talk to the instructor about any circumstances or concerns you have about this requirement.

#### Group Work

Groups and project topics will be determined in the fourth week of class. Projects will be graded and the entire group will receive the same grade for the project. Each group member will assess their own role in the group and how the group functioned as a whole. The group will give a 30-minute presentation about the project they completed. Presentation grades will be given individually. Informal weekly meetings with the instructor will provide feedback on the work in progress.

#### Presentations in Front of Class

All students will present material in front of the class for a total of 20 minutes. Part of this requirement is fulfilled by the formal project presentation. The remainder will be fulfilled by more informal in class presentations, such as a sample Just Be presentation or project proposal.

#### Reflection Papers

Three reflection papers serve as a personal reflection and communication to the instructor about the course expectations and outcomes. Each reflection paper should be 1- 2 pages long and address the questions below.

#### Reflection Paper 1: Expectations and Preconceptions

- » What is outreach and why is it important?
- » Why did you take this course?
- » What makes computing exciting for you?
- » What do you hope to get out of this course?

## Reflection Paper 2: Skills Assessment

- » Assess your skills as a presenter
- » What have you learned about yourself as a presenter?
- » Assess your teamwork skills
- » What have you learned about yourself as a team member?
- » What would you like to improve?

## Reflection Paper 3: Outcomes

- » What did you learn in this course?
- » How did you improve your presenting, teamwork, communication and leadership skills?
- » What does outreach mean to you and why is it important?
- » Describe your project and why it is an important contribution to Just Be.
- » How would you improve the course for next semester?

## Participation and Homework

Students are expected to attend class, complete assigned work, and participate in discussions.

Grade Breakdown	
Group Project	200
Group Project presentation	200
Presentation (in the field)	200
Short in-class presentation	50
Skills Evaluation	50
Reflection papers (3@50 pts each)	150
Homework (personal slide and bio)	50
Participation	100
<b>TOTAL 1000 pts</b>	

Grading Scale		
A+ 98-100	A 94-96	A- 90-93
B+ 87-89	B 84-86	B- 80-83
C+ 77-79	C 74-76	C- 70-73
D+ 67-69	D 64-66	D- 60-63
F 59 or below		

## Class Schedule

There may be changes made to the class schedule. Please be patient and flexible as issues arise.

Week 1	Review syllabus and expectations, introduce the roadshow program, and discuss outreach Handout: syllabus, presentation tips Homework: attend super practice, create/update biography for website and personal slide
Week 2	Presentation tips, assign people to do example presentations Homework: first reflection paper
Week 3	Example presentation Due: first reflection paper, biography, and personal slide
Week 4	Brainstorm project topics, form groups Homework: create project proposal for next class
Week 5	Project proposals and feedback
Week 6	Work on project in groups
Week 7	Work on project in groups
Week 8	Work on project in groups
Week 9	Work on project in groups Homework: second reflection paper
Week 10	Present projects to class and invited guests Due: second reflection paper
Week 11	Present projects to class and invited guests Homework: self evaluation of presentation
Week 12	Discuss projects, presenting, and outreach Due: self evaluation Homework: meet with instructor individually to discuss presentation evaluation
Week 13	Discuss outreach and why it is important Homework: third reflection paper
Week 14	Instructor evaluation, discuss class, improvements for next time

## PROGRAM ACTIVITIES

“Hands-on, minds-on” activities are essential to the roadshow program. Interactive learning experiences anchor the content of the talk and make the roadshow experience memorable. The associated *Program Activities Guide* includes six activities that are a sampling of the kinds of experiences student presenters might incorporate into their roadshow program.

Here is a summary of the activities in the associated *Program Activities Guide*:

**Activity 1:** Line Chaserz Robotic Car

**Objective:** Students learn that a robotic car is a mechanical computing device that employs sensors. Students recognize how sensors are used in a variety of applications in their everyday world.

**Activity 2:** Sorting Networks

**Objective:** This activity shows how computers sort random numbers into order using sorting algorithms or a “sorting network.”

**Activity 3:** Sudoku

**Objective:** Students understand that computers are problem-solving (and creating) devices that use logic based on algorithms.

**Activity 4:** University of Washington Careers Video

**Objective:** Students see people working and talking about their work in Computer Science and Information Technology and recognize they are regular people who enjoy rewarding careers.

**Activity 5:** Cheetos and Candy Bars

**Objective:** In this logic activity students approach a problem that involves employing a set of rules known to be true. Such rules, or algorithms, dictate how computers solve problems.

**Activity 6:** Teach a “Robot” to Draw

**Objective:** Students understand that computing devices function by acting on precise and sequenced instructions, and these instructions are delivered through computer program languages that devices “understand” and execute.

Find these activities in the Program Activities folder where you downloaded this Box, [www.ncwit.org/roadshow](http://www.ncwit.org/roadshow).

# EVALUATION AND TRACKING

## THE IMPORTANCE OF EVALUATION

Evaluation is an important step to improve your roadshow program and to show yourself, your presenters, the school, your stakeholders, and your peers what kind of impact your outreach program is having. Evaluation can range from formative evaluation that guides program improvement to summative evaluation that is reported to others. Along with evaluating the roadshow, it will be useful to compare new student enrollment (at your institution over time and against comparable schools) and to survey incoming students to learn how they became interested in computing.

### Formative Evaluation: Presenter Reflection and Student Impressions

You can conduct formative evaluation even if you do not get additional face-to-face time with either teachers or students. When presenters return from a roadshow, arrange for a debriefing session. Their evaluation of how the program went is critical to continual improvement. Undergraduate presenters, for instance, are closer in age to the audience than teachers or faculty and can offer helpful insights. Along with gathering their impressions of student enthusiasm for the various activities and student grasp of the concepts, ask about details you addressed during the presenter training, including set-up, timing, materials, and transitions. Ask: What went well? What could we do better next time?

If you have an opportunity to talk to students in the audience, you can find out their impressions. You can also talk to their teacher, an excellent informant for student reactions. See *Formative Evaluation Interview* at the end of this component.

### Summative Evaluation: Measuring Effectiveness in Reaching the Goal

Even if you do nothing else to evaluate your program, you should at least collect and monitor enrollment in the major on an annual basis. Systematic tracking of new enrollment will help you know if you are making an impact.

Compare trends of new student enrollment by gender relative to: the past, the national average, and your peer institutions.

You can enhance this basic evaluation by having all incoming students in your department, or major, complete a questionnaire about what interested them in your department, whether or not they saw one of your roadshows, and other questions specifically related to your outreach activities. See *Sample Incoming Student Survey*.

### No Need for Institutional Review Board (IRB)

Contrary to popular lore, you can conduct a program evaluation of your roadshow without going through an Institutional Review Board (IRB) process. As long as you do not publish your findings or report them as “research,” and as long as you use the results solely for program improvement and quality assurance, you can survey and interview the students who participate in your roadshow.

If you do intend to publish your findings, or if your evaluation is part of a research or thesis project, then you must get IRB approval at your university to ensure adequate human subjects protection. This process can take anywhere from a week to two months from submission of your request to approval, so start early. Forms and procedures are unique to each university, so you will need to check with the IRB office on your campus.<sup>11</sup>

NCWIT provides many helpful documents you can use to prepare for IRB submission in our *Student Experience of the Major Program-in-a-Box* ([www.ncwit.org/sem](http://www.ncwit.org/sem)).

The Assessing Women and Men in Engineering (AWE) Project also provides an overview of IRB procedures under “Implementation Tools” (<https://www.engr.psu.edu/awe>). A one-time registration form is required to access various AWE services.

### NOTES:

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<sup>11</sup> Program evaluation typically is not subject to as many restrictions as other kinds of research when you seek IRB approval. There are concerns for human subjects, however. For instance, the middle- and high-school student population is defined as “vulnerable” because they are under 18. It is important to note, though, that the evaluation involves minimal risk, or no risk, to the subjects, and you are not asking them about sensitive subjects, nor are you administering an intervention to particular subgroups of students and not to other subgroups.



## The Evaluation Spectrum

To give you an idea of how best to use your limited time and resources for evaluation, consider the following evaluation possibilities, listed below from least time- and resource-intensive to most. Sample interview questions and surveys are provided at the end of this section.

### Evaluation Components

	Least intensive	Minimally Intensive	Moderately Intensive	Most Intensive
Interview students	<b>X*</b>			
Have teachers ask students	<b>X*</b>			
Teacher focus group	<b>X*</b>			
Student survey		<b>X</b>	<b>XX</b>	<b>XXX</b>
Track new enrollment	<b>X*</b>	<b>X</b>	<b>X</b>	<b>X</b>
Survey incoming students	<b>X*</b>	<b>X</b>	<b>X</b>	<b>X</b>

\*Any one of these would be helpful.

**Least intensive evaluation.** A “least intensive evaluation” could be administered in a number of ways, using any one or any combination of the approaches outlined below:

- 1 Conduct brief informal interviews of student audience members (use feedback only for program improvement). Be sure to include as many viewpoints as possible. See *Formative Evaluation Interview* at the end of this component.
- 2 Provide teachers at your roadshow audience schools with a set of questions they ask their students and then report back to you on student responses. See *Formative Evaluation Interview*.
- 3 Conduct a post-event interview or focus group discussion with teachers who attended the roadshow. See *Formative Evaluation Interview*.
- 4 Track new student enrollment in your department, making comparisons over time and with peer institutions and national data.
- 5 Survey incoming students to find out how they heard about your department and how they became interested in computing. See *Sample Incoming Student Survey* at the end of this component or modify one of the Pre-college Recruiting Surveys available from Assessing Men and Women in Engineering (<https://www.engr.psu.edu/awe>).

**Minimally intensive evaluation.** A “minimally intensive evaluation” could consist of three components:

- 1 Survey administered after the roadshow (“post-only”). The questions on this survey would ask students to reflect on how they felt before and after the presentation. It could be administered immediately after the roadshow or within the week following. See *Sample Post-only Survey* at the end of this component.
- 2 Track new student enrollment in your department, making comparisons over time and with peer institutions and national data.
- 3 Survey incoming students to find out how they heard about your department and how they became interested in computing. See *Sample Incoming Student Survey* at the end of this component or modify one of the Pre-college Recruiting Surveys available from Assessing Men and Women in Engineering (<https://www.engr.psu.edu/awe>).

**Moderately intensive evaluation.** A “moderately intensive evaluation” could consist of three components:

- 1 Surveys administered before the roadshow and soon after the roadshow. These surveys would need to be confidential, but need not have unique identifiers because aggregated pre data could be compared to aggregated post data. See *Sample Pre Survey* and *Sample Post Survey* at the end of this component.
- 2 Track new student enrollment in your department, making comparisons over time and with peer institutions and national data.
- 3 Survey incoming students to find out how they heard about your department and how they became interested in computing. See *Sample Incoming Student Survey* at the end of this component or modify one of the Pre-college Recruiting Surveys available from Assessing Men and Women in Engineering (<https://www.engr.psu.edu/awe>).

**Most intensive evaluation.** The “most intensive evaluation” could consist of three components:

- 1 Surveys administered at three points in time: Before the roadshow, immediately after the roadshow, and six months after the roadshow. These surveys would need to be confidential and have unique identifiers to enable matching between individual respondents. The students (not the researchers) should create their own unique identifiers. (See *Sample Pre Survey* and *Sample Post Survey* at the end of this component for one unique identifier methodology.)
- 2 Track new student enrollment in your department, making comparisons over time and with peer institutions and national data.
- 3 Survey incoming students to find out how they heard about your department and how they became interested in computing. See *Sample Incoming Student Survey* at the end of this component or modify one of the Pre-college Recruiting Surveys available from Assessing Men and Women in Engineering (<https://www.engr.psu.edu/awe>).

## FORMATIVE EVALUATION INTERVIEW

As much as is feasible, collect reactions from a variety of audience members so that you can continually improve your roadshow. Be sure you hear from a *variety* of individuals and *enough* individuals that represent your target audience so that you are not reacting to the opinions of a unique few.

### *Interview Questions*

The purpose of this roadshow is to encourage students to consider enrolling in computing programs in their high schools and in college. We need your feedback to make sure we are hitting our mark. Please respond honestly to the following questions. Thinking back to the presentation you just watched . . .

- 1 What did you like most?
- 2 What did you learn?
- 3 What most surprised you?
- 4 How can we improve this presentation?
  - a. Is there any additional information we should cover in our presentation?
  - b. Should it be more interactive? Less interactive?
- 5 Did this presentation prompt you to consider studying computing in high school or college? (Why or why not?)
- 6 What did your friends think of the presentation?
- 7 Any additional comments?

## SAMPLE PRE SURVEY

We are interested in hearing what you think about computing. This is not a test. Please answer honestly. Your responses will remain confidential and will not be shared with anyone except the computing roadshow team.

To match your confidential survey with other surveys you may complete for us in the future, please create an identifying code as follows: Write in the 1st 2 letters of your mother's unmarried last name, then your birth date. For example, if your mother's unmarried last name was Smith, and you are born on April 14, your code will be sm-14.

Write your code here: \_\_ - \_\_

**1 In what ways do you use computers? (Check all that apply)**

- ☐ I don't use computers
- ☐ Game playing
- ☐ Accessing Web sites for information  
(such as Wikipedia)
- ☐ Slideshow presentations
- ☐ Spreadsheets
- ☐ Artwork/animations
- ☐ Downloading music
- ☐ Maintaining a blog, Facebook or Myspace pages
- ☐ Maintaining a website
- ☐ Robotics
- ☐ Programming
- ☐ Designing/maintaining computer networks  
(LAN, wireless)
- ☐ Open source contributions
- ☐ Other \_\_\_\_\_

**2 What do you think computer science is?**

**3 What do you think computer scientists do? Check as many sentences as you wish from the list below to best reflect your thoughts.**

- ☐ I don't know what computer scientists do
- ☐ Computer scientists mainly work on machines and computers
- ☐ Computer scientists work with other people to solve problems
- ☐ Computer scientists have lots of choices about what they can do in their jobs
- ☐ Computer scientists mainly work on things that have nothing to do with me
- ☐ Other: \_\_\_\_\_
- ☐ Other: \_\_\_\_\_

**4 How interested are you in exploring computer science as a possible area of study or job choice? (Check your answer)**

- ☐ Very interested
- ☐ Somewhat interested
- ☐ Not at all interested

**5** If you plan to go to college, how likely or unlikely are you to major in computer science?

- ☐ Very likely
- ☐ Somewhat likely
- ☐ Somewhat unlikely
- ☐ Very unlikely
- ☐ Don't plan on college

**6** Any other comments?

These next 3 questions are about you. We won't know whose answers we are reading on each questionnaire, but these questions let us know a little something about you.

**7** Your gender (Check your answer)

- ☐ Male
- ☐ Female

**8** Your grade (Check your answer)

- ☐ 6th
- ☐ 7th
- ☐ 8th
- ☐ 9th
- ☐ 10th
- ☐ 11th
- ☐ 12th

**9** Please check your ethnicity ...

- ☐ Hispanic or Latino
- ☐ Not Hispanic or Latino

**10** What race do you consider yourself to be?

(Please check all that apply)

- ☐ White or Caucasian
- ☐ Black or African American
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Native Hawaiian or other Pacific Islander
- ☐ Other race
- ☐ Unknown race

## SAMPLE POST SURVEY

We are interested in hearing what you think about computing now that you have seen the roadshow presentation. This is not a test. Please answer honestly. Your responses will remain confidential and will not be shared with anyone except the Computing roadshow team.

To match your confidential survey with others you may complete for us in the future, please create an identifying code as follows: Write in the 1st 2 letters of your mother's unmarried last name, then your birth date. For example, if your mother's unmarried last name was Smith, and you are born on April 14, your code will be sm-14.

Write your code here: \_\_ - \_\_

**1** What do you think computer science is?

**2** What do you think computer scientists do? Check as many sentences as you wish from the list below to best reflect your thoughts.

- ☐ I don't know what computer scientists do
- ☐ Computer scientists mainly work on machines and computers
- ☐ Computer scientists work with other people to solve problems
- ☐ Computer scientists have lots of choices about what they can do in their jobs
- ☐ Computer scientists mainly work on things that have nothing to do with me
- ☐ Other \_\_\_\_\_
- ☐ Other \_\_\_\_\_

**3** How interested are you in exploring computer science as a possible area of study or job choice? (Check your answer)

- ☐ Very interested
- ☐ Somewhat interested
- ☐ Not at all interested

**4** If you plan to go to college, how likely or unlikely are you to major in computer science? (Check your answer)

- ☐ Very likely
- ☐ Somewhat likely
- ☐ Somewhat unlikely
- ☐ Very unlikely
- ☐ Don't plan on college

**5** Please tell us what you liked most about the presentation:

**6** Please tell us what you liked least about the presentation:



**7** Would you recommend this presentation to a friend?

(Check your answer)

- ☐ Definitely
- ☐ Probably
- ☐ Probably not
- ☐ Definitely not

**8** Would you recommend that your school have this presentation again next year? (Check your answer)

- ☐ Definitely
- ☐ Probably
- ☐ Probably not
- ☐ Definitely not

**9** Any other comments?

## SAMPLE POST-ONLY SURVEY

We are interested in hearing what you think about computing and about the roadshow presentation you just watched. This is not a test. Please answer honestly. Your responses will remain confidential and will not be shared with anyone except the Computing roadshow team.

**1 In what ways do you use computers? (Check all that apply)**

- ☐ I don't use computers
- ☐ Game playing
- ☐ Accessing Web sites for information (such as Wikipedia)
- ☐ Slideshow presentations
- ☐ Spreadsheets
- ☐ Artwork/animations
- ☐ Downloading music
- ☐ Maintaining a blog, Facebook or Myspace pages
- ☐ Maintaining a website
- ☐ Robotics
- ☐ Programming
- ☐ Designing/maintaining computer networks (LAN, wireless)
- ☐ Open source contributions
- ☐ Other \_\_\_\_\_

**2 What do you think computer science is?**

**3 What do you think computer scientists do? Check as many sentences as you wish from the list below to best reflect your thoughts.**

- ☐ I don't know what computer scientists do
- ☐ Computer scientists mainly work on machines and computers
- ☐ Computer scientists work with other people to solve problems
- ☐ Computer scientists have lots of choices about what they can do in their jobs
- ☐ Computer scientists mainly work on things that have nothing to do with me
- ☐ Other: \_\_\_\_\_
- ☐ Other: \_\_\_\_\_

**4 Before you saw this roadshow presentation, what did you think about computer science and computer scientists?**

**5 Thinking about how you felt before you saw this roadshow, how likely or unlikely were you to major in computer science in college? (Check your answer)**

- ☐ Very likely
- ☐ Somewhat likely
- ☐ Somewhat unlikely
- ☐ Very unlikely
- ☐ Don't expect to go to college

**6** Thinking about how you feel now, after seeing this roadshow, how likely or unlikely are you to major in computer science in college? (Check your answer)

- ☐ Very likely
- ☐ Somewhat likely
- ☐ Somewhat unlikely
- ☐ Very unlikely
- ☐ Don't expect to go to college

**7** Now that you have seen this roadshow, how did it change your interest in exploring computer science as a college major or job choice (if at all)? (Check your answer)

- ☐ No change — I was already interested
- ☐ No change — I am still not interested
- ☐ I am slightly more interested now
- ☐ I am very interested now
- ☐ I was interested, and now I am no longer interested

**8** Please tell us what you liked most about the presentation:

**9** Please tell us what you liked least about the presentation:

**10** Would you recommend this presentation to a friend? (Check your answer)

- ☐ Definitely
- ☐ Probably
- ☐ Probably not
- ☐ Definitely not

**11** Would you recommend that your school have this presentation again next year?

(Check your answer)

- ☐ Definitely
- ☐ Probably
- ☐ Probably not
- ☐ Definitely not

**12** Any other comments?

These next 4 questions are about you. We won't know whose answers we are reading on each questionnaire, but these questions let us know a little something about you.

**13** Your gender (Check your answer)

- ☐ Male
- ☐ Female

**14** Your grade (Check your answer)

- ☐ 6th
- ☐ 7th
- ☐ 8th
- ☐ 9th
- ☐ 10th
- ☐ 11th
- ☐ 12th

**15** Please check your ethnicity ...

- ☐ Hispanic or Latino
- ☐ Not Hispanic or Latino

**16** What race do you consider yourself to be? (Please check all that apply)

- ☐ White or Caucasian
- ☐ Black or African American
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Native Hawaiian or other Pacific Islander
- ☐ Other race
- ☐ Unknown race

## SAMPLE INCOMING STUDENT SURVEY

### Instructions to the Administering Department:

This entry survey can help you to identify the experiences that your brand-new students had that may have influenced them to declare your major or take your introductory course. By including a list of the outreach events and other communication efforts that have been held by your department, you will be able to see which (if any) of your recruiting activities has the greatest influence on enrollment. The survey can help you to do more of what works and less of what doesn't.

To customize this survey, complete the following steps:

- 1 Modify the title by adding your institution name and department.
- 2 Modify the introduction paragraph.
- 3 Modify the first question by adding your institution name and department.
- 4 Modify the table in the first question by listing your outreach activities or events. Be sure to add or delete rows, where necessary.
- 5 Modify question three by adding the appropriate major or minor.

Be sure to keep the survey responses anonymous. Do not ask for individual names.

<Institution Name>, Department of <department name>

### Entry Survey

Dear Student:

We would like to know about experiences that influenced you to <take this course/declare a major in> <major name> at the <institution name>.

- 1** How often, if at all, did you participate in any of the following events or activities hosted by the <institution name> – Department of <department name>?

	Never	Once	More than Once
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 2** Please name any other events or activities that contributed to your interest in computing and indicate your level of participation.

	Once	Two or Three Times	Four or More Times
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 3** Please indicate your interest in majoring or minoring in <name of major>? (Check your answer)

- ☐ Extremely disinterested  
☐ Moderately disinterested  
☐ Mildly disinterested  
☐ Mildly interested  
☐ Moderately interested  
☐ Extremely interested

These next 4 questions are about you. We won't know whose answers we are reading on each questionnaire, but these questions let us know a little something about incoming students.

- 4** Gender (Check your answer)

- ☐ Male  
☐ Female

- 5** What year were you born? 19\_\_

- 6** Please check your ethnicity ...

- ☐ Hispanic or Latino  
☐ Not Hispanic or Latino

- 7** What race do you consider yourself to be? (Please check all that apply)

- ☐ White or Caucasian  
☐ Black or African American  
☐ American Indian or Alaska Native  
☐ Asian  
☐ Native Hawaiian or other Pacific Islander  
☐ Other race  
☐ Unknown race

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SIGCSE, ACM Special Interest Group on  
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