AgentCubes-in-a-Box: Introduce Computing Through Game Design

Introduce students to computer science through AgentCubes, a powerful and engaging 2-D and 3-D programming tool. By completing the lessons in this program-in-a-box, your middle school students will learn to program their own games and simulation worlds, and in the process, learn the fundamentals of computer science.

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AiC Award Recognitions

AiC Award Recognitions honors women’s technical aspirations and abilities, as well as the educators who support them.

Aspirations in Computing (AiC)

Aspirations in Computing (AiC) provides encouragement, enables persistence, opens doors, and changes lives for women in technology from K-12 through career. By offering exclusive

awards, scholarships, internships, community, and more, AiC turns barriers into possibilities.

Aspirations in Computing (AiC) Collegiate Award

AiC Award Recognitions honors women’s technical aspirations and abilities, as well as the educators who support them.

Aspirations in Computing (AiC) Educator Award

AiC Award Recognitions honors women’s technical aspirations and abilities, as well as the educators who support them.

Aspirations in Computing (AiC) High School Award

AiC Award Recognitions honors women’s technical aspirations and abilities, as well as the educators who support them.

Aspirations in Computing (AiC) Impact Award

AiC Award Recognitions honors women's technical aspirations and abilities, as well as the educators who support them.

Booming Enrollments – What is the Impact?

We are in the throes of another undergraduate enrollment surge. The number of new CS/CE majors in bachelor's programs at Taulbee departments this year has reached the peak levels seen at the end of the dot-com era. While this is better news than the opposite (declining enrollments), it is critical that the field take into account how policies and efforts to manage the enrollment surge will affect groups that are under-represented in computing. The Taulbee Survey shows a three-year increase of approximately 61 percent in undergraduate enrollment at U.S. CS departments between 2010-11 and 2013-14. We also note that the booming enrollments are not limited to doctoral granting universities. For the past two years, ACM has sponsored a survey similar to the Taulbee Survey, but which collects data from Non-doctoral granting Departments in Computing (NDC). The most recent study included data from 164 institutions representing 302 programs at the bachelor's level. Between 2012-13 and 2013-14, these institutions saw more than a 16% increase in CS

degree production and over 7% increase in total CS enrollment.

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BPCNet: Get Support for the NSF Broadening Participation in Computing Plan Requirement

The National Science Foundation (NSF) is committed to addressing the lack of diversity in the computing workforce by encouraging practices and programs that focus on the underrepresentation of women of all racial/ethnic backgrounds (African Americans/Blacks, Hispanic Americans, American Indians, Alaska Natives, Native Hawaiians, Native Pacific Islanders), and persons from economically disadvantaged backgrounds, and persons with disabilities. A Broadening Participation in Computing (BPC) plan should incorporate one or more of these groups, and/or another group underrepresented in computing, that is relevant to your local area (for example, rural populations).

As an NSF-funded BPC Alliance, NCWIT offers scalable, evaluated,

and packaged programs and resources that CISE Principal Investigators (PIs) and their departments can engage with as plans for broadening participation in computing are developed.

> CISE PIs can work with a dedicated NCWIT liaison for your BPC plans. Email bpcnet@ncwit.org with any questions.

Why Is Diversity Important for CS Research?

Technology should be developed by those who are as diverse as the population it serves. CS is missing out on innovative thinkers, but you can make a difference by getting involved in recruiting and educating a new generation of researchers.

Read this blog to learn (or remind yourself) how BPC pertains to you and your field.

NCWIT Research You Can Learn From and Put Into Action Immediately

View a collection of packets online.

NCWIT Programs You Can Get Involved In

Aspirations in Computing (AiC)

Aspirations in Computing (AiC) encompasses a suite of programs that provides technical girls and women with ongoing engagement, visibility, and encouragement for their computing-related interests and achievements from high school through college and into the workforce. AiC opportunities include awards for women in high school, college, and graduate school, as well as high school educators. An entire department can get involved, or individual students and faculty can volunteer for a number of opportunities.

AiC Award Application Reviews

CISE research teams can volunteer to review AiC award applications – thousands of which are received in the last quarter of each calendar year. Get inspired by the amazing accomplishments of high school, undergraduate, and graduate students interested in computing while giving back.

Departments do not need to have an NCWIT Academic Alliance membership in order for individuals to volunteer.

Time commitments vary per person (from one to 10+ hours).

Email bpcnet@ncwit.org for more information.

AiC Affiliate Award Events

CISE researchers can host or volunteer for AiC Affiliate Award events: view a map of 79 Regional Affiliates online.

In order to participate, departments must have an NCWIT Academic Alliance (AA) membership. (Verify AA memberships online. Not listed? Fill out an AA membership form to join more than 600 colleges and universities nationwide.)

Time commitments vary by region and level of involvement (from about 10 to 100 hours).

Email bpcnet@ncwit.org for more information.

AspireIT

NCWIT AspireIT is designed to teach K-12 girls programming fundamentals and computational thinking in fun, creative, and hands-on environments. Participants are ultimately encouraged to contribute their unique perspectives and ideas to future innovations. Research shows that participants more easily identify with near-peer mentors, increasing their personal self-efficacy and confidence. To that end, NCWIT offers two AspireIT components to amplify and further the positive impact of near-peer instruction: the AspireIT Impact Award and the AspireIT Toolkit.

CISE researchers and their departments can utilize the AspireIT Toolkit to facilitate engaging and inclusive computer science experiences for K-12 students. Researchers and their departments can utilize the Toolkit to implement computing programs in their community – encouraging participants to learn new skills and become technology innovators.

The approximate time commitment varies by level of involvement (~5 to 100 hours).

Email bpcnet@ncwit.org for more information.

AiC Noteworthy Outcomes

- **Ninety percent** of past high school AiC Award recipients report a major or minor in a STEM field – **82 percent in computer science or engineering**.
- Since 2013, more than 9,500 girls have received an estimated 295,000 instruction hours through 436 AspireIT programs in 43 states. AspireIT participants reported statistically significant increases over time for "Intent to Persist in Computing," "Confidence in Computing," and "Perceived Social Support for Computing."
- **Eighty-six percent** of 2018 Collegiate Award recipients agreed that winning the award increased their commitment to pursuing a computer science degree in college.

BACK TO LISTING OF ALL PROGRAMS

CISE PIs can work with a dedicated NCWIT liaison for your BPC plans. Email bpcnet@ncwit.org with any questions.

Counselors For Computing (C4C)

CISE researchers can host Counselors for Computing (C4C) events on their campus. C4C provides professional school counselors with information and resources they can use to support ALL students as they explore computer science education and careers. C4C conveys this information at workshops across the country, including high schools and college campuses.

C4C Noteworthy Outcome

In 2017, C4C staff and counselor consultants produced or

presented at 52 events in 18 states, **reaching 4,477 counselors for a potential reach of 1,119,250 girls**. Nearly all counselors who attended events reported that C4C influenced their understanding of computing careers (91 percent).

"Being a change-maker, developing new opportunities for our students resonated with me and inspired me." ~ C4C Participant

BACK TO LISTING OF ALL PROGRAMS

CISE PIs can work with a dedicated NCWIT liaison for your BPC plans. Email bpcnet@ncwit.org with any questions.

Extension Services

Extension Services (ES) recommends research-based approaches and resources for increasing women's participation in computing, helping departments achieve measurable results in the short term and the long term. PIs can work with an ES consultant to develop a customized strategy that focuses on creating culture change within educational systems.

Time commitments vary by level of involvement (from about five to 20 hours).

Noteworthy Outcome

For 2012-16 ES clients who received customized consultation, new enrollments of **women grew by 75 percent** over four years, **outgrowing the increase in men**, which grew by only 38 percent.

BACK TO LISTING OF ALL PROGRAMS

CISE PIs can work with a dedicated NCWIT liaison for your BPC plans. Email bpcnet@ncwit.org with any questions.

TECHNOLOchicas

Departments can host a TECHNOLOchicas event on campus, either for K-12 outreach or inreach at their college or university. TECHNOLOchicas, co-produced with the Televisa Foundation, is a national initiative designed to raise awareness among young Latinas and their families about opportunities and careers in technology. Visit the TECHNOLOchicas site for videos, events, and resources for encouraging Latinas to pursue computing. More than 250 profiles of real-life, diverse Latinas in tech are available at technolochicas.org.

Time commitments vary by level of involvement (from about 20-25 hours).

Noteworthy Outcomes

- The TECHNOLOchicas campaign leverages **NCWIT resources, in both English and Spanish**, for engaging young women in computing.
- TECHNOLOchicas have participated in **more than 120 outreach events nationwide**, including appearances at local schools and public housing communities, conference presentations, CSEdWeek events, as well as events hosted by major tech corporations, including Apple and Microsoft.

BACK TO LISTING OF ALL PROGRAMS

If you are a CISE PI with questions about NCWIT programs or

resources, contact us at bpcnet@ncwit.org.

Self-guided Course: Create a Recruitment or Retention Plan

This self-guided course is designed for faculty and administrators who are beginning work on diversifying undergraduate computing programs or are trying to reignite existing initiatives. In this course, you will learn from NCWIT social scientists and from fellow faculty and administrators who have implemented successful initiatives. At the end of the course, you'll have a concrete plan for implementing doable recruitment and retention strategies, including some evaluation mechanisms.

Time commitment will vary by level of involvement (from about 12-40 hours).

BACK TO LISTING OF ALL PROGRAMS

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Bridging the Encouragement Gap in Computing

There is consensus among researchers that encouragement matters and plays a critical role in engaging more young women and girls in computing. Here are some key highlights from published research studies, and follow-up tips on practicing encouragement.

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Public Published Date 05/09/2019

Broadening Participation by Supporting Great Teaching

This is the first of a regular column that EngageCSEdu is doing for ACM InRoads magazine. The goal of the column is that by highlighting aspects of the EngageCSEdu project and its community, we can show how great teaching can help broaden participation in computing. This article focuses on informal ways of encouraging student interaction as a means to building

positive, inclusive student community. It also includes information on how faculty can contribute to the collection and serve as reviewers.

View the ACM InRoads article online.

Public Published Date 02/21/2017

Computation Creativity: An Interview with UNL's Elizabeth Ingraham and Leen-Kiat Soh

Learn more about using Computation Creativity activities in your introductory computing courses to engage your students and to improve their learning. In this March 2018 issue of ACM Inroads magazine, NCWIT Research Scientist and EngageCSEdu Director Beth Quinn interviews Professors Liz Ingraham and Leen-Kiat Soh. Professors Ingraham and Soh, along with other colleagues from University of Nebraska, are building and testing off-line activities for developing students' creative computational thinking, or "Computational Creativity." Dr. Soh is also an active member of the NCWIT Academic Alliance.

This is the fourth of a regular column that EngageCSEdu is doing for ACM InRoads magazine. The goal of the column is that by highlighting aspects of the EngageCSEdu project and its community, we can show how great teaching can help broaden participation in computing.

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