



RECRUIT STRATEGICALLY:

A “High Yield in the Short Term” Workbook for Attracting Women to Undergraduate Computing and Engineering

TABLE OF CONTENTS

1. Why Recruit Strategically to Increase Women’s Representation?	4
• Be Proactive, Not Reactive	
• “High Yield in the Short Term” Approach to Recruiting	
• Components of an Effective Recruiting Plan	
• Contents of This Workbook	
2. How Can You Identify and Locate Target Audiences?	6
• Majors With Demonstrated Mathematics Ability	
• Locating Groups On Campus	
• Locating Groups Off Campus	
3. Which Messages Resonate With Your Target Audiences?	9
• Which Messages Do All Audiences Need to Hear?	
• Using Images Wisely	
• Testing: Will the Message Really Work?	
4. How Can You Reach Your Audiences?	11
• Ideas for Reach On Campus	
• Ideas for Reach Off Campus	
5. What Existing Assets Can You Leverage and Manage?	13



This workbook is a resource of the NCWIT Extension Services for Undergraduate Programs (ES-UP). ES-UP helps undergraduate departments of computing and engineering develop high-impact strategies for recruiting and retaining more women students.

www.ncwit.org/extensionservices

6. Evaluation: Track What Works and What Doesn't 17

- The Power of Data: What Evaluation Can Show

7. What Will Work for You? Brainstorming Initiatives 20

8. Appendix: Worksheets, Surveys, Examples..... 25

- Worksheet for Identifying Audiences, Their Influencers, and How to Reach Them
- Message Crafting Practice Worksheet
- Sample Outreach Letter from a Current Student
- Example of a Real Strategic Plan
- Marketing Plan Exercise
- Sketch a Recruiting Initiative
- Recruiting Initiative Calendar
- Worksheet for Calculating Annual Enrollment Yield from Recruiting Efforts
- Survey: Did Your Initiatives Influence Students to Take Your Class?
- Survey: How Effective Was Your Event?

9. Additional Resources for Accomplishing Recruiting Goals 38

- Inspire and Engage
- Inform
- Guide
- Reach Out
- Seek Support

1

WHY RECRUIT STRATEGICALLY TO INCREASE WOMEN'S REPRESENTATION?



This workbook is devoted to recruiting women. For retention, please see the NCWIT Extension Services publication, *Strategic Planning for Retaining Women in Undergraduate Computing*

(www.ncwit.org/retainingworkbook).

NCWIT provides additional resources for several types of recruiting and outreach events. Find resources at www.ncwit.org.

This workbook includes guidance, useful information, examples, and templates for developing an effective recruitment plan to increase women's participation in undergraduate computing, computer engineering, electrical engineering, and mechanical engineering. These disciplines have few women.

The workbook assumes you desire the greatest return on investment in the shortest time, while populating your major with the best students from an expanded pool of applicants. These underlying principles, approaches, and guidelines may help you identify and evaluate a feasible and successful set of recurring recruiting initiatives.

Be Proactive, Not Reactive

Most academic departments have outreach efforts to inform the public and potential students about their discipline. Participation in a variety of events and production of materials to communicate with students, teachers, parents, and employers are common. However, these recruitment efforts often are undertaken in an opportunistic way. For example, initiatives may be selected because of the motivation and time of a particular faculty member (often independently of other faculty), they may take advantage of a funding solicitation (and thus are not sustained after the funding period), or they may result from chance awareness of an event and chance availability of someone who can attend. Typically, little thought is given to the efficient allocation of resources (such as money or time), the message provided to the particular audience, or tracked outcomes. To encourage women's participation in computing and engineering disciplines, a well-mapped, cohesive, and sustainable recruitment plan is essential.

Developing a plan for recruitment helps a department:

- Identify specific and reasonable goals for recruiting efforts.
- Pinpoint groups with a strong likelihood of succeeding in your field and provide information that shows how your department's major(s) can satisfy their career or life goals.
- Select low-cost outreach initiatives implemented at strategic times and venues.
- Carefully track what works and what doesn't to improve decision making.

"High Yield in the Short Term" Approach to Recruiting

This workbook can help you identify the greatest number of students with appropriate aptitudes who are available to declare a major or minor in the next one to three years. The workbook also will help you develop relevant messaging about careers in target disciplines so students of varying educational levels (and those who influence them) can make informed choices about their future.

Components of an Effective Recruiting Plan

You likely will have many recruiting initiatives in order to recruit effectively, each with several interrelated components. The sections that follow will help you create a cohesive recruiting plan that enables your department to:

- **Identify and locate target audiences** with aptitude.
- **Align messaging** with the present values, beliefs, expectations, or goals of each target audience. For example, students' goals may be substantially different from their parents' goals for them, yet parents influence what their children value. Some messages are likely to be informative for all audiences, while other groups will need additional or less information.
- **Reach audiences** with people and media that are believable and have a high chance of being accessed. Targeting the influencers of students is an excellent way to accomplish greater return on investment. For example, one high school teacher speaks to hundreds of students each year.
- **Leverage and manage existing assets** to determine how you can take advantage of current programs (e.g., minors, tracks in the major, outreach), better inform those who are already communicating on your behalf (e.g., admissions office), and draw on the time and resources of others who wish to support you (e.g., students, alumni).
- **Track and report results** so that you know what works and what doesn't. Otherwise, how do you know if your efforts were worth your scarce resources? Evidence of success, even when small, also can support fundraising.

Contents of This Workbook

The first sections of the workbook help you identify which groups of people you might target to optimally aid your recruitment efforts (potential students and influencers), create messages that are truly relevant to each of these audiences, share information in a meaningful format, and leverage and manage existing assets to help achieve your goals.

The worksheets, examples, and templates that follow can be customized for your own use to help provoke and form ideas for your department's plan. In the section "What Will Work for You? Brainstorming Initiatives" is a series of decision trees showing examples of how you might make decisions about what initiatives to pursue.

In addition, throughout the workbook there are two types of callout boxes:



It Was a Good Idea at the Time... boxes provide further guidance for your recruiting initiatives by describing efforts or ideas that may cause worse problems than they solve.



Resource boxes point you to related material.

2

HOW CAN YOU IDENTIFY AND LOCATE TARGET AUDIENCES?

Chances are that you have limited time for recruiting students, either on or off campus. Nevertheless, you may have untapped opportunities to acquaint both on- and off-campus groups with the career possibilities of a degree in your discipline. You can heighten awareness of your major among qualified undeclared majors, students seeking a second major, and potential minors who are already on campus. You also can reach out to high school students and those who influence them—teachers, counselors, parents, and alumni. Influencers can do the outreach for you, provided you give them the right information. Additionally, you can reach out to adults returning to education who might be well suited for your field.



“If you’re a math whiz...”

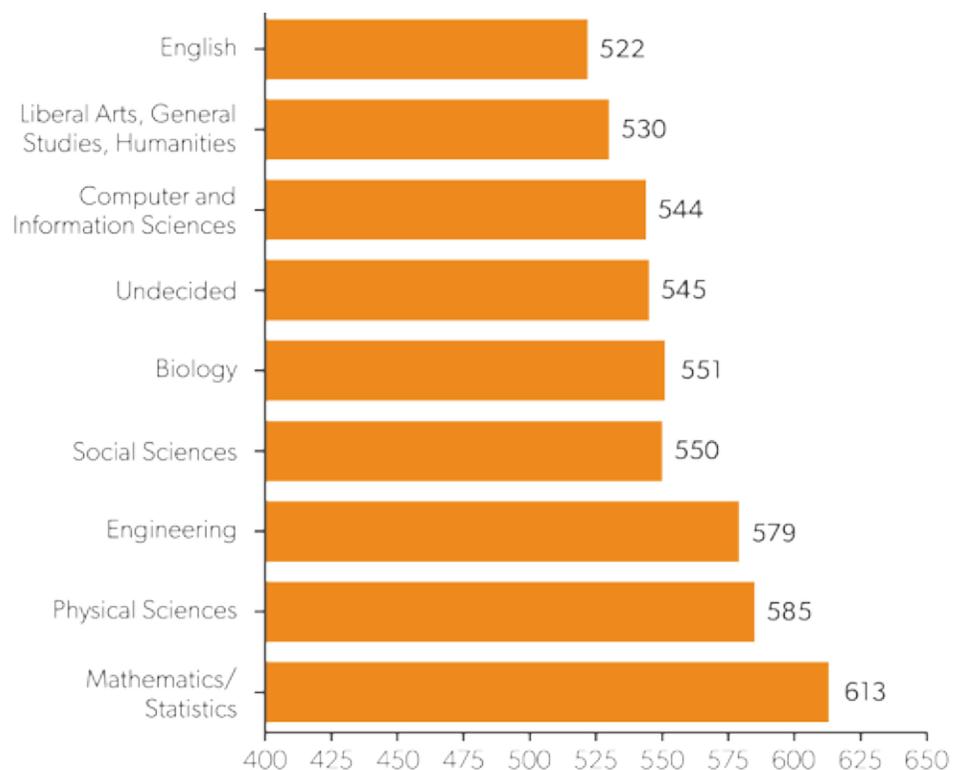
Though targeting high school or early college students who have demonstrated

mathematics ability can be a useful way to recruit able students, be sure not to describe math ambiguously. Research shows that students can interpret “being good at math” as needing to be “math geniuses.” This is a turnoff for women.

Majors With Demonstrated Mathematics Ability

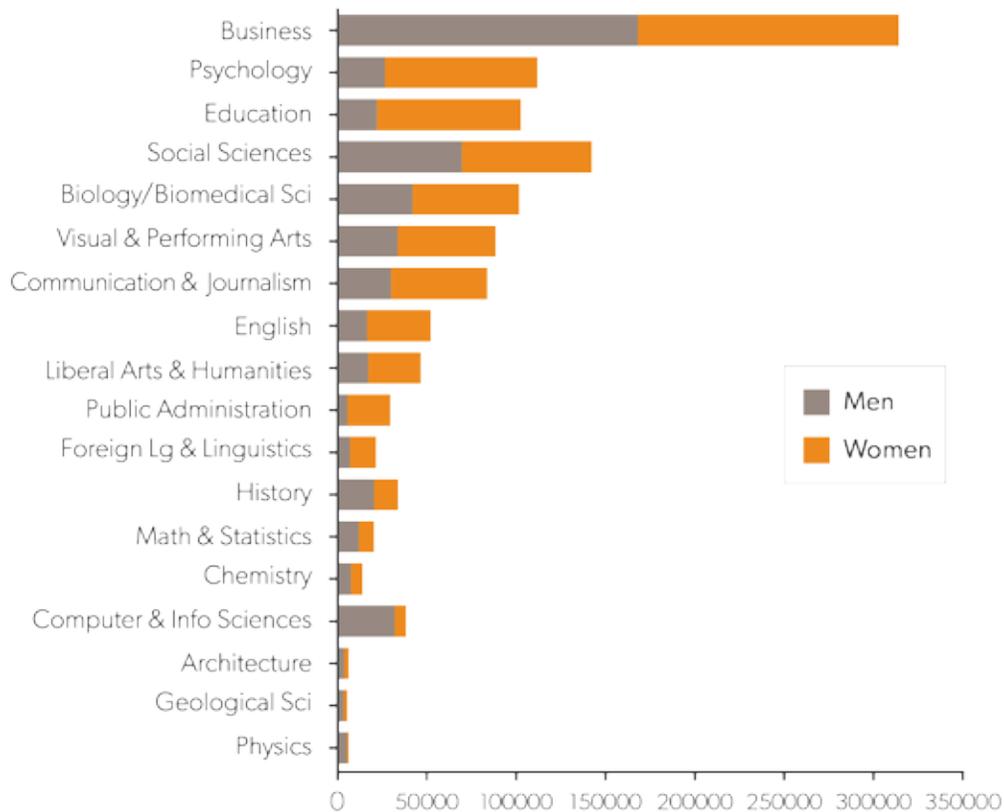
Most undergraduate programs in computing and engineering majors expect relatively high mathematics aptitude as demonstrated by SAT or ACT tests. Therefore, it may make sense to target students who are likely to have high math scores on standardized tests. Students with mathematics competence demonstrated through their SAT scores are shown in Figure 1 according to their intended major. Figure 2 shows fields that awarded the highest number of bachelor’s degrees to women. Use these two graphs to determine which majors are likely to have the most women with high mathematics aptitude on your campus.

Figure 1: SAT Math Score by Intended Major, 2014



Source: The College Board, SAT Major Categories Report (unpublished)

Figure 2: Most Popular Majors in U.S. in 2013, by Bachelor's Degrees Awarded



Source: U.S. Department of Education, National Center for Education Statistics. (2015). Digest of Education Statistics, 2013 (NCES 2015-011) Chapter 3.

Locating Groups On Campus

Reaching out to groups on campus can be a less resource-intensive component of your recruiting plan, since these students have already been admitted to your institution.

Minors. A minor in your field can supplement other majors, providing another relevant skill set that students can use. For example, biology majors with a minor in a computing discipline could pursue a career in bioinformatics.

Non-Majors. Many students enter college undecided about their major. You can reach out to non-majors and undecided majors directly and indirectly (see section on how to reach your audiences). Some of these students might be in your department’s introductory classes. They could choose to declare a major in your department if they have positive experiences in these classes and see an enjoyable future by staying in the field.

Introductory Course Students. Introductory course students, whether they have declared a major or not, may be sampling fields and can easily switch majors. Make sure your class cements, rather than reverses, their decision to focus on computing or engineering. Let students know the career options and interesting applications of the field. Use examples that are relevant to their likely field of study. Personal encouragement from faculty and teaching assistants can be very powerful. Hearing, “You’re good at this. You should major in ...” is often the reason a student declares or stays in a major. Students should also be reminded that although assignments and topics can be challenging, if they keep practicing, they can build their intellectual “muscle.”

“You’re really good at this for a girl”

Intended to build confidence, statements like this really imply that girls are not as good as boys at “this.”



Locating Groups Off Campus

Influencing groups off campus requires a different approach but can be a worthwhile and effective part of your recruiting strategy.

High School Students. These students are in the process of making important decisions about their future. Communicating to them the benefits of your major in this formative stage of their lives can help direct their choices about college.

Parents of High School Students. Parents of high school students deeply influence their choices. Having parents communicate compelling information about your major and its associated careers could lead to an increase in the number of women who enroll in your program.



Empower school counselors to increase student interest in and preparedness for computing and technology jobs. Equip counselors using the NCWIT Counselors for Computing (C4C)

resources: www.ncwit.org/C4C.

High School Teachers, Counselors, and Staff. High school teachers and administrators also play a vital part in shaping student interest and motivation. Getting them on board can positively influence how girls feel about areas of study in your field. Make sure these influencers have accurate information about careers, offerings, and requirements for the major.

Adult Women Returning to Education. Non-traditional students are often overlooked in recruiting initiatives. Women who return to education for an additional degree can enhance their career or switch to a more rewarding one, including computing and engineering. Former members of the military and military spouses also are candidates.



For additional information about working with the community college audience, see NCWIT's publication *Pipeline-in-a-Box: Promoting Advancement of CS/IT Students from Two-Year to*

Four-Year Institutions: www.ncwit.org/pipeline.

Community Colleges. Connect with community colleges to create a pipeline of prospective students. Having completed their core classes, community college students are now looking for a relevant major. Because articulation agreements vary widely by state and institution, it is best for them to visit with advisers and math and science teachers to discuss the possibility of a major in your department. Provide advisers and math and science faculty with useful transfer information.

WHICH MESSAGES RESONATE WITH YOUR TARGET AUDIENCES?

Just as advertisers use different messages — and different media — with different target audiences, you should think carefully about the messages that are likely to persuade your audience to act. Not all parents are alike, nor do parents and teachers have identical goals for or obligations toward students. Likewise, high school, college, and returning students have different career goals. Consider your target audience as you craft your messages.

For resources to guide you when speaking to specific audiences, use the “audience” search filter box at www.ncwit.org/resources.



Which Messages Do All Audiences Need to Hear?

There are some messages that every audience needs to hear. Parents, advisers, teachers, financial aid offices, and career services all are unlikely to recommend career trajectories where there are few jobs. Young women, too, hope to earn a decent living — but often not at the expense of happiness. Tell all audiences:

- The U.S. Bureau of Labor Statistics continues to predict a strong computing industry.
- As shown in Table 1, jobs in computing and electrical and mechanical engineering have high-paying salaries.

Calling kids who like computing “geeks” or “nerds” (including “NerdGirls,” etc.)



Although the intention is to make “geek” or “nerd” seem positive, its use can introduce a negative stereotype to those who don’t know it or reinforce a known stereotype by repeating it.

Table 1: High-Paying Salaries

Occupation	2012 Median Pay
Computer Hardware Engineers	\$100,920
Software Developers	\$93,350
Computer Network Architects	\$91,000
Electrical Engineers	\$89,630
Information Security Analysts	\$86,170
Mechanical Engineers	\$80,580
Computer Systems Analysts	\$79,680
Database Administrators	\$77,080
Computer Programmers	\$74,280
Network and Computer System Administrators	\$72,560
Web Developers	\$62,500
Computer Support Specialists	\$48,900

Source: Bureau of Labor Statistics Occupational Outlook Handbook

For more information on jobs related to computing and engineering, see www.bls.gov/ooh.





“Remember, try to get perfect grades in college.”

People interpret comments in context. In the context of being told about computing, statements like these can be interpreted as meaning that computing is a high-stress career.



Dot Diva has created an image library that is free to use for recruiting efforts. See www.flickr.com/photos/dotdiva/sets/72157625370274859.



“Men only care about games.”

Undoubtedly, the audience will know many men who care about a lot more than games (like fathers). So why should the women you are talking to believe anything else you say?

- Computing and engineering jobs are socially relevant. The work done by professionals in these areas is a crucial component in solving many of the world’s problems.
- The expertise that comes with academic study in computing and engineering is applicable in a wide variety of domains. Computing and engineering professionals work in every industry — health, education, business, transportation, etc. Even though their careers may change track, graduates skilled in these disciplines will be equipped to adapt and still have time for family and friends.
- Computing and engineering work requires collaboration with others.

Using Images Wisely

- Images convey powerful messages. In your recruitment materials, show images of women and men working to solve problems that your target audience cares about.
- Computation and engineering principles can be abstract, so it is difficult to show their power in photos. Consider medical applications, for example, with a caption that points out the human behind the machine (e.g., the brains behind the echocardiogram).
- Avoid abstract images like zeros and ones and complicated mathematics equations.

Testing: Will the Message Really Work?

One of the best ways to determine if a message will resonate is to test it with its intended audience.

- Before investing time and money in communicating with your audience, do some research to find out what is important to that audience.
- Create a draft and show it to some of your audience members.
- Ask your testers to provide blunt, honest feedback. Listen as they share their impressions of what your message communicates to them. Are these the reactions you intended? If not, ask for feedback on how you could improve your pitch and revise your messages to better meet the audience’s needs.

HOW CAN YOU REACH YOUR AUDIENCES?

Most students outside of your major are uninformed about the major and its related careers. You can inform students through non-major or other computing and engineering service courses. You also can explicitly invite them to declare a major in your department, in class, through off-campus outreach, or by other means. For example, you can tell them what you know, give them brochures, or expose them to guest speakers during class, department gatherings, or presentations. Repeat and reinforce your messages, but do so with a reasonable frequency because messages heard too often will sound overbearing or like evangelism.

Make sure students understand these key points:

- Computing and engineering are essential elements of nearly every human endeavor today.
- Computer scientists and engineers are solvers of many of the world's problems.
- A computing or engineering degree will help them develop skills that can be used in many working contexts and subject matters.
- They and their families can enjoy a higher-than-average income with a computing or engineering career.

In fact, also sharing this information with your declared majors may help retain them.

Ideas for Reach On Campus

- Consider developing a brochure, postcard, or poster.
- Ask members of student groups to post your materials in their residence hall rooms or to hand them out to first-year students leaving large-lecture courses.
- Ask the career services office if you can put a poster on their bulletin board or if they will pass out brochures. Give career services team members the information they need to talk about computing careers.
- You also can use a personal touch with students whom you've identified as talented in computing and engineering studies. Many students do not realize when they are doing well in relation to their peers. When a professor tells students, "you're good at this; you would make a good major," it is very powerful.

Access information and cards from the NCWIT Talking Points series: www.ncwit.org/tp.



"Pat was born with six fingers, so she fits right in with the computer science class."



Sure, young people can be rebellious of social norms. But they are unlikely to participate in a group that is cast as abnormal in a negative way. Young women need to feel they belong, are competent, and are worthy of respect.



“I don’t mind being the only girl. It shows I’m as good as the boys.”

Intended to alleviate fear about being the only girl, this statement suggests that boys are better at computing than girls, which can cause loss of confidence that a girl will be successful.

Ideas for Reach Off Campus

Obviously, high school students are not as easy to reach, because you have to find extra time to go off campus. However, you may be able to leverage:

- Existing or potential relationships with science and mathematics teachers at your largest feeder schools
- Students who would like to do outreach, especially at their former high school
- A summer program to educate teachers about computing and engineering concepts and provide specific guidance for recruiting girls into their classes (you will need funding to do this)
- A list of applicants to the college/university that separates students by their math SAT or ACT scores, enabling you to send postcards, for example you will need funding to do this)

Using these resources, you can reach off-campus students in a number of ways:

- Send postcards or brochures to students. Parents are more likely to see mailings that are not sealed in envelopes. These materials also can be distributed by asking your current students to deliver them to local high schools.
- Send talking points, postcards, and the Counselors for Computing (C4C) Intersecting Pathways to a Computing Career poster to teachers and counselors. Be sure there is a link to an appealing website (that is, not the website showing the requirements of your major). Evaluate the website for messaging and images that are consistent with the section on messages.
- Create a poster. The Computer Science Teachers Association (CSTA) provides a customizable, downloadable poster. Send copies to teachers, principals, or high school counselors.
- Find out when back-to-school or parent night is, and make your materials available for teachers to give to parents.
- Leave brochures with community groups, religious organizations, and libraries or among other reputable resources.

WHAT EXISTING ASSETS CAN YOU LEVERAGE AND MANAGE?

Don't do all of the recruiting work yourself. Use the checklists below to identify potential on- and off-campus sources of support for your efforts. Make sure that these groups have accurate and up-to-date information about computing and engineering careers, their importance in the U.S. economy, and their benefits to participants. For example, you can provide talking-points cards to the admissions office and create an appealing website for potential students. See Table 2 for more ideas about how different groups can help you inform potential audiences. We left an empty cell next to each resource so you can brainstorm whom it might help you reach and how.

Table 2: Leverage Points: Which Resources and Initiatives are Available on Your Campus?

University Resources	How They Might Help	Brainstorm: How Can This Resource Help You Recruit?
Admissions Office	<ul style="list-style-type: none"> Identify potential applicants and communicate to them the information you provided about your department. Share information about potential applicants and recruiting opportunities with your department. 	
Communications/ Press Office	<ul style="list-style-type: none"> Give your department insight into campus-wide recruitment efforts. Connect media with your department. 	
Community Relations Office	<ul style="list-style-type: none"> Connect your department with local businesses and communities for special events and partnerships. 	
School of Education/ Teacher's College	<ul style="list-style-type: none"> Train future teachers with accurate information about computing and engineering careers. Conduct educational research to determine inclusive instructional practices to improve women's experience in science and technology. Establish and maintain contact with area school districts. Design and direct after-school and summer enrichment programs related to computing and engineering for K-12 students. 	

University Resources	How They Might Help	Brainstorm: How Can This Resource Help You Recruit?
University Career Services	<ul style="list-style-type: none"> • Provide career counseling to undeclared majors. • Introduce suitable candidates to computing and engineering. 	
Centers for Pre-College Encouragement (Institution's equivalent to the Center for Innovation in Engineering and Science Education [http://ciese.org] on your campus)	<ul style="list-style-type: none"> • Spread relevant messages and generate interest in your department. 	
Women's Support Centers	<ul style="list-style-type: none"> • Promote your discipline and its benefits. 	
Schools/Faculty of STEM Disciplines	<ul style="list-style-type: none"> • Provide alternative career options and guidance. • Introduce suitable candidates to computing and engineering. 	
Computing Department Faculty and Courses	<ul style="list-style-type: none"> • Recruit undeclared majors from intro, applications, and service courses. • Provide high-level support by having the department head or dean add his or her name to any materials you send out about your major, especially when reaching out to high school teachers and administrators. 	
Mechanical and Electrical Engineering Department Faculty and Courses	<ul style="list-style-type: none"> • Recruit undeclared majors from intro, applications, and service courses. • Demonstrate support and increase visibility by having the department head or dean add his or her name to any materials you send out about your major, especially when reaching out to high school teachers and administrators. 	

Table 3: Leverage Points: Collaborate with Student Groups and Services

Student Groups and Services	How They Might Help	Brainstorm: How Can This Resource Help Your Department?
<i>Non-Major Related Student Volunteer Organizations</i>	<ul style="list-style-type: none"> • Reach out, teach to area K–12 schools and community. • Mentor kids — with a focus on introducing more girls to science fields. 	
<i>Student Groups in Computing</i>	<ul style="list-style-type: none"> • Promote positive computing image. • Provide service on and off campus. 	
<i>Women’s Center</i>	<ul style="list-style-type: none"> • Feature technical women guest speakers. • Host special events. 	
<i>New Student Week/ Orientation</i>	<ul style="list-style-type: none"> • Host information booths. 	

Table 4: Leverage Points: Collaborate with Student Allies and Influencers

Allies and Influencers	How They Might Help	Brainstorm: How Can This Resource Help Your Department?
<i>Computing and Engineering Alumni</i>	<ul style="list-style-type: none"> • Attend career days (elementary, middle, high schools). • Make class visits (middle/high schools). • Offer mentoring/shadowing on the job. • Establish internships. 	
<i>Friends and Family of Computing and Engineering Students and Faculty</i>	<ul style="list-style-type: none"> • Raise awareness with school guidance counselors and school administrators on how to promote your field to girls. • Provide materials to school counselors or math, science, and computer teachers. • Share relevant messages with teachers. • Distribute computing materials and messages at math and science teaching conferences. • Share the excitement of your field through the media (e.g., articles to the local newspaper). 	

Allies and Influencers	How They Might Help	Brainstorm: How Can This Resource Help Your Department?
<p>Current Computing and Engineering Students</p>	<ul style="list-style-type: none"> • Make class visits (middle/high schools and/or community colleges), particularly to their own high schools. • Communicate with former teachers and their new students, including by writing letters and emails to teachers that include success stories and information to share with current students. • Provide materials to school counselors, or math, science, and computer teachers. • Recognize and reward existing teachers who introduce girls to the target majors, e.g., send a letter or recognize a teacher at a student group function. • Offer online or in-person mentoring to school-age girls. • Supply market data regarding particular programs, schools, and teachers that support girls in computing and engineering. 	

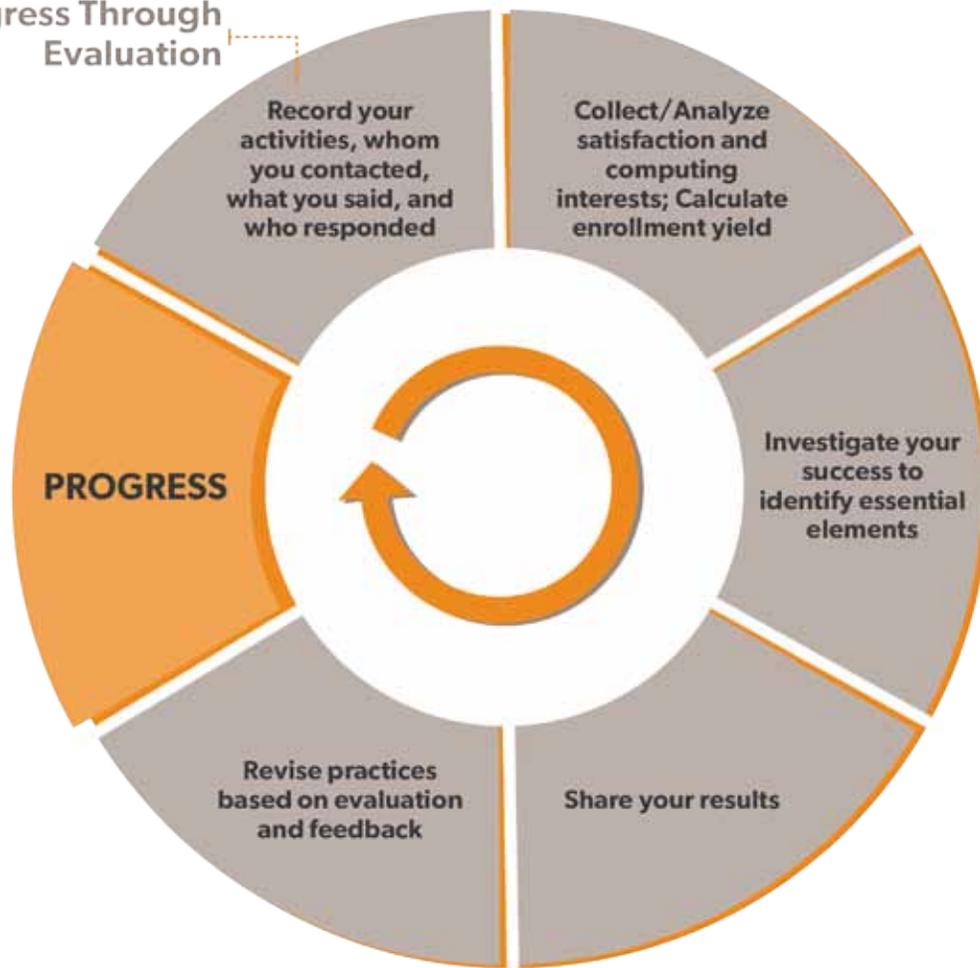
In addition to the above resources, professional societies can serve as a great source of information and contacts. Many universities have their own chapters of the larger societies, some of which focus on women and minorities. Here is a list of some major professional organizations in computing and engineering that may have chapters at your institution:

- American Society of Mechanical Engineers (ASME): www.asme.org
- Association of Computing Machinery (ACM): www.acm.org
- Association of Computing Machinery’s Council on Women in Computing (ACM-W): www.women.acm.org
- IEEE Computer Society: www.computer.org
- Institute of Electrical and Electronics Engineers (IEEE): www.ieee.org
- Society of Women Engineers (SWE): www.societyofwomenengineers.swe.org

EVALUATION: TRACK WHAT WORKS AND WHAT DOESN'T

Evaluation is an essential element for improving recruitment results. Feedback can help you refine your efforts so that your recruitment plan will be effective.

Progress Through Evaluation



Recruitment Goal: Attract more women of all ethnicities to your computing/engineering major.

Formative Evaluation: Evaluate how your recruitment is progressing through brief interviews or surveys regarding participant experience, changes in their interest/intention to enroll, and remaining barriers to interest/intention to enroll. Use the entry survey in the appendix.

Do not be discouraged if you find little or no effect from single messages. Multiple messages and approaches are often needed before students take action to declare or change their major.

Summative Evaluation: Compare trends in new student enrollment in the major by sex and race, relative to average peer institutions.

Find out whether your initiatives influenced students' decisions to take your class using the NCWIT Entry Survey:
www.ncwit.org/EntrySurvey



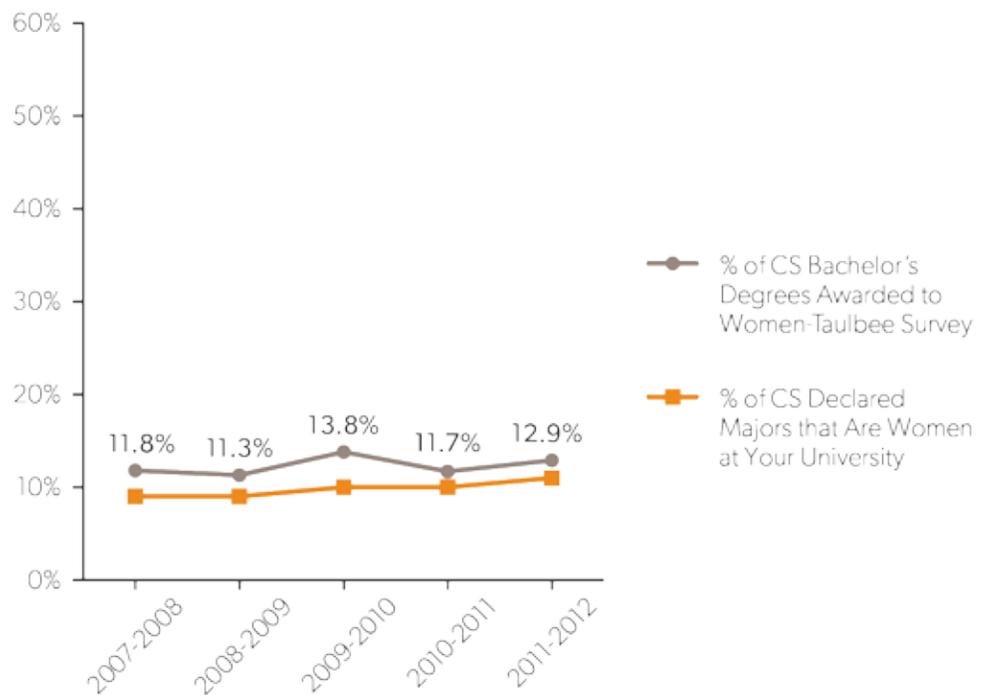
The Power of Data: What Evaluation Can Show

Evaluation can solicit useful feedback about many elements of your recruitment initiatives.

Use of Assessment Data, Example 1. Show how trends at your institution compare to the average institution of your type.

The Computing Research Association (CRA)'s Taulbee Survey is conducted annually to document trends in student enrollment, degree production, employment of graduates, and faculty salaries in academic units in the United States and Canada that grant the Ph.D. in computer science (CS), computer engineering (CE), or information (I). If your university fits this description, this is a good source to which you can compare statistics.

Figure 3: Women's Representation in Computer Science



Source: CRA Taulbee Data and Sample University Enrollment Data

Use of Assessment Data, Example 2. Document curricular change associated with changes in the gender composition of enrollment.

A new Introduction to Computing course that did not require programming experience — a true “CS 0” course — was offered this year for engineering students.

In contrast to the typical introductory course where women comprise 25% of the students, women comprised 44% of the enrollment in the new course.

In striking contrast to the typical loss of student interest, intent to major increased from none to 26% of the women.

Use of Assessment Data, Example 3. Illustrate the influence of peers.

A woman described one result of her unsatisfactory experiences as a computing major in this way:

“If anybody came up to me and said, ‘Hey, I’m thinking about a major in computer science,’ ... I’ve said, ‘Don’t come here [for computer science].”

Use of Assessment Data, Example 4. Illustrate the influence of service courses.

A typical experience for women in this program is introduction through a curricular requirement.

“I came to [this university] as an accounting major and ... [took a general education course] ... called Intro to Computing. ... I decided that I liked it more than I had liked the accounting courses ... and I changed my major.”

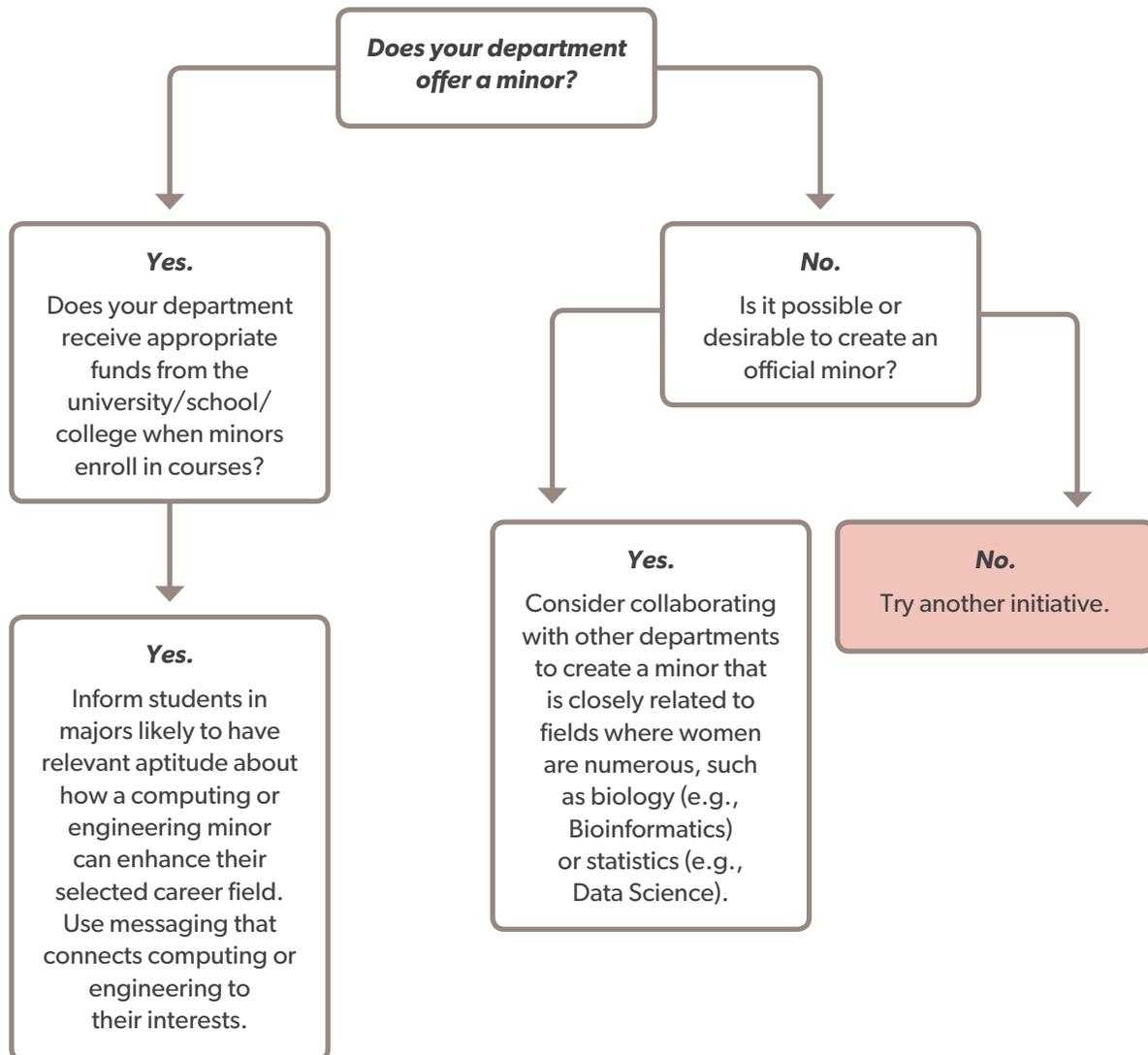
“You’re so brave to major in mechanical engineering with all these guys!”



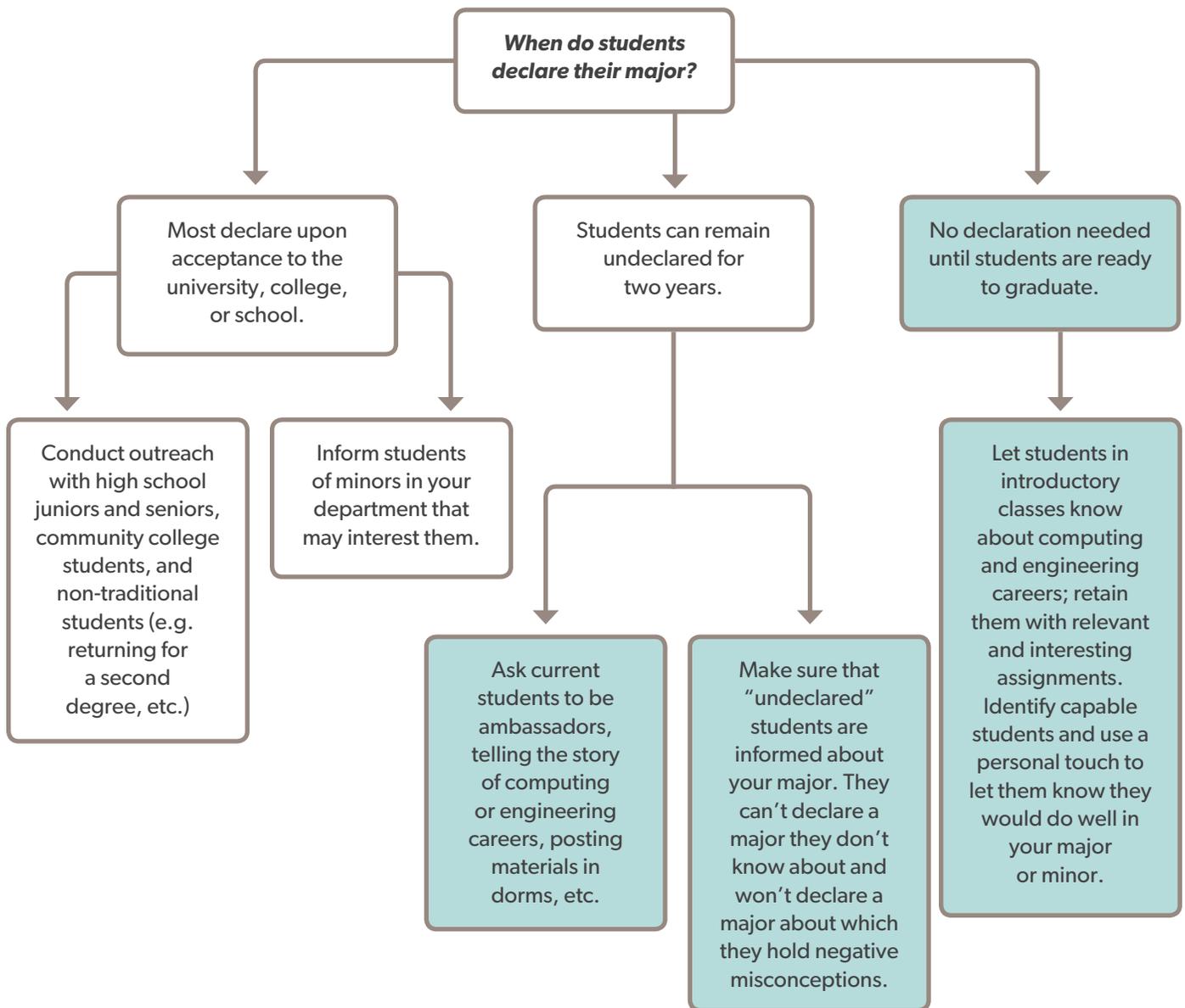
Telling a woman that she is “brave” for declaring her major can create the idea that there is something to be afraid of, and the resulting anxiety can negatively impact performance.

7 WHAT WILL WORK FOR YOU? BRAINSTORMING INITIATIVES

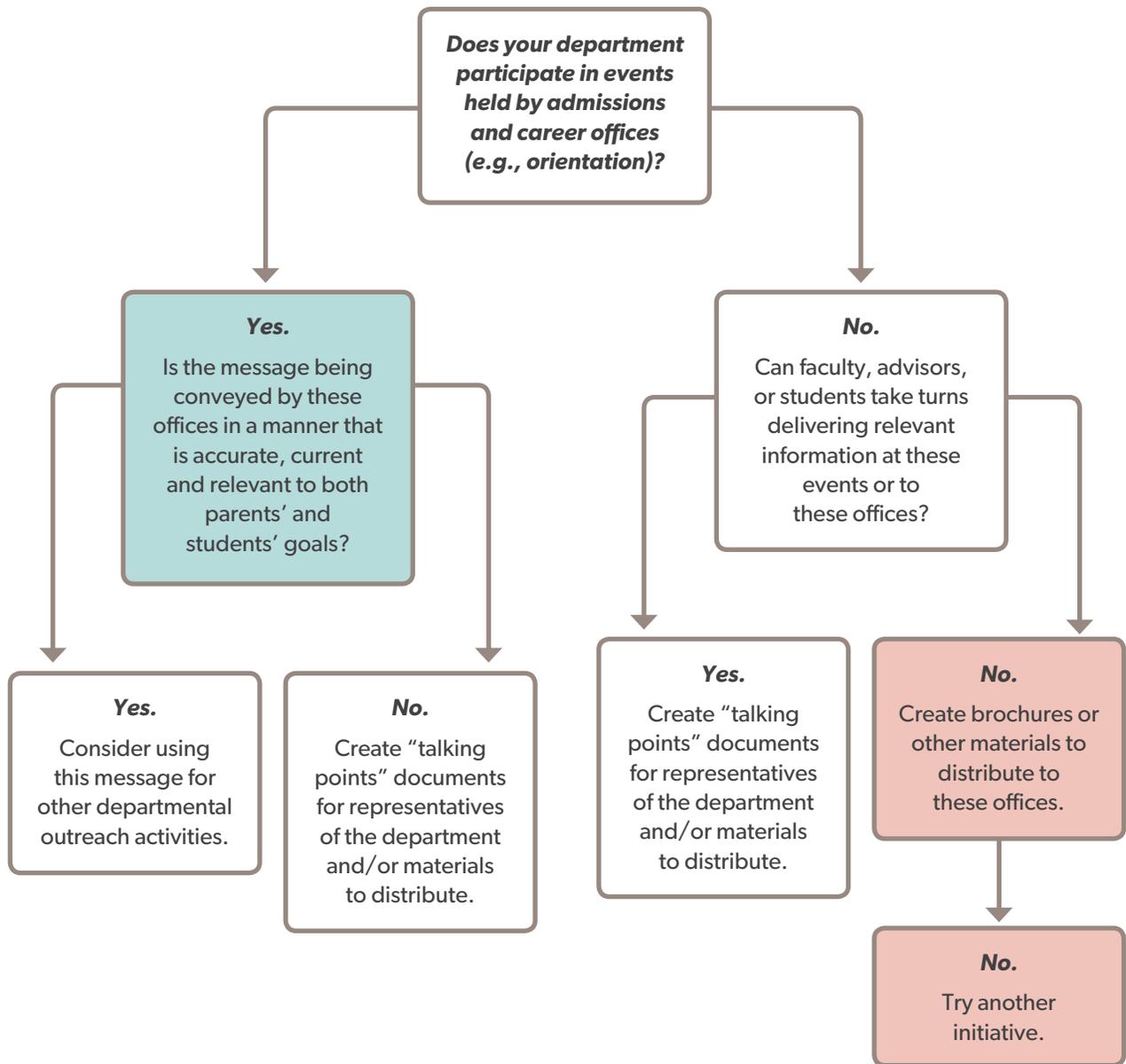
Ideas for Reaching Students Already on Your Campus: Minors



Ideas for Reaching Students Already on Your Campus: Non-Majors



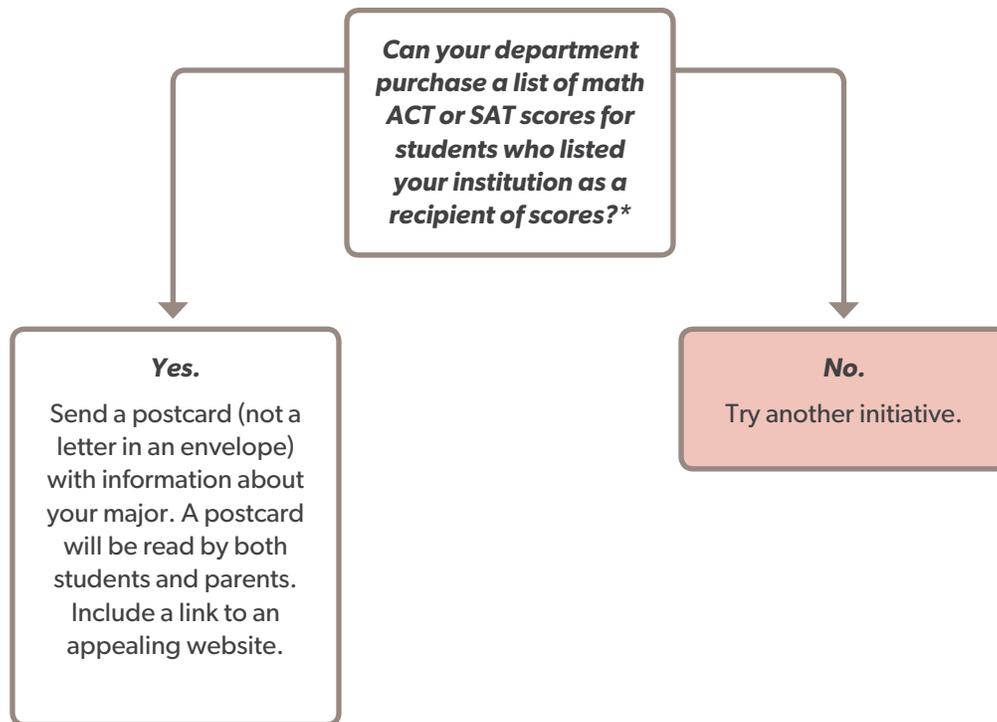
Ideas for Reaching Students Already on Your Campus: Official Events



Ideas for Reaching Students Not on Campus: Teachers, Feeder Schools



Ideas for Reaching Students Not on Campus: Purchasing Aptitude Test Scores



* Note that ACT Educational Opportunity Service provides names and scores at \$0.31 per name; SAT Student Search Service provides names and scores at \$0.32 per name.

APPENDIX: WORKSHEETS, SURVEYS, EXAMPLES

8

The following worksheets will help you develop ways to communicate with your audiences effectively by showing you how to plan and evaluate meaningful recruiting initiatives.

- Worksheet for Identifying Audiences, Their Influencers, and How to Reach Them
- Message Crafting Practice Worksheet
- Sample Outreach Letter from a Current Student
- Example of a Real Strategic Plan
- Marketing Plan Exercise
- Sketch a Recruiting Initiative
- Recruiting Initiative Calendar
- Worksheet for Calculating Annual Enrollment Yield from Recruiting Efforts
- Survey: Did your initiatives influence students to take your class?
- Survey: How effective was your event?

Worksheet for Identifying Audiences, Their Influencers, and How to Reach Them

How will you reach your desired audiences and influencers?

	Who/what influences this group?	How to reach this group?	How will you reach influencers?	What are your related resources or allies?	
Undeclared Majors					
	e.g., advisers, friends, parents				
New Students					
	e.g., instructors; students/friends; parents; media		e.g., host open house; CS mailing/email to students & teachers		
College-Bound Seniors					
	e.g., counselors, teachers, friends, boys				
Community College Students					
High School Girls (Grades: 9-11)					
				e.g., ed. school faculty & students	
Middle School Girls (Grades 6-8)					
	e.g., friends; family; teachers; media	e.g., CS students send marketing email to younger sibs to pass on.			

What will your message be?

Target Audience: _____

Messages all audiences need to hear	Messages particular to your target audience
<p>Diversity is important</p> <p>Lots of jobs</p> <p>High <i>entry-level</i> salaries with 4-year degree</p> <p>Social relevance</p> <p>Flexibility: industry, geographic</p> <p>Work with others</p> <p>Time with family</p> <p>Other</p>	<p>Social value of computing (what this audience cares about)</p> <p>Relevance to present interests</p> <p>Relevance to real world</p> <p>Express creativity</p> <p>Other</p>

Sample Outreach Letter from Current Student

Instructions: Ask current students to write to their high school teachers. Below is a sample letter. Your students can make the text more relevant to their own experiences.

Dear Ms. Harris,

I hope you are doing well. I've been meaning to send an update to you, my favorite math teacher, and now that the semester is winding down, I have some extra time. I want to share my experiences so far this year as a **computer engineering** student.

It's been challenging getting used to my new environment and major. Classes can be a lot of work and can be time consuming, but I've found that I've been able to succeed with hard work and diligence. I've been able to use a variety of resources to stay on track, such as a study group that I meet with regularly. (Your calculus class also helped prepare me for my introductory courses.) Overall, I am enjoying my studies; though my major can be demanding, it's worth all of the effort every time I complete an assignment or do well on a test.

The best part is that I know I'll be in good shape when I graduate — my professors are always sharing information about career opportunities, and the options all seem not only promising but also interesting. I had no idea that engineering has such a wide applicability to the real world. I have a long journey to complete before graduation, but I know I have a lot to look forward to.

How are things back at Eisenhower? Are the students busy preparing for college applications? If so, please feel free to share this letter and my information with them. I am excited to talk to anyone interested in **computer engineering** about joining my university's department. I know it would be as beneficial for them as it has been for me. Please let the kids in the class see this letter and tell them they can contact me.

Thanks for everything!

Sincerely,

Bianca Christina

Example of a Real Strategic Plan

<Institution> – Strategic Plan for Recruitment – Draft – April 13, 2010

Three Year Goal: Increase female student representation in CIS 10% per year (Yr 1=30%, Yr 2=40%, Yr 3= 50%).

Component	Diversity Vision	Actions	Assets	Timeline	Outcomes	Evaluation	Reporting
Recruiting Undecided Students at Univ: Fred = Lead	Increase undecided students' awareness of the range of careers in IT	Univ alumni campus visits & question/answer sessions with undecided students	Present to students their experiences & educate about what it's really like to work in IT	Fall and Spring each year	<ul style="list-style-type: none"> Remove geek bias Increase awareness of career options Increase understanding of reality of IT profession 	<ul style="list-style-type: none"> Students draw an IT person before and after session Quick survey Track enrollment yield/increase in female enrollment numbers 	Department annual report
Recruiting CSS Students not accepted into another Major: Tom = Lead	Increase likelihood that students searching for a major might choose CIS	Create advising materials that show how students can easily complete CIS major upon denial in another major	Students denied one major (e.g., PT, Nursing, Ed) understand options and can choose a closely related major	Annually provide updated materials to advisors in majors that traditionally turn down students	Increase enrollment of students in CIS 2085 from PT, Nursing, and Ed Education	<ul style="list-style-type: none"> Track number of students in CIS 2085 originally from PT, Nursing, and Ed programs 	Department annual report
Recruiting On Campus through Computer Science Education Week Activities: Jen = Lead	Raise awareness among faculty, staff, and CSS students of IT careers and major	On campus and online (Facebook) promotion of IT careers and CSS CIS major/minor	<ul style="list-style-type: none"> Actively dispel myths of IT geek and change images (best kept secret). Disseminate information about the IT job market & alumni stories 	Late fall – coinciding with National CS Education Week	<ul style="list-style-type: none"> Increase number of students aware of CIS and careers in IT Increase number of students enrolling in CIS 	<ul style="list-style-type: none"> 1/2 page evaluation using retrospective pretest format Facebook page visits 	Department annual report
Recruiting through High School Teachers: Laurie = Lead	High school teachers have contact with hundreds of students each year	Deliver IT talking points and recruitment materials to select teachers in local high schools	<ul style="list-style-type: none"> Students often value their teachers' opinions. Personal contact with high school students. Teachers who are alumni can enthusiastically support CSS 	<ul style="list-style-type: none"> After initial visit, use technology for ongoing contact with teachers and to provide materials. Possibly reach teachers who come to CSS for summer programs 	<ul style="list-style-type: none"> Increase contact with high school teachers Increase dissemination of CIS recruiting materials Increase contact with high school students 	<ul style="list-style-type: none"> Track number of teachers contacted & materials delivered Track number of online requests for information by high school students from these schools 	Department annual report
Recruiting High School Students: Lisa = Lead	Promote high school students' investigation of IT careers through creation of short videos of IT professionals	Students video tape IT professionals and post on Blackboard	Undecided high school students actively involved	Spring semester in Online Exploratory Course	Increase awareness of IT careers	End of course survey	Statistical graphs reported in Department annual report
Recruiting Middle and High School Students: Diana = Lead	Increase contact with middle school and high school students and raise their awareness of CIS and CSS	Mentors promote CIS/Univ. through contacts on campus and online with middle school and high school students	<ul style="list-style-type: none"> Mentors can give first-hand descriptions of the CS field. Alumni as mentors can promote CSS 	Annual and ongoing training session for mentors	<ul style="list-style-type: none"> Valid images of the CS field Continued contact through mentor relationship 	<ul style="list-style-type: none"> Mentor survey Contact cards 	<ul style="list-style-type: none"> NSF annual report Department annual report

Sample Marketing Plan with Sample Activities: Fill in the Blanks

	Fall	Spring	Summer	Ongoing
Incoming Freshmen				
	e.g., plan guest speaker for intro CS course		e.g., plan <i>New Student Week</i> booth	
Undeclared Majors				
	e.g., send CS fact sheet to university career counselors			e.g., mentor students in intro courses
Community College Students				
			e.g., pair interested community college student with current CS student (& community college grad)	
Middle Schoolers & Their Influencers				
		e.g., encourage community IT businesses and alumni to plan "Take Our Daughters to Work Day" activities	e.g., ask friend of CS or teacher to hold session at summer conference	e.g., meet with principal and math/science chairs to discuss summer computer curriculum (alumni and friends of CS)
High Schoolers & Their Influencers				
	e.g., send speaker to HS math class or computer class, commence mail and email campaign to students who express interest			

Reminders: Be sure to incorporate short- and long-term goals.

Develop plans incorporating existing resources, allies, and events. Develop and implement one or two strategies targeting desired audiences.

Sketch a Recruiting Initiative

Your recruiting plan should include more than one initiative. Fill out this worksheet for each initiative you are planning. It will help you articulate your goals with a particular audience, plan for appropriate messages, keep track of who is involved, and note the nature of evaluation.

<p>Target Audience:</p> <p>Description:</p> <p>Location:</p>
<p>Assets:</p> <p>How they'll help:</p>
<p>Message:</p> <p>Need it meets:</p> <p>Competition:</p> <p>Objections overcome by:</p>
<p>Delivery method:</p> <p>Timing:</p> <p>Frequency:</p> <p>Follow-up:</p>
<p>Assessment:</p>
<p>Reporting:</p>

Recruiting Initiative Calendar Worksheet: Fill in the Blanks

Develop plans incorporating existing resources, allies, and events. Develop and implement one or two initiatives targeting each desired audience.

	Fall	Spring	Summer	Ongoing
Incoming Freshmen				
	e.g., plan guest speaker for intro CS course		e.g., plan New Student Week booth	
Undeclared Majors				
	e.g., send CS fact sheet to university career counselors			e.g., mentor students in intro courses
Community College Students				
			e.g., pair interested community college student with current CS student (& community college grad)	
Adults Returning to Education				
High School Students & Their Influencers				
	e.g., send speaker to HS math class or computer class, commence mail and email campaign to students who express interest	e.g., pair interested HS senior with college CS major		

Worksheet for Calculating Annual Enrollment Yield from Recruiting Efforts

Enrollment Yield from Recruitment Initiatives							
Academic Year: _____							
	Date	# Female Contacts	# Subsequent Enrollees	# Male Contacts	# Subsequent Enrollees	# Minority Contacts	# Subsequent Enrollees
Initiative #1:							
Initiative #2:							
Initiative #3:							
Initiative #4:							
Initiative #5:							
Initiative #6:							

<p>Calculate ENROLLMENT YIELD from each Initiative for each sex as (# Subsequent Female Enrollees) / (# Female Contacts)</p>	
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Enrollment Yield from Applications

Academic Year: _____

If you have an application process, please fill in data about **APPLICATIONS** as of August 1st of the Current School Year.

	Total Applicants	Transfer Students	White	Asian	Black	Other Race	Average Age
FEMALE applicant numbers:							
MALE applicant numbers:							

Please fill-in data about **ENROLLMENTS** as of September 1st of the Current School Year.

	Total Enrollment	Transfer Students	White	Asian	Black	Other Race	Average Age
FEMALE applicant numbers:							
MALE applicant numbers:							

Survey: Did Your Initiatives Influence Students to Take Your Class?

Instructions: Identify the experiences that may have influenced your brand-new students to declare your major or take your introductory course. Modify yellow-highlighted text to reflect your undergraduate program and list your outreach activities or events in question 1. Avoid asking more questions: focus on recruiting efforts. Question 6 allows you to track students from course to course, if you intend to survey them more than once. Delete question 6 if you do not plan to follow up.

Find out whether your initiatives influenced students' decisions to take your class using the NCWIT Entry Survey:
www.ncwit.org/EntrySurvey



Institution Name – Department of <Computer Science> First Course Survey

Dear student:

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

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

	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"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

	One	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"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. How disinterested or interested are you in majoring or minoring in **<Computer Science>**?

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

Personal Background

4. Gender

- Male
- Female
- Choose not to reply

5. Race/ethnicity

6. The following questions will create an ID number associated with your survey. The ID will allow us to compare your answers over time while retaining your anonymity.

- What is the two-digit day of the month of your mother’s birthday? (If you don’t remember, select your own birthday). For example: January is 01.

- What is the two-digit day of the month of your father’s birthday? (If you don’t remember, select your own birthday). For example: February is 02.

- How many younger brothers and sisters do you have? (Enter 0 if you have none)

- How many older brothers and sisters do you have? (Enter 0 if you have none)

- What is the first letter of your mother’s first name? (Use lowercase letters)

- What is the final letter of your mother’s first name? (Use lowercase letters)

Survey: How Effective Was Your Event?

Sample Contact Questionnaire for a Student Contact

<EVENT NAME and DATE>

PLEASE PRINT

Name _____

Telephone _____

Email _____

How did you hear about the (CS major (at institution), (event))?

[Offer possible ways with check boxes. Instruct to check all that apply. Include an "other" option with a blank to fill-in.]

Based on the information you received from us today, how interested are you in majoring in *****?

(Circle one response.)

1. Very interested
2. Somewhat interested
3. Neither interested nor disinterested
4. Somewhat disinterested
5. Very disinterested

What further information would help you decide that *** is right for you?

[If you repeat this type of contact, you can eventually offer categories with check-all-that-apply boxes.]

How satisfied were you with today's (meeting, event, ...)? (Circle one response.)

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied

What could improve your satisfaction with this *****?

[If you repeat this type of contact, you can eventually offer categories with check-all-that-apply boxes.]

Please make any other comments or suggestions regarding the ** major or your experience here today: _____

Find out whether your initiatives influenced students' decisions to take your class using the NCWIT Entry Survey:
www.ncwit.org/EntrySurvey



THANK YOU FOR COMPLETING THIS QUESTIONNAIRE

9

ADDITIONAL RESOURCES FOR ACCOMPLISHING RECRUITING GOALS

Inspire and Engage

- **National Center for Women & Information Technology (NCWIT) multimedia material:** www.ncwit.org/resources. Browse multimedia interviews with successful women in engineering and computing.
- **Dot Diva multimedia material:** <http://dotdiva.org/educators/resources.html>. Browse brochures, flyers, posters, images, and PowerPoint presentations made for different audiences, and watch videos of real-life Dot Divas in action.
- **Engineer Your Life multimedia material:** <http://engineeryourlife.org>. Browse multimedia interviews with successful women in engineering and computing, explore different career fields in engineering, and learn how to prepare for these fields in high school.

Inform

- **National Academy of Engineering CTC — Changing the Conversation:** www.engineeringmessages.org. Learn how to speak about engineering in a productive and encouraging manner.
- **NCWIT Talking Points site:** www.ncwit.org/resources. Select “Talking Points” under “Resource Type” on the left side of the page for documents that will provide succinct information about issues surrounding women in computing and engineering.
- **U.S. Bureau of Labor career statistics:** www.bls.gov/ooh. Browse job prospects, requirements, and salaries for a variety of careers in computing and engineering.
- **NCWIT Computing Education and Future Jobs: A Look at National, State, and Congressional District Data:** www.ncwit.org/CompEdFutureJobs. This report includes data about IT jobs and computer science education, disaggregated by state and congressional district.

Guide

- **NCWIT Which computing majors are right for me?** www.ncwit.org/whichcomputingmajor. This card, co-branded with ACM, explains how computing interests and talents line up with different undergraduate degrees and the careers that follow.
- **NCWIT How can I prepare for a computing major?** www.ncwit.org/preparecomputingmajor. Produced with the ACM and the CSTA, this card gives computing-specific advice for steps to take on the path from high school to college.

- **NCWIT Counselors for Computing (C4C):** www.ncwit.org/C4C. *Counselors for Computing (C4C) is a four-year campaign through which thousands of students — especially girls — are introduced to computing and encouraged to pursue education and careers in IT. C4C equips counselors with up-to-date information and resources they can use to advise effectively.*

Reach Out

NCWIT Outreach-in-a-Box: Discovering IT: www.ncwit.org/outreach. *This is a program to strengthen and diversify the IT pipeline through outreach to middle schools. Using the box, IT professionals customize and deliver a classroom presentation and engage youth in hands-on activities that inspire and inform them about opportunities in IT.*

Seek Support

Computing:

- Association of Computing Machinery: <http://www.acm.org>
- Association of Computing Machinery’s Council on Women in Computing: <http://women.acm.org>
- IEEE Computer Society Educational Activities Board
www.computer.org/portal/web/education
- National Center for Women & Information Technology: www.ncwit.org
- Computer Science Teachers Association: www.csta.acm.org

Engineering:

- American Society of Mechanical Engineers: www.asme.org
- Society of Women Engineers: www.swe.org
- National Academy of Engineering: www.nae.edu
- ENGAGE: Engaging Students in Engineering: www.engageengineering.org
- Institute of Electrical and Electronics Engineers (IEEE): www.ieee.org/index.html
- Women in Engineering Programs and Advocates Network (WEPAN): www.wepan.org

National Center for Women & Information Technology (NCWIT)
www.ncwit.org | 303.735.6671 | info@ncwit.org

Lifetime Partner:

