Pipeline Initiatives & Women@CC
The College Of Computing At A Glance

What We Do
The College of Computing at Georgia Tech is a national leader in the creation of real-world computing breakthroughs that drive social and scientific progress. We are defining the new face of computing by expanding the horizons of traditional computer science students through interdisciplinary education, collaboration, and a focus on human centered solutions.

Strategic Focus
Cross campus, multidisciplinary collaborations significantly increase opportunities for true innovation in five areas of strategic focus for the College. We are working to create breakthroughs in:
- Digital Health
- High Performance Computing
- Digital Entertainment
- Robotics
- Information Security
- 3rd World Development

Degree Programs
- Bachelor of Science in Computer Science (12% women)
- Bachelor of Science in Computational Media (23% women)
- Minor in Computer Science (18% female)
- Master of Science in Computer Science (17% women)
- Master of Science in Human Computer Interaction (50% women)
- Master of Science in Information Security (23% women)
- Master of Science in Bioengineering* (85% women)
- Ph.D. in Computer Science (18% women)
- Ph.D. in Human-Centered Computing (59% women)
- Ph.D. in Algorithms, Combinatorics, and Optimization*
- Ph.D. in Bioengineering*
- Ph.D. in Bioinformatics*
- Ph.D. in Robotics (Coming Soon)
- Ph.D. in Computational Science and Engineering (Coming Soon)
*designates interdisciplinary degree program

Enrollment As of Fall, 2006
- Bachelor’s: 968 • Master’s: 286
- Doctoral: 274 • Special Grads 18

Faculty As of Fall, 2006
- Academic Faculty: 81 (including 10 joint faculty)
- Research Faculty: 30 • Instructional Faculty: 7
- Post Docs: 2 Female faculty: 19

Women@CC Faculty Advisors
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Mary Jean Harrold, PhD harrold@cc.gatech.edu
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Recruiting, Retention & Outreach Initiatives Umbrella
College of Computing Office of Diversity and Community

Target group
- Underrepresented talent in computing (undergraduate and graduate)
- CoC community at large

Program goal
To increase the overall number of women earning CS degrees from Georgia Tech (BS/MS/PhD)

Program description
The office was instituted by the Dean of the College of Computing, Dr. Richard DeMillo and reflects his commitment to improving diversity and strengthening community within the college and with our partners. Coordinated by an Assistant Dean for Diversity and Community and staffed by personnel who support the mission, responsibilities include fund raising, outreach, recruiting, and development of programs to promote success and satisfaction of students in computing – particularly women and minorities.

Funding sources
College of Computing (CC), NSF, Cisco, HP, Boeing, Lockheed Martin, SAIC, Intel, Goldman Sachs, GA Department of Education, Toyota, Apple, Google, Amazon

Web site for more information
ODC home page under construction
www.cc.gatech.edu

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Retention Initiative
Women@CC

Target group
Women in Computing

Program goal
- To promote, welcome and celebrate women in computing
- To inspire women through community

Program description
Georgia Tech’s Women@CC organization helps females develop a sense of community through service projects, social activities, and by providing continual support. Both the graduate and undergraduate women’s groups have established Advisory Boards to plan activities that respond to the needs of their groups. They have developed several Community Interest Groups, including PhD Support Groups, Student-Faculty Luncheon Roundtables, Career Development; Peer Support Big Sister (graduate) and Peer2Peer Mentor Network (undergraduates); Both groups sponsor CC community-wide events and are actively involved throughout the year in outreach programs. Examples include partnerships with YWCA and Girl Scouts, Summer Camp ICE@GT, ICE teacher training workshops, CC Ambassadors, STARS Student Leadership Corps, and more.

Funding sources
College of Computing, NSF, Cisco, HP, Boeing, Lockheed Martin, SAIC, Intel, Goldman Sachs, GA Department of Education, Toyota, Apple, Google, Amazon

Tools available
Interest surveys; program designs

Web site for more information
www.cc.gatech.edu/women

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Retention Initiative
Opportunity Scholars

Target group
Women Computer Science, Computational Media and Computer Engineering

Program goals
- Promote success and retention of underrepresented minorities and women in computer science, computational media and computer engineering at the Georgia Institute of Technology.
- Foster an interest in pursuing research
- Create a support community

Program description
Starting in freshman year, women and minority students in computing are matched to a graduate mentor based on research interests. For a maximum of 3 years, they engage in 5 hours of research per week with the Mentor and one other undergraduate. Each participant receives a small stipend and is paid for research time. Monthly professional development seminars are held for the students and they have a monthly luncheon with their Mentor; Mentors engage in intrusive advising if mid-term deficiencies are reported; each pair prepares and presents at an end of the year poster competition. In depth assessment tools are used, including focus groups with mentors and on line survey with undergrad Scholars. Retention of participants significantly exceeds all other students in computing. During the 2006-07 year we have 68 Scholars and 30 Graduate Mentors enrolled in this program.

Funding sources
College of Computing, College of Engineering. Intel, SAIC

Tools available
Program details; power point slide overview; assessment instruments

Web site for more information
http://www.cc.gatech.edu/projects/isp/index.htm

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Recruitment and Retention Initiative
Curricular Intervention: New Degree Programs
- BS in Computational Media
- MS in Human-Computer Interaction
- PhD in Human-Centered Computing

Program Goal
- To respond to students' interests and attract broader participation.

Program Description
BS in Computational Media is a joint degree between the College of Computing and the School of Literature, Communication, and Culture (LCC) in the Ivan Allen College of Liberal Arts. Students in the CM program take half their required courses in each school, gaining a firm grounding not only in computer science but also in the theory, history, and professional practice of digital-media creation. The CM program has 200 students in its second year of existence. The student body of the BS in CM is 23% female, as is the 2006 freshman class, which is more than twice as large as the previous year's. In contrast, the BS in CS is 15% female, and the freshman class 2006 is 10% female.

MS in Human-Computer Interaction is a joint degree of the College of Computing; the School of Literature, Communication, and Culture (LCC) in the Ivan Allen College of Liberal Arts; and the School of Psychology in the College of Sciences. The MS in HCI is built around the highly successful GVU Center. The MS in HCI focuses on the design, implementation, and evaluation of computer interfaces that improve the user experience. This program is nine years old, and the student body characteristically is 50% female, compared to the MS in CS, which is 17%.

PhD in Human-Centered Computing goes beyond HCI to consider computing from the socio-technical perspective. Students study a set of theories drawn from sociology, cognitive science, design, and anthropology in order to understand how people engage with and through computing in their daily lives. The PhD in HCC is 59% female, compared to the PhD in CS, which is 18%.

Web site for more information
http://www.cc.gatech.edu

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Recruiting Initiative
College of Computing
Student Ambassadors Organization

Target group
A diverse array of prospective college bound high school students considering Computing; women and minorities are priority.

Program goals
- To increase the overall number of Georgia Tech applicants pursuing College of Computing degrees
- To increase the incoming undergraduate underrepresented student population at the College of Computing
- To be the leader in enrolling the largest number of women in computing
- To provide an opportunity for professional/soft skill development for current computing students

Program description
The College of Computing Student Ambassadors play an integral role in the college’s strategic recruitment efforts and overall visibility. The CC Ambassadors are the “face” of the College of Computing throughout the multiple events held on behalf of our college. It is the mission of the CC Ambassadors to help attract the incoming freshman class and shape “The New Face of Computing”! We have 23 incredible undergraduates representing a diverse array of talents, interests, geographical locations and backgrounds who assist with the many recruitment initiatives at the college. The women at CC comprise 56% of the Ambassadors' talent and spirit, making this a truly representative organization!

Funding sources
Office of Diversity and Community
Georgia Tech College of Computing

Available tools
Web based student program application; professional development workshop designs

Web site for more information
Web site under construction

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Recruiting Initiative
CC Admitted Freshmen Women – Yield Program

Target group
Freshman women admitted into computing for Fall term.

Program goal
To provide an opportunity for admitted women in computer science to meet with undergrad women in computing and to experience the community and academic and student life from their perspective.

Program description
Prior to the final decision date when admitted students accept the offer of admission, our Undergraduate Women invite each female for an overnight stay. They have two date options and each option centers around an event where they can learn more about computing at GT and the community. The Spring Celebration of Women in Computing is one, and the other is the Cool Computing@GT program. The visiting students stay with our women, attend class with them, hear panels, attend the special event and get their questions answered. As one current CC freshman woman said, “Attending the Spring program absolutely made my decision easy. Prior to it I was actually planning to go somewhere else!”

Funding sources
Office of Diversity and Community
GT College of Computing

Tools available
Our Undergrad Women’s Advisory Board is happy to share what they do with this program.

Web site for more information
http://www.cc.gatech.edu/women

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Recruiting Initiative
CoolComputing@GT

Target group
Talented high school women, minority students and their parents.

Program goal
To dispel myths and spark interest in computing in an interactive way.

Program description
Women and minority students from the greater metro Atlanta area are identified by PSAT scores and invited to spend a day with students at the College of Computing. The design is similar to a mini-conference, with several concurrent sessions from which they choose. These include such things as research demos; student panels; overview of the versatility in computing; Aware Home tours; poster sessions; career panels with industry representatives. Participants are also provided with lunch, a t-shirt, and corporate give-aways.

Funding sources
College of Computing; student registration fee of $10 helps to increase commitment to attend and off sets cost. The conference is organized and run by our women and minority students in computing.

Tools available
Program design

Web site for more information
http://www.cc.gatech.edu/coolcomputing/

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Recruiting Initiative

WISDOM through Computing – “Women Innovating Society & Designing Opportunities with Meaning”

Target group
Women at Georgia Tech who are classified as “Undecided” majors and potential graduate school bound women in computing

Program goal
To increase the awareness of opportunities and overall enrollment of women in computing at Georgia Tech.

Program description
The WISDOM evening event is geared to inform and attract 1st & 2nd year Georgia Tech women that are classified with an “undecided” major to consider the possibilities in computing. The event will also highlight and promote the college’s graduate programs to 4th & 5th year female students. The program includes:

- Light dessert & beverages mingling session with current CC faculty & female students.
- Welcome, “Inspiration Through Community”
- New Face of Computing - Brief overview of CC innovation
- Concurrent Sessions A & B:
  A: “Take a Closer Look at CC – It’s not what you think!”
  B: Undergraduate Student Panel
- B: Graduate Student Panel

Closing remarks – Why Computing @ GT

Funding sources
Co-sponsored by Women@CC and Office of Diversity and Community

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Recruiting Initiative
The FUTURES Program

Target group
This program is for exceptional 10th and 11th grade women interested in investigating careers in law, government, business, the sciences, writing, multimedia, public service, economics, architectural or industrial design, construction management, health, engineering, education, and the computing professions.

Program goal
To attract young women to “preview” the versatility of what Georgia Tech offers.

Program description
The students will hear presentations about these careers and have the opportunity to meet with Georgia Tech faculty, staff, and students in small groups to discuss curriculum, internship and co-op opportunities, campus life, admission requirements, study abroad, and scholarships. CoC female Ambassadors assist and serve as Aware Home tour guides to interested participants.

Funding sources
Georgia Institute of Technology Office of Admissions & Special Programs
CC Office of Diversity and Community

Tools available
Marketing materials

Web site for more information
http://www.visits.gatech.edu/futures/

Contact person for more information
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FUTURES PROGRAM
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K-12 Initiative
Institute for Computing Education

Target group
K-12 students, teachers, parents, guidance counselors

Program goals
- To dispel myths relating to the field computing
- Increase awareness of career opportunities and interest in pursuing computing.
- Pursue our formal partnership (since 2003) with GA Department of Education to grow and train CS teachers in engaging curriculum and methodologies

Program description:
The following pages describe a variety of initiatives that have developed under the auspices of ICE@GT. These include: Summer high school camps; middle school camps; teacher training; formal partnership with GA DOE; outreach to YWCA and Girl Scouts; AP Practice Exam Site; LEGO MindStorms Lending Library; the “Emma” story for elementary kids

Funding sources
College of Computing, Toyota Foundation, NSF, Georgia Vocational Staff Development Consortium

Tools available
Workshop design models; camp tool kits – start to finish; assessments; ideas

Web site for more information
www.cc.gatech.edu/ice

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K-12 Initiative
Teacher Training

Target group
High School Teachers

Program goal
Increase the quantity and quality of computing teachers in Georgia with a focus on increasing the number and quality of AP CS teachers.

Program description
Currently in our fourth year, we offer 3 summer residential workshops for teachers: Beginning Programming in Java (8 days), Intermediate Programming in Java (4 days), and College Board endorsed AP CS (4-5 days). In addition we also offer year-round shorter workshops on: Alice, LEGO robots, the AP Case Study, Object-Oriented Programming, and the AP Exam. We use the media computation curriculum originally developed by Dr. Mark Guzdial of Georgia Tech in the Beginning and Intermediate workshops. We have been holding summer workshops since 2004 and have had 138 teachers take one or more workshops with us from 107 schools.

Our plan is to train teachers with little or no programming experience to teach an introductory computing course. Participating teachers must provide signed agreement from their principals showing that the support is in the system to actually teach the course. After a year or two of teaching that course we expect them to take the intermediate workshop and then teach that material as well. After a year or two of teaching the intermediate material they should take the AP workshop and become AP teachers. The AP CS is in the Business and Computer Science Department in Georgia, so we are mostly training business teachers.

Funding sources
The Georgia Department of Education, the Toyota Foundation, the National Science Foundation, and the College of Computing at Georgia Tech.

Tools available
Workshop designs; end of workshop surveys, follow-up interviews, focus groups, follow-up surveys; curriculum; slides; exercises.
Teacher training continued...

**Key learnings based on our experience**

Schools will often send 2-3 teachers to the same workshop, so that at least one teacher can be a substitute for the course. It can take a year after the teacher takes a summer workshop to get a new course to be offered at a school. Principles sometimes send teachers with no experience to AP workshops so be sure to check on applicants experience. Some principles won't let teachers teach these courses even if the teacher wants to. Some teachers will take the summer workshops just to get continuing education credit without any intention of teaching it. So it is best to have a development agreement that is signed by the teacher and the principal that says what the plan is for offering related courses and continued teacher training. It is best to pay all of the teacher's expenses such as hotel, food, and parking. Many teacher’s don't check their school e-mail in the summer so be sure to get the teacher's home e-mail and home address. Some teachers will cancel at the last minute, and some won't show up for the summer workshop. Giving teachers a stipend to attend a short workshop helps improve attendance.

**Web site for more information**

[http://www-static.cc.gatech.edu/program/ice/teacherworkshops.html](http://www-static.cc.gatech.edu/program/ice/teacherworkshops.html)
[http://coweb.cc.gatech.edu/ice-gt/10](http://coweb.cc.gatech.edu/ice-gt/10)

**Contact person for more information**

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K-12 Initiative
Summer Camp for Middle School Students

Target group
Middle School students, with a focus on minority students and girls

Program goals
- Provide a fun and interesting introduction to computing for middle school students. Get more middle school students to consider taking STEM classes.
- Develop a design, complete with business model for teachers to hold their own self supporting summer camps throughout the state
- Provide opportunity for informal mentoring to develop between the participants and our CC students who work as lab assistants.

Program description
In the summer of 2004 we offered 3 weeks of camp, each for 20 middle school students. In the camps we had students work with Alice, Scratch, LEGO Mindstorms RIS 2.0, and PICO Crickets.

Funding sources
GIFT Teacher and a $125 fee/student for each week of camp.

Tools available
Surveys
Application forms
Specific program design/content

Key learnings
We wanted to try many different things our first summer to see what the kids preferred, but it was too many things to cover. In the future we will do a week of Scratch and PICO Crickets, and a separate week of Alice and LEGO robots. It is important to have a show-and-tell at the end of the camp where the kids can show their parents what they have done. You want to have enough robot kits so that you can leave them assembled till the end of camp show.

Web site for more information
http://coweb.cc.gatech.edu/ice-gt/447

Contact person for more information
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**K-12 Initiative**  
Robot Lending Library

**Target group**  
High school students and teachers

**Program goal**  
- Introduce high school students to computing by having them build and program robots.
- Provide a loan program to schools that do not have the resources to purchase kits of their own.

**Program description**  
We have 10 LEGO Mindstorms RIS 2.0 kits that we loan out to schools for up to 3 weeks at a time. Teachers must leave a deposit of $50 for up to 6 kits and $100 for up to 10 kits. The teachers must return the kits with the parts counted and sorted and no major missing parts or they forfeit the deposit. Many schools bought their own kits after borrowing ours.

**Funding sources**  
The National Science Foundation, the College of Computing at Georgia Tech.

**Assessment tools available**  
Focus groups and surveys.

**Key learnings based on our experience**  
Make sure that the teachers understand the conditions under which they forfeit the deposit and have a form for them to sign. Keep one copy of the form and send one with the teacher. Since we raised the deposit and put stickers on the compartments to show where the parts go they are returned in good shape. You need someone to check the kits when they come back and to replace missing parts.

**Web site for more information**  
[http://coweb.cc.gatech.edu/ice-gt/443](http://coweb.cc.gatech.edu/ice-gt/443)

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**K-12 Initiative**
AP Computer Science Practice Exam Site

**Target group**
AP CS Teachers and Students

**Program goal**
- Provide an on-line multiple choice practice exam to help the students study for the AP exam.
- Provide a way for teachers to create and share sample AP Exam questions.

**Program description**
We created a web site that allows students to take a practice AP exam. Students select the number of questions and the type of questions (A or AB). Questions are pulled at random from our database of 120 multiple choice questions. The answers are also shown in a random order. Students are told if their selected answer is right or wrong and why the answer is right or wrong.

Teachers can submit questions to the database and after they are approved they are added to the pool of questions.

**Funding sources**
The College of Computing at Georgia Tech.

**Tools available**
Focus groups and surveys

**Key learnings based on our experience**
Some teachers wanted to grade the results of the student's practice exam but the students found they could use the back button to fix their answers. AP Teachers have said that this is one of the most valuable things that we have done for them.

**Web site for more information**
http://manatee.cc.gt.atl.ga.us/apExam/

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**K-12 Initiative**

**Outreach for Girls**

**Target group**

Middle to high school aged girls.

**Program goal**

Introduce girls to computing in a fun way and in an environment that supports them.

**Program description**

Since April 2005 we have helped with 9 LEGO robot workshops with the Girl Scouts. Research has shown that in co-ed robot teams the boys tend to take over the building and programming of robots. Girls often have less experience with computers than boys. Female students in computer science assist the girls. In addition, we trained camp counselors at one summer camp to do the LEGO robot activities and they had 73 girls do the one week of robot activities and another 65 girls had a shorter introduction. In 2007 we will also introduce the Girl Scouts to Alice at Saturday workshops.

In 2007 we will begin working with the YWCA in three after school programs for middle school girls. We plan to use PICO Crickets, Scratch, LEGO robots, and Alice with the girls.

**Funding sources**

The National Science Foundation and the College of Computing.

**Assessment tools available**

Surveys.

**Key learnings based on our experience**

The Girl Scouts like to add accessories to their robots. They enjoy programming the robots to go through a course taped on the floor.

**Web site for more information**

[http://coweb.cc.gatech.edu/ice-gt/201](http://coweb.cc.gatech.edu/ice-gt/201)

**Contact person for more information**

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K-12 Initiative
Summer Camp ICE@GT

Target group
High school women and minority students

Program goal
To introduce talented high school girls and minority students to computing

Program description
For the past 3 summers we have offered one week day camps, using our computer labs on campus and computing college students (women and minorities) as the lab assistants. Students must apply, submit grades and teacher recommendations, write an essay and pay a deposit to be admitted. Students use media computation to produce a collage, and LEGO Mindstorms, Alice animation, build-a-computer, and a show at the end.

Funding sources
College of Computing, student tuition ($75 per person includes, t-shirt, lunches and all camp related activities), NSF (REU)

Tools available
Application Handbook; camp design; evaluation

Key learnings based on our experience
High school students will not pay more than $75/wk, non-residential

Web site for more information
http://www.cc.gatech.edu/campice/

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**K-12 Initiative**

“Emma”

**Target group**
Elementary School Girls

**Program goal**
- Encourage young girls to think about going into computing.

**Program description**
The CC Women created a Power Point slide show that builds on “You Can Be Anything!” The story begins with one of our students at age 10 (we used real photos from her album) wondering about “why can’t someone invent…” Her Dad encourages her to think about inventing things herself and then she saw the “You Can Be Anything!” music video in school and she “gets it”. She goes on to graduate and goes into computing in college. When we actually used the show, the real Emma came out on the stage at the end of the story with an AIBO dog, finished the story and led the students as they all sang “You Can Be Anything!”

**Funding sources**
Didn’t cost anything to create it. You can easily take the slides and insert your own students into it and take it on the road!

**Key learnings based on our experience**
The children LOVED it and really got into the story and the song at the end. They oo-ed and ah-ed when Emma came out to finish the story in real life.

**Web site for more information**
www.cc.gatech.edu/community

**Contact person for more information**
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**Intervention Across the Pipeline**

**NSF Broadening Participation in Computing (BPC) Alliance:**
*Georgia Computes!*

**Target group**
- Pre-high school students and group leaders
- High school students and teachers
- Undergraduate students and teachers

**Program goal**

Broaden participation in computing across the state of Georgia by improving the state of computing education across the pipeline.

**Program description**

With a new NSF BPC Alliance grant, we are integrating several of our interventions and disseminating across the state in order to broaden participation in computing at both the undergraduate and graduate levels.

- **Pre-High School:** We are working with YWCA and Girl Scouts to offer computing activities and train group leaders.
- **High School:** While continuing our ICE workshops, we will teach other CS departments across the state how to run summer camps.
- **Pre-Undergraduate:** We are creating an on-line space for younger students to share their computational artifacts, and meet successful undergraduate and graduate computing students as role models.
- **Undergraduate:** We will host workshops for faculty in Georgia to help them in adopting and adapting the innovative undergraduate curricula being developed at Georgia Tech for contextualizing computing in engineering, robotics, and media.

**Partners**

YWCA, Girl Scout Council of Northwest Georgia, CEISMC, University System of Georgia, Georgia Department of Education

**Funding sources**

The National Science Foundation Broadening Participation in Computing program

**Web site for more information**

http://www.georgiacomputes.org (*Under Construction*)

**Contact person for more information**

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Pipeline Initiative
NCWIT Hub: The mission of the National Center for Women & Information Technology (NCWIT) is to ensure that women are fully represented in the influential world of information technology and computing. NCWIT's overarching goal is parity in the professional information technology (IT) workforce, and our fundamental strategy is to educate, disseminate, and advocate a national, multi-year implementation plan that generates tangible progress within 20 years.

NCWIT is organized using a distributed core-hub model, a model that will encourage efficiency, support existing programs, unify like-minded efforts, and leverage consolidated efforts for national impact. NCWIT's distributed group of hubs -- consisting of academic institutions, industry initiatives, professional groups, and other organizations -- acts as the flexible foundation for the creation and application of programs, research and outreach.

Program Description
Georgia Institute of Technology (Georgia Tech) is one of seven hubs for NCWIT. Georgia Tech, one of the top research universities in the country, shares NCWIT's commitment to increasing the number of women in computing. With the support of the College of Computing's Assistant Dean for Diversity, the Dean of the College of Computing, and the top Georgia Tech administration, NCWIT will leverage Georgia Tech's strength in societal research concerning women and technology and its connections with colleges and universities in Georgia and surrounding states. Programs include an innovative introductory computing curriculum for undergraduates; the College-level Diversity in Computing Advisory Board; the Technology, Engineering, and Computing Summer Camp (for middle-school girls) and Career Conference (for high-school girls); high-school AP-CS teachers workshop and support; the NSF ADVANCE Program for Institutional Transformation (for faculty); and the Center for the Study of Women, Science, and Technology.

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