MARYLAND CENTER FOR WOMEN IN COMPUTING

2017-2018 Report

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Mission:

The Maryland Center for Women in Computing (MCWIC) works to increase diversity in all fields of computing by providing a variety of opportunities for women and other underrepresented minorities to engage and contribute to the technical community through research, education, outreach, and partnerships.

Staff:

Director: Dr. Jan Plane
Assistant Director: Kate Atchison
Graduate Coordinator: Beth Davis
Graduate Coordinator: Samantha Ammons
Office Undergraduate Student Worker: Stacy George
Other Undergraduate Student Staff: 18 Student Ambassadors for outreach programs and 7 Tutors

2017-2018 Executive Summary

Maryland Center for Women in Computing supported over 1400 K-12 students and ~250 current UMD students during the June 2017- May 2018 academic year.

- 18 outreach ambassadors supported ~32 activities that encouraged students from underrepresented populations to pursue computing careers and interest.
- CompSciConnect almost doubled in size from 70 students to 125 students in Summer 2017.
- After-school outreach programs expanded to include 4 Prince George's County Public Schools adding elementary schools for the first time.
- A new high school event, Ladies Navigate Computer Science, was held in September to assist students thinking about pursuing computing at the college level.
- A new workshop for elementary students is planned for May 2018.
- Our Second Annual Diversity in Computing Summit was held in March 2018 with 9 corporate sponsors and 106 attendees.
- Cyber Camps and CompSciConnect research poster was presented at the Research on Equity and Sustained Participation in Engineering Computing and Technology (RESPECT) conference.
- The MCWIC Tutoring program expanded to include all entry-level computer science courses. 7 tutors supported over 150 students in CMSC 131, 132, 216, and 250 since it began in Fall 2016.
- 73 UMD students attended the Grace Hopper Celebration in Computing Conference.

K-12 Outreach

K-12 outreach programs include CompSciConnect, after-school outreach programs, and weekend events.

Throughout the year, MCWIC Ambassadors take our curriculum on the road to visit local organizations and schools (i.e., . local Girl Scout troops) with a fun STEM activity. Activities last approximately 2 hours. STEM options include LEGO Mindstorm Robots, cryptology activities and programming that provide an introduction to computing principles. Additional activities include high school recruiting events and local resource fairs.

Outreach efforts are primarily staff by our MCWIC Ambassadors. Funding for these programs is supported primarily through Brendan Iribe, AFCEA Bethesda, and MCWiC general funds.

Key Stats:

- ~32 Outreach Events
- Over 1400 students reached
- 18 Undergraduate students hired to support programs

MCWIC Outreach Ambassadors

Each year, undergraduate students are selected to be MCWIC ambassadors where students receive training on best practices for teaching and content and then apply these skills to our various outreach programs described below. 8 Teaching Ambassadors are hired full-time in the summer to support camps. At least ten (10-12 Outreach Ambassadors are hired during the school year to support ~100 hours of events throughout the semester.

CompSciConnect

Computer Science Connect is a three- year camp designed to introduce middle school girls (as well as boys from underrepresented groups) to programming concepts using robots, Scratch, dynamic web pages, and basic virtual reality. Campers also learn additional to computer science topics including number theory, cybersecurity, logic puzzles, and computer use and safety. CompSciConnect was started in the summer of 2012. Since it inception, **376** students have participated in CompSciConnect. Undergraduate students serve as Teaching Ambassadors by leading campers through the curriculum and supporting them with school year projects. In 2017, we expanded camp offerings by adding an addition six sessions across six weeks for campers.

Key Statistics:

- 125 students in the summer camp
- ~100 students continuing each month during the school year
- 8 undergraduate Teaching Ambassadors
- 6 sessions of CompSciConnect across 6 weeks

MCWIC After-School Outreach

In a weekly after-school program, MCWIC Ambassadors provide after-school programs in nearby Prince George's County Public School System to introduce more students to computing through hands-on activities and real world problems. Much of the curriculum is adapted from CompSciConnect. In 2017, Greenbelt Middle School and College Park Academy continued their

programs. Paint Branch Elementary School was added in Fall 2017. Lamont Elementary School was added in Spring 2018.

Key Stats:

- *4 PGCPS after-school outreach programs*
- *65 students served*
- *11 UMD undergraduate Outreach Ambassadors serving 2-3 hours weekly*

High School Recruiting Workshop- Ladies Navigate Computer Science

In 2017, we hosted our first ever Ladies Navigate Computer Science recruiting event to engage current high school juniors and seniors to learn about the University of Maryland Computer Science program, computing research, and computing careers. 55 high school women attended. We plan to continue this event.

NCWIT Aspirations

The Maryland Center for Women in Computing serves on the NCWIT Maryland Affiliate Team. Each year we promote, recruit, review applications, and host the NCWIT Aspirations in Computing Award Ceremony to honor Maryland female students and their work in computing. In 2018, 68 students and educators were recognized for their efforts. The award ceremony was be hosted at UMD in April with over 50 students expected to attend. Hands-on workshops around wearable technology and virtual reality will be led by UMD undergraduate staff and members of the Maryland Affiliate Team. Additional outreach support is given through the Aspire IT grant program. We currently support high school student-run programs at Montgomery Blair and Wootton High Schools. These programs support current high school girls to run after-school programs that teach computer programming.

Elementary Workshop- JumpStart Computing

In May 2018, we will host our inaugural workshop for elementary students. 60-75 elementary students will rotate through 1 hour activities on robotics, cryptography, number theory, and introductory computing. Outreach Ambassadors will lead the curriculum.

Girl Scouts

We partnered with the Girls Scouts of the Nation's Capital Region to host robotic workshops for Brownie and Junior Girl Scouts 1-2 times per semester. Two sessions of workshops are held each day with ~30 students served in each session. In 2017-2018, workshops were held in November 2017, February 2017, and April 2018. This impacts ~180 students across all workshops.

High School Programming Workshops

Each semester, our outreach ambassadors host high school programming workshops for students in 8th-12th grade. Topics include: Virtual Reality, App Development, Python, Alice, and Web Development. In 2017-2018, workshops were held in October 2017, March 2018, and April 2018. ~45 students across all workshops.

Project Rise Up 4 CS

Project Rise Up 4 CS helps underrepresented (female, Hispanic, African American,Native American) students pass the Advanced Placement (AP) Computer Science A course and exam by current UMD students offering online tutoring and webinars. Project Rise Up 4 CS is a project in collaboration with Georgia Tech. ~ 12 students are supported by 3 undergraduate tutors.

Current Students

MCWIC Tutoring Program

MCWIC tutoring is offered each semester for CMSC 131, 132, 216, and 250 from the third week of the semester to the last week of classes. In Fall 2016, the Maryland Center for Women in Computing started a tutoring program for students from underrepresented populations in the introductory programming class- CMSC 131. Based on the demand, we raised additional funds to support tutors in all of the lower level classes (100 and 200 levels) during the Fall 2017 semester. To date, 8 undergraduate students have served as tutors. Over 150 students benefited from tutoring since it began.

Key Stats for 2017-2018

- *3* undergraduate tutors each semester
- 10 hours of drop-in tutoring offered each week
- ~12 hours of 1:1 tutoring offered each week
- Spring 2017: 96 sessions and ~40 unique students
- Fall 2017: 94 sessions and ~50 unique students
- Spring 2018: 85 sessions and ~45 unique students

Grace Hopper Celebration

With support from the BRAID initiative, Brendan Iribe, and other corporate sponsors, the University of Maryland and MCWIC are able to fund at least 50 students to attend the Grace Hopper Celebration each year. Students gain valuable connections, resources, career opportunities, and advice. In 2017, MCWIC along with the department supported 51 students and 4 faculty/staff. The iSchool supported 10 students. 12 students secured funding from outside sources. In total, 73 UMD students and 5 faculty/staff members attended.

Key Stat for 2017

- 73 UMD students attended the Grace Hopper Celebration in Computing Conference

Diversity in Computing Summit

MCWIC hosted their 2nd annual Diversity in Computing Summit on March 2nd 2018. This one-day workshop of informative workshops and dynamic speakers is designed for all advocates of underrepresented groups to emphasize inclusive computing efforts. 106 attendees participated. Industry partners, community supporters, sponsors, students, faculty, and staff all came together to make this a great event. Keynote speakers were: Abigail Lewis, AAUW, and Sec Kelly Schulz gave keynotes. 8 breakout sessions were hosted. This event was supported by 9 corporate sponsors. ~$18,000 were raised to support the Maryland Center for Women in Computing.

MCWIC Lounge

The MCWIC lounge is a community space on the 3rd floor of AV Williams (3147) for women in computing to meet, study, and connect. The lounge is now open Monday-Friday from 8 am - 6 pm instead of requiring swipe card access. The MCWiC lounge has a microwave,seating, whiteboard walls, and study space for students.

Conference Travel Funds

In Spring of 2017, we decided to allocate some of our funding to supporting students who wish to attend other conferences. Since it began, we have supported 7 students in attending conferences such as NSBE, Tapia, and the NCWIT Summit.

Professional Development and Social Events

Each semester the Center provides professional development opportunities for our students. Events can range from insightful talks by industry leaders or faculty from other universities or panels and round-table discussions. In collaboration with student organizations, we also host social events for women of the department to get to know each other. Events in 2017-2018 included: Welcome Back Dinners (each semester), Grad Women Lunches, Grace Hopper Networking Night, Cookie Decorating Social, How to Work a Conference, Resume/Career Prep, and an Intern Panel. ~250 UMD students attended one of our programs.

Student Organization Support

The Center supports The Association for Women in Computing and GradWomen to build community and create events to empower and support female computing students across campus. These organizations actively recruit women in to technical majors, and work to retain women in the field.

MCWIC also supports the Girls Who Code chapter at UMD. The Girls Who Code chapter is led by UMD undergraduates and meets 10-12 weeks out of the semester with girls 8th-12th grade girls interested in computing. Each week, we help Girls Who Code book space and market their event. Snacks and computers are provided as needed. Additional support is provided as requested.

The University of Maryland hosts a very large hackathon,Technica, the largest all ladies hackathon in the US. This effort is student led and had over 900 participants this year with participants from colleges around the east coast as well as high school women. In Fall 2017, the MCWIC also sponsored Techinia.

Additional student organizations who support and recruit underrepresented students include: CodeBlack, Ladies of CS, and CS Latino.

Research Efforts

CompSciConnect/Laboratory for Telecommunication Sciences

MCWIC conducts research to evaluate its programs and to understand confidence, exposure and access to K-12 education in computing for underrepresented students. Through one-day workshop styled events, summer camps and after-school programs, pre- and post- surveys are collected from student participants. An initial analysis of surveys collected show several trends in the lack of encouragement and exposure to computing that middle school students receive and shows that our outreach efforts do have a positive impact on student confidence in the field of computing. Findings were recently presented at the poster session of the RESPECT Conference (Research on Equity and Sustained Participation in Engineering, Computing, and Technology) in Baltimore, Maryland. Research will be submitted for consideration to several other conferences this year.

Maryland Center for Computing Education [MCCE]

For many years, MCWIC has partnered with other programs improving the computing education K-12. This began with the CS Matters in Maryland Project and has now expanded to participating in

the statewide advisory board for computer science education. This board has developed 15 year goals for the state and more recently has been instrumental in the creation of the Maryland Center for Computing Education (housed at the USM offices just off campus). The MCCE's primary goal is in the preparation of teachers for computing across the grades and across the state. MCWIC partners with MCCE to ensure that diversity, inclusion and equity are major considerations in those goals.

BRAID

The BRAID initiative includes fifteen computer science departments across the U.S. including the **University of Maryland** that are committed to implementing changes to their introductory computer science courses, pathways into the major, departmental climate, and outreach efforts in hopes of diversifying their computer science majors. In return for funding, we provide data on the computer science department and our students. Updated research can be found here.

Plans for 2018-2019

- New MCWIC Advisory Board to form
- Launch a mentoring program for students in conjunction with AWC
- Increase the number of students we send to professional conferences
- Continue to increase the number of K-12 students impacted by the outreach programs we offer
- Take on the marketing and management of all 3 Cybersecurity Camps
- Offer and evaluate the alternative intro programming sequence for majors to determine if the change in language and focus have any significant effect on students in general and more specifically on students from underrepresented populations.
- Work more closely with the newly created Maryland Center for Computing Education to research where efforts can have the biggest impact in the K-12 space - support the CSforAll initiative.

Additional Diversity Efforts across the Computer Science Department

The CMSC's Diversity and Inclusion Committee has been active in collecting survey data from faculty, staff and students and then aligning that survey data with the university's efforts in the same area. This data will then be used to ensure the goals of the thriving workplace initiative are implemented and effective within the department. The committee is specifically looking at hiring practices and graduate student admission practices to better understand diversity and inclusion in these contexts.

Additionally as a recommendation from BRAID, a new curriculum for CMSC 131 and 132 was piloted in 2017-2018.

Fiscal Year 2018 Budget total:
Annual Budget Allocation
$50,000- College of Mathematical and Natural Science
$25,000- Dept of Computer Science
$25,000- UMIACS (University of Maryland Institute for Advanced Computer Studies)

Additional Financial Support

- $100,000 yearly from Brendan Iribe- 2017-2021
- $25,000 yearly- AFCEA Bethesda- earmarked for Outreach/CompSciConnect
- $40,000 yearly from NSA's research lab - Laboratory Telecommunication Science (LTS)- earmarked for research
- Corporate Partner Support/Alumni Giving- ~$32,000 for 2017-2018
- Registration Fees for some of our programs
- Various Gifts and Grants- NCWIT, CSMatters-NSF, Oculus Outreach, and RiseUp4CS-Georgia Tech

2017-2018 Corporate Sponsors
Advocate Level ($5000+):
Appian
Capital One
Northrop Grumman
ValidaTek

Additional Support ($2000+):
Booz Allen Hamilton
Deloitte
Google
General Dynamics Mission Systems
Johns Hopkins Applied Physics Lab