Indiana University Bloomington: School of Informatics and Computing  2015 NCWIT NEXT Second Place Awardee for Excellence in Promoting Women in Undergraduate Computing

**RECRUIT STRATEGICALLY**
- Targeted outreach to women in introductory courses
- “Own your Awesome” brochure sent to admitted women and URMs
- Peer/student ambassadors conduct recruiting and outreach
- Work to inform top influencers, such as university advisors and parents

**RETAINT WITH PEDAGOGY**
- Creating Inclusive Classroom and Lab Environments workshop for all TAs
- Faculty best practices teaching collegium
- Classroom observation rubric that highlights best practices
- Collaborative learning including pair problem-solving and peer-led team learning

**RETAINT WITH CURRICULUM**
- Serve IT Clinic lets students “make a difference” assisting nonprofits
- Intro courses that fulfill University core requirements enable non-majors to try CS
- Cognates in Human-Centered Computing and Health Sciences
- 8 week course introduces students to computing majors and careers

**SUPPORT INITIATIVES**
- Strong support from administrative leaders
- Strategic planning that prioritizes diversity
- Campus-wide multidisciplinary Center of Excellence for Women in Technology

**ASSESS EFFORTS**
- Pre- and post-semester surveys document changes in student efficacy and inform marketing and outreach
- Success of diversity initiatives and pedagogical interventions assessed with pre- and post-data
- NCWIT Student Experience of the Major survey

**RETAINT WITH STUDENT SUPPORT**
- Supplemental instruction (PLTL) and study groups for intro classes
- Free tutoring for all lower level classes
- Women in Computing banquet with recognition for supportive faculty
- Support for Grace Hopper attendance

**RETAINT WITH CURRICULUM**
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**Total Declared Women Majors**

**Change Conditions, Not Students**

**Graduation of Women**
**SUPPORT INITIATIVES**
- Four new professional positions for recruiting and retaining women
- The College’s Dean makes diversity a priority and shows support by attending events and programs
- New space for WIE programs
- Increase in the number of women faculty

**RECRUIT STRATEGICALLY**
- MSU Women in Engineering video, brochure, and website
- WIE Student Ambassadors lead tours, organize events, maintain a blog for prospective students, hold WIE luncheons at recruiting events, and more
- MSU Tapestry Workshop led to strong connections with HS teachers

**RETAIN WITH PEDAGOGY**
- Intro programming course emphasizes relevance and uses pair programming
- Inclusive pedagogy and the power of encouragement promoted through presentations in departmental faculty meetings

**RETAIN WITH CURRICULUM**
- Computational Thinking Lab course for new programmers taking intro computing; includes Peer-Led Team Learning and emphasizes growth mindset
- Google Computer Science Engagement Award for intro programming materials contributed to EngageCSedu

**RETAIN WITH STUDENT SUPPORT**
- CoRe first year residential engineering program
- Spatial visualization assessment; supplemental course for low scorers
- WIE organizes social and professional development activities and sponsors women to attend the Corporate Spring Break Tour
- WIE Connect pairs first year students with upper class student mentors

**ASSESS EFFORTS**
- NCWIT Student Experience of the Major survey
- NCWIT Entry Survey annually to evaluate recruitment strategies
- Surveys used to assess success of the Computational Thinking Lab course
- NCWIT Tracking Tool data to assess needs and impact of strategies

### Total Declared Women Majors

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### Change Conditions, Not Students

- **RECRUITING STRATEGIC PLAN**
- **PEDAGOGY**
- **EVALUATION & TRACKING SYSTEM**
- **INSTITUTIONAL POLICIES & SUPPORT**
- **STUDENT SUPPORT**

### Graduation of Women

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*Michigan State University: Computer Science*

*2015 NCWIT NEXT Second Place Awardee for Excellence in Promoting Women in Undergraduate Computing*

*ncwit.org | NCWIT Extension Services for Undergraduate Programs | Contact: Teresa VanderSloot, iselava1@msu.edu | ESC: Michelle Slattery, peakresearch@usa.net*
University of California-Berkeley: Electrical Engineering and Computer Science 2016 NCWIT NEXT Honorable Mention Awardee for Excellence in Promoting Women in Undergraduate Computing

**SUPPORT INITIATIVES**
- Center for Access to Engineering Excellence promotes student success
- Positions supporting diversity with a Director for Diversity and Achievement, CS Scholars Program staff, and two additional CS advisors
- Diversity of faculty increasing through new hires

**RECRUIT STRATEGICALLY**
- CS Education Day targets underserved and underrepresented HS students
- Community College Engineering Visit Day and Transfer to Excellence REU program target prospective transfer students
- Partnership with outside organizations brings computing to diverse or underserved populations, e.g. Black Girls Code, Techbridge

**RECRUIT WITH PEDAGOGY**
- Beauty and Joy of Computing introductory course emphasizes the relevance and impact of computing and is designed for students who lack programming experience

**RECRUIT WITH CURRICULUM**
- BS and BA degrees provide multiple pathways to computing
- CS KickStart 1-week program for incoming women without CS experience promotes inclusion and provides an introduction to programming

**ASSESS EFFORTS**
- CRA’s Data Buddies Survey used to assess student experiences
- Female participation tracked in classes, programs, and events
- NCWIT Entry Survey
- NCWIT Tracking Tool

**RETAIN WITH STUDENT SUPPORT**
- CS Scholars program supports diverse cohorts of students without CS experience for professional development seminars, tutoring, mentoring, and research opportunities
- T-PREP program prepares and builds community amongst transfer students

**RETAIN WITH CURRICULUM**
- BS and BA degrees provide multiple pathways to computing
- CS KickStart 1-week program for incoming women without CS experience promotes inclusion and provides an introduction to programming

**Total Declared Women Majors**

**Change Conditions, Not Students**

**Graduation of Women**
RECRUIT STRATEGICALLY
- Increased outreach targeting female students and students of color in middle school, high school, through community college
- Website revised to be more interesting, appealing, and highlight women
- SUCCESS workshop for HS students, parents, and teachers
- ICS Scholars day with special women’s luncheon for admitted freshmen
- WICS students call all admitted female students (freshman and transfer)

RETAIL WITH CURRICULUM
- Python in intro courses enables students to solve realistic problems early
- First year course sequence unified across all majors to eliminate anxiety-provoking major decision points
- Non-major courses with societal implications and multiple computing minors create additional pathways to ICS, in part targeted to women

RETAIL WITH STUDENT SUPPORT
- Undergraduate Mentorship Program pairs students with corporate mentors and incoming women with more advanced students
- Scholars Network Summer Transition Program to increase retention of female and students of color
- Promotion of learning communities, research & internship opportunities

ASSESS EFFORTS
- Comprehensive evaluation plan including NCWIT Tracking Tool
- Continuous evaluation of perceptions and yield of recruiting activities using NCWIT Entry Survey to tailor marketing and recruitment efforts
- Continuing (2nd) course survey used to track retention in first year
- Student Experience of Major survey used to guide curriculum revisions

Support Initiatives
- Office of Access and Inclusion (OAI) established in 2014
- OAI collaborates with many university/school offices including Admissions, Student Affairs, Institutional Research, Communications, Development, External Relations
- OAI contributes to recruitment, student support, and assessment efforts

Retain with Pedagogy
- Contextualized, inclusive examples and assignments with broad appeal
- Interactive, live coding and execution in lectures (mistakes and all)
- Pair programming used in all introductory courses
- Peer tutors, with women well represented, provide students with immediate access to help in labs

Retain with Curriculum
- Python in intro courses enables students to solve realistic problems early
- First year course sequence unified across all majors to eliminate anxiety-provoking major decision points
- Non-major courses with societal implications and multiple computing minors create additional pathways to ICS, in part targeted to women

Change Conditions, Not Students
- Recruitment Strategic Plan
- Pedagogy
- Curriculum
- Evaluation & Tracking System
- Institutional Policies & Support
- Student Support

Total Declared Women Majors
- University of California Irvine Bren School of ICS—All Majors

Reduced Attrition of Women (and Men)
- Attrition Rates Female All Races/Ethnicities
- Attrition Rates Male All Races/Ethnicities

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ncwit.org | NCWIT Extension Services for Undergraduate Programs
University of Pennsylvania: Computer and Information Science
2015 and 2016 NCWIT NEXT Honorable Mention Awardee for Excellence in Promoting Women in Undergraduate Computing

**SUPPORT INITIATIVES**
- SEAS Faculty Diversity Committee
- Advancing Women in Engineering program
- Funding from Trustees Council of Penn Women, School of Engineering and Applied Science, and other grants

**ASSESS EFFORTS**
- Admissions, enrollment, and graduation data focus recruiting and retention efforts
- Assessment of initiatives such as PESP workshops and WiCS High School Day for Girls
- Google Analytics used to track reach of website

**RECRUIT STRATEGICALLY**
- Penn Emerging Scholars Program (PESP) peer-led team learning workshops target undecided students
- Outreach at College Majors Fair for undecided A&S students
- Improved website features current student profiles and projects
- CIS Student Outreach Committee and WiCS outreach to K-12

**REINT WITH CURRICULUM**
- Intro CIS course for students without programming experience
- Students from Arts and Sciences can easily take CS as a second major

**REINT WITH PEDAGOGY**
- Peer mentors in Intro CIS recitations
- TA training program directed by teaching faculty
- Diversity Talks series for SEAS faculty

**REINT WITH STUDENT SUPPORT**
- Women in Computer Science Residential Program living and learning community
- Faculty host outreach events to support current URM students
- Widely attended advising events for freshman majors and non-majors
- Support for Grace Hopper attendance

**TOTAL DECLARED WOMEN MAJORS**
- University of Pennsylvania–Computer and Information Science
- Total Declared Majors Female All Races/Ethnicities

**CHANGE CONDITIONS, NOT STUDENTS**

**GRADUATION OF WOMEN**
- University of Pennsylvania–Computer and Information Science
- Graduation Trends Female All Races/Ethnicities
University of Texas-Austin: Computer Science
2016 NCWIT NEXT Second Place Awardee for Excellence in Promoting Women in Undergraduate Computing

SUPPORT INITIATIVES
• Two permanent student affairs positions oversee diversity efforts
• Attention to diversity permeates departmental activities; all faculty committees must attend to diversity
• Collaboration with Admissions and Development offices
• Corporate partners that support women’s initiatives

ASSESS EFFORTS
• Women’s participation tracked in programs, classes, and recruiting
• Admissions, enrollment, and retention monitored with NCWIT Tracking Tool
• Work with admissions staff includes setting goals, tracking progress, and discussing processes

RETAIN WITH CURRICULUM
• Revised admission standards that reduce emphasis on computing experience
• Faculty personally recruit women for the Turing Scholars Honors Program
• Female “Dream Team” organizes lunches, faculty teas, tours, and personally contacts admitted students
• Student Ambassadors host HS students visiting the department for a day

RETAIN WITH PEDAGOGY
• Intro courses taught by inspiring and supportive faculty
• Faculty luncheons for promoting and sharing ideas
• Pair and group programming, flipped classrooms

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RETAIN WITH STUDENT SUPPORT
• Summer prep materials sent to incoming students
• Imposter syndrome addressed during orientation
• CS Pods learning communities for all incoming freshman
• Well-organized WiCS group is very active in diversity efforts and includes men

Total Declared Women Majors

Change Conditions, Not Students

Graduation of Women
University Texas at El Paso: Computer Science
2015 NCWIT NEXT Honorable Mention Awardee for Excellence in Promoting Women in Undergraduate Computing

RETAIN WITH PEDAGOGY
- UT El Paso’s Peer-Led Team Learning program expanded to El Paso Community College
- Stereotype threat presentation for peer leaders and faculty from UT El Paso and El Paso Community College

RETAIN WITH CURRICULUM
- Two introductory computing courses approved as university-wide core curriculum courses and designed to emphasize the use of technology in problem solving, communication, and knowledge acquisition

RECRUIT STRATEGICALLY
- “I AM” campaign presents positive images of CS
- Strong relationship with El Paso Community College
- AiC participants invited to participate in Nexus, a semester or summer experience in a research lab
- College of Engineering Ambassadors/ACM-W conduct MS/HS outreach

SUPPORT INITIATIVES
- Dean of the College of Engineering identifies gender diversity as a priority
- Advancement of Women in Computing Committee (AWICC) formed in 2014
- External funding obtained to increase diversity and revise early classes

RETAIN WITH STUDENT SUPPORT
- “I AM” messaging reinforces computing identity of current students
- Physical spaces provided for students to meet and work
- ACM-W mentoring brings together students and professional women
- Women In Engineering (WIN) program coordinates activities that encourage, enlighten, and empower (E3) women

ASSESS EFFORTS
- Adoption of a data-driven approach and analysis of effectiveness of recruitment and retention strategies
- NCWIT Tracking Tool data
- NCWIT Entry Survey

Total Declared Women Majors

Change Conditions, Not Students

Graduation of Women
**University of Washington: Computer Science**

2015 NCWIT NEXT Grand Awardee for Excellence in Promoting Women in Undergraduate Computing

### Support Initiatives
- Commitment to diversity is understood internally and made public
- Strong, professional advising staff provides personal attention
- Designated staff positions for diversity efforts
- Funding for diversity is provided by grants and supplemented by the department

### Assess Efforts
- Development of evaluation of recruiting strategies is funded and underway
- NCWIT Tracking Tool to track admissions, enrollment, and graduations

### Retain with Pedagogy
- Intro course is taught by engaging faculty, uses assignments that illustrate broad range of applications, features faculty research, and has many female TA's
- Strong women are purposefully encouraged to continue with computing

### Retain with Curriculum
- Welcoming "one size fits all" introductory course
- K-12 computing education seminar for undergraduate and graduate students

### Retain with Student Support
- Facebook group allows informal discussion of current issues
- ACM-W hosts women's and mixed-gender events
- Preparation for employment includes career prep and internship events, and Leadership Seminar
- Support for Grace Hopper attendance

### Recruit Strategically
- DawgBytes K-12 outreach program includes CSE tours, summer camps, classroom visits, programming competitions, AP CS review and ice cream social, CS4HS teacher workshop, Inspirational Teacher Banquet, equipment lending, CSTA involvement, and more
- Effects of outreach are expanded by engaging teachers

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**Change Conditions, Not Students**

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ESC: Rebecca Dohrmann, dohrman@ncwit.org
Virginia Tech: Department of Computer Science
2016 NCWIT NEXT Second Place Awardee for Excellence in Promoting Women in Undergraduate Computing

**SUPPORT INITIATIVES**
- Diversity Committee established in 2009
- Faculty participation in diversity-related service is high and “counts” in annual evaluations
- Significant increases in the number of female faculty
- New University president is strongly committed to diversity

**RETAIN WITH PEDAGOGY**
- Instructional strategies implemented in some early courses include growth-minded communication, exposure to role models, active learning, and scaffolding in course projects

**RECRUIT STRATEGICALLY**
- Spring Women’s Preview Weekend for admitted students
- Faculty outreach to admitted students during STEP summer orientation
- Fall Welcome Back Networking Night for admitted CoE students
- Active with NCWIT Aspirations; scholarships offered to winners
- CS Ambassadors conduct outreach to high schools

**RETAIN WITH CURRICULUM**
- “Designer Minors” combine CS with disciplines that attract many women, such as mathematics, business, and bioinformatics

**ASSESS EFFORTS**
- Collect feedback, numbers, and yield from recruiting events
- NCWIT Tracking Tool to chart progress in enrollment and success of female CS majors
- CoE Director of Graduate Programs and Assessment is part of the team

**RETAIN WITH STUDENT SUPPORT**
- Peer mentoring of female first-year CoE students to support and recruit
- Annual dinner with faculty and a female distinguished lecturer in CS
- Many co-curricular clubs including active AWC club with female and male members
- Support for attendance at Grace Hopper and Tapia

**TOTAL DECLARED WOMEN MAJORS**

**CHANGE CONDITIONS, NOT STUDENTS**

**GRADUATION OF WOMEN**

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