



# IRIBE INITIATIVE FOR INCLUSION & DIVERSITY IN COMPUTING

**MCWIC** | MARYLAND CENTER FOR WOMEN IN COMPUTING

*Iribe Initiative for Inclusion and Diversity in Computing (I4C): [Web](#) / [Twitter](#) / [Facebook](#) / [Instagram](#)*  
*Break Through Tech DC at UMD: [Web](#) / [Twitter](#) / [Instagram](#)*  
*[2021-2022 Overview Slides](#)*

## 2021-2022 Report

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### 1. **Executive Summary**

The Iribe Initiative for Inclusion and Diversity in Computing (I4C) aims to create a supportive, vibrant and inclusive community of students, educators and researchers coming together to increase the involvement—and success—of all individuals from historically marginalized populations in computing. I4C delivers on this mission by hosting a wide variety of current student programming including mentoring, tutoring, community building, and student support—as well as K-12 outreach. A unit within the University of Maryland's Department of Computer Science, I4C supports all computing majors across campus. Break Through Tech DC at UMD, a national initiative committed to increasing gender equality in tech, is also housed within I4C. Over 1,600 K-12 students and educators and over 1,000 UMD students directly engaged with I4C programming between June 2021 and May 2022 through support from our many partners. Over 80% of all students served are from populations underrepresented in computing. Programs shifted to a hybrid format as current students returned fully to campus in Fall 2021. Summer 2022 saw the return of in-person K-12 programming with the expectation of more in-person outreach programming in Fall 2022.

25 corporate and community partners provided funding for the following programs:

- Over 800 current students attended our programs including diversity conferences, tutoring, peer mentoring, and community building programs.
- Over 170 students attended Diversity Conferences this year, including [Richard Tapia Celebration of Diversity in Computing](#), [Grace Hopper Celebration](#), [AfroTech](#), [BEYA STEM](#), [Wonder Women in Tech DC](#), and [oSTEM](#).
- Free [Guided Study Sessions](#) and [1:1 tutoring](#) for undergraduate students were offered for CMSC 122, 125, 131, 132, 216, 250, 330 and 351— supported by 18 tutors. Over 350 students engaged in 1,100+ tutoring hours in the 2021-2022 year.

- 600+ students, faculty, and staff have joined our I4C DICE Lounge Slack community
- Over 80 computing undergraduate and graduate students participated in the I4C Peer and Alumni Mentoring Program, which featured technical workshops, topics and monthly meetings with upperclassmen and alumni mentors. 16 alumni participated in the expanded program.
- 64 students from across the U.S. participated in the hybrid Tech + Research workshop as part of Technica. 11 different UMD faculty led projects.
- 472 students participated in Break Through Tech programming including career workshops, speakers events and community-building programs.
- 51 students completed the Guild summer bridge program and 58 students completed a Sprinternship, a micro-internship during the winter term.
- New courses were offered, including CMSC 100/INST 101 and CMSC 125
- 38 outreach ambassadors supported 150 activities that encouraged students from underrepresented populations to pursue computing careers and interests serving over 1,600 K-12 students, families and educators.
- 247 campers participated in our Summer 2021 virtual summer academy programming through AI4ALL, JumpStart Computing, Intro to Computing, CompSciConnect and Cyber Defense Training.
- I4C supported recruitment efforts for undergraduate students from underrepresented populations by mailing postcards and hosting open houses for admitted students.
- Diversity and inclusion training and resources were shared widely within the CS department. An inclusive spotlight was added to the monthly newsletter, and an inclusive moment was added to monthly Friday Faculty meetings.
- Monthly communications through the Diversity newsletter were shared with all students in order to encourage a more inclusive climate.

## 2. History

The Iribe Initiative for Inclusion and Diversity in Computing (I4C) was launched in April 2019 with a \$1 million gift from Brendan Iribe, UMD alumnus and co-founder of the virtual reality company Oculus. I4C aims to increase diversity and foster a stronger environment of inclusion in the Department of Computer Science (CMSC). I4C serves as an umbrella over the Maryland Center for Women in Computing (MCWIC) and Break Through Tech DC at UMD. MCWIC hosts programs and spaces for students who identify as women, but we have expanded our efforts to serve all students who are from populations underrepresented in computing. Break Through Tech is a national initiative that was brought to UMD in March 2021.

In Spring 2019, two full-time coordinators were added to support the growth of programs as well as the expansion of our graduate assistantships.. Each semester, I4C hires at least 2 graduate assistants and 30+ undergraduate students in computing to support programs.

In Spring 2021, UMD announced a grant from Break Through Tech to propel more women into computing degrees and careers in tech—through curriculum innovation, career access and community building. The grant's goal is to increase the number of women graduating with a tech degree at UMD by at least 12% by 2026. New staff lines were added to support this grant including community, curriculum, career and communication lines: Amy Vallaincourt, Elias Gonzalez, Caitlin Rudy and Katie Bemb, respectively.

In Spring 2022, Dr. Jan Plane announced her retirement from the University of Maryland. Kate Atchison was promoted to the Associate Director of I4C. Dr. David Weintrop will serve as the Interim Director of I4C while the full search for the Director of I4C will launch in Fall 2022.

## 3. Iribe Initiative for Inclusion and Diversity and Computing Staff

- Founding Director: Dr. Jan Plane
- Interim Director: Dr. David Weintrop
- Associate Director: Kate Atchison
- Retention Coordinator: Veronica Sanchez

- Outreach Coordinator: Charlotte Avery
- Career Access Lead, Break Through Tech DC: Caitlin Rudy
- Communications Lead, Break Through Tech DC: Katie Bemb
- Community Outreach Lead, Break Through Tech DC: Amy Vallaincourt
- Curriculum Innovation Lead, Break Through Tech DC: Elias Gonzalez
- K-12 Research Graduate Assistant: Kristina Kramarczuk
- Current Students and Marketing Graduate Assistant: Sofia Gonzalez Prieto
- Break Through Tech Data Graduate Assistant: Kayla Norton
- K-12 Outreach Graduate Assistant: Lucy Allan
- Office Undergraduate Student Worker: Utsa Santhosh
- Marketing Interns: Faith Chisholm and Raphael Ukelegbu
- Undergraduate Research Students: Maya Narayanasamy, Anaum Khan and Genevieve Sampson
- 38 Student Outreach Ambassadors throughout the academic year
- 18 I4C Tutors throughout the academic year
- 12 Summer 2021 Ambassadors

#### **4. K-12 Outreach**

K-12 outreach programs include summer camps, after-school outreach programs, workshops, STEM festivals, admitted student events and weekend events. In Summer 2021, our summer camps were rebranded as the I4C Summer Academy to better represent the academic component of these programs. All programs were virtual in the fall semester, but programs started to transition back to in person during April. All summer 2022 programs are in person. Hybrid programming will continue.

Throughout the year, 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 cyber safety, web development, Scratch and other programming languages. Additional activities include high school recruiting events and local resource fairs. Outreach efforts are primarily staffed by our Ambassadors. Funding for these programs is supported primarily through Brendan Iribe, AFCEA Bethesda and MCWIC general funds.

##### ***Key Stats:***

- ~150 outreach events (85 unique events)
- Over 1,600 unique students reached
- 38 undergraduate students hired to support programs

##### ***Outreach Ambassadors***

Each year, undergraduate students are selected as Ambassadors. They receive training on best practices for teaching computing content in equitable ways and then apply these skills to our various outreach programs described below. 12 Teaching Ambassadors were hired full-time in the summer to support the virtual summer academy experience. At least 25 Outreach Ambassadors were hired each semester to support ~90 hours of programming for our K-12 population. From Summer 2021 to May 2022, 38 different Ambassadors (81% women, 10% underrepresented racial populations) supported outreach efforts.

#### **Summer Academy**

##### ***CompSciConnect***

Computer Science Connect is a three-year academy designed to introduce middle school girls and boys from underrepresented populations to programming concepts using drag-and-drop programming, Python, dynamic web pages, and basic virtual reality games. Participants learn additional computer science topics including number theory, cybersecurity, logic puzzles and computer use and safety. Since its inception in Summer 2012, over 500 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 Summer 2021, six different two-week sessions of camp were offered in a virtual setting. Over

200 students and their parents attended the annual showcase in December. At the annual Maryland Day, 40 students presented to a full crowd in the Iribe Center on Saturday, April 30. In December 2021, we celebrated the 10th anniversary of CompSciConnect. You can view the highlight [video here](#). View the Fall Showcase website here: [go.umd.edu/cscshowcase](http://go.umd.edu/cscshowcase)

#### *Key Statistics for Summer 2021:*

- 133 students in the summer camp
- ~90 students continuing each month during the school year
- 12 undergraduate Teaching Ambassadors
- 6 two-week sessions of CompSciConnect

#### ***JumpStart Computing***

The JumpStart Computing summer program is a five-day computing camp for elementary students. During this day camp experience, students participate in an interactive learning experience in computing mainly through the Scratch coding platform. In Summer 2021, 43 students participated in the program (68% women and 50% historically underrepresented racial communities).

#### ***Intro to Computing***

Intro to Computing is a two-week summer program where students learn the basics of Python and explore the computing field. The program is geared towards students with little to no prior computing experience. Students learn about career options in the field, take at least one field trip, and hear from a variety of speakers to learn more about how to prepare to enter the profession. In Summer 2021, 23 students participated in the program (43% women and 56% historically underrepresented racial communities).

#### ***AI4ALL***

In Summer 2021, I4C hosted its third AI4ALL summer program. AI4ALL is a national initiative that seeks to increase diversity and inclusion within artificial intelligence by introducing high school students to the field. UMD AI4ALL virtually welcomed 29 students from all over the world to the program. Throughout the three-week program, students were given the opportunity to use artificial intelligence to address problems of a probabilistic and numeric nature. Students explored the field of AI through team projects, industry field trips and guest speaker presentations. Nora Burkhauser served as our curriculum lead. Five faculty supported research projects within artificial intelligence and machine learning, all culminating in the AI4ALL Showcase. At the showcase, students were celebrated and presented their projects to family, friends, faculty and staff.

#### ***Faculty Projects for Summer 2021***

- Adversarial Attack + Adversarially Trained Network = New Images – Soheil Feizi
- Recognizing Object in Images – David Jacobs
- Creating Art with Neural Networks – Matthias Zwicker
- Speech Emotion Recognition using Convolutional Neural Networks – Dinesh Manocha
- Using Sentiment Analysis to Interpret Twitter Data – Dinesh Manocha

View the [2021 AI4ALL showcase here](#).

#### ***Cyber Defense Training***

The Cyber Defense Training was held in July 2021. 21 students completed the advanced cyber defense curriculum. An experienced security professional and UMD alum, Toby Lin, taught the content during the morning sessions and was assisted by two ambassadors who ran lab activities in the afternoons. Students also connected with MC2 and ACES faculty and staff. In 2021, the program was modified to extend across two-weeks in the virtual space.

## **K-8 Outreach**

### ***Creative Computing***

In a weekly after-school program, ambassadors provided programs in the nearby Prince George's County Public Schools system to introduce students to computing through hands-on activities and real-world problems. Much of the curriculum is adapted from CompSciConnect and Harvard's Creative Computing curriculum.

Students were able to participate virtually and in person during the last year. College Park Academy and Langley Park Elementary resumed their programs in the Fall 2021. We continued to offer Creative Computing for grades 4-6, 5-7 and 6-8 virtually. This enabled us to reach students from areas outside of our neighboring counties. Past commitments with Lamont Elementary and Mother Jones Elementary were put on hold through the end of the Spring 2022 semester. The College Park Academy program continued through the pandemic virtually. We served ~230 elementary and middle school students through the Creative Computing Program.

### ***Girl Scouts***

We continued our partnership with the Girls Scouts of the Nation's Capital to host Cybersecurity and Coding for Good Badge workshops virtually for Daisies (Grades K-1), Brownies (Grades 2-3), Juniors (Grades 4-5), Cadettes (Grades 6-8), Seniors (Grades 9-10) and Ambassadors (Grades 11-12). During Fall 2021, we served three troops and held two Saturday workshops to support 117 Girl Scouts. In Spring 2022, we served 10 troops to support 76 students. Of the 193 Girl Scouts, most came from our neighboring counties including Prince George's County and Montgomery County. Our efforts impacted Girl Scout troops from Charles County (MD), Calvert County (MD), Fairfax County (VA) and Prince William County (VA).

## **Grades 7-12 Outreach**

### ***Girls Who Code – UMD Chapter***

Led by three undergraduate women in computer science and 10+ volunteers, over 283 girls in grades 7-12 met weekly in a virtual setting and learned coding fundamentals while also building a strong community of computing women. The students were divided into two classes on Python and JavaScript based on experience due to the large number of participants and volunteers.

## **Reboot Representation Rise-Up 4 CS**

In partnership with University of Michigan and Reboot Representation, we launched the Project RiseUp4CS with over 25 women from the surrounding area. This program supported underrepresented women in passing the Advanced Placement (AP) Computer Science A exam through weekly webinars and 1:1 tutoring sessions with undergraduate tutors here at UMD.

In 2020-2021, we were funded by Reboot Representation to offer a separate program, Rise-Up 4 CS. In Fall 2021, we served 42 women and nonbinary students from neighboring counties. Through this program, we offered weekly webinars, 1:1 tutoring sessions and community-building activities. During Fall 2021, we expanded to rolling admissions, and in Spring 2022, we expanded to include tutoring opportunities to students taking AP Computer Science Principles. In total, we supported 48 students.

## ***Navigate and Perspective Computer Science High School Recruiting Workshops***

In Fall 2021, we hosted the Navigate and Perspective Computer Science recruiting event to engage current high school juniors and seniors in learning about the UMD computer science program, computing research and computing careers. In total, 20 high school students attended from local high schools. Students engaged in panel discussions and academic and industry guest speakers. We partnered with our student organizations, such as Girls Who Code, the Association of Women in Computing, Women in Cybersecurity, Technica, Code Black, Student Advisor Board and XR Club.

## **Admitted Student Receptions for Women and BLNA Students**

In order to better recruit and admit women and Black, LatinX, and Native American (BLNA) into the computer science major, I4C continued to target admitted women and BLNA students into computer science. All 300+ women who were admitted into computer science at the UMD received a postcard inviting them to a virtual meet and greet and an on campus visit day during Maryland Day. There were a total of 71 students who attended our admitted student events in Spring 2022.

### **High School Workshops**

In Fall 2021, we continued offering high school workshops virtually to students in grades 9-12. We served 52 students and offered the following workshops:

- Intro to CS
- Cybersecurity
- UI/UX + Web Dev
- Python + Data Science
- Python I + II
- Java

In Spring 2022, we continued these workshops, expanded our popular workshops to offer more days, and included Tech + Bio, which was a chance for students to discuss how technology and computing support biological science. From Fall 2021 to Spring 2022, we served 175 students. Our relationship with the DC College Access Program helped us reach students typically underrepresented in computing in the Washington, D.C. area.

### **NCWIT Aspirations**

I4C leads the NCWIT Maryland Affiliate Team. Each year, we promote, recruit, review applications and host the NCWIT Aspirations in Computing Award Ceremony to honor Maryland young women and their work in computing. In April 2022, 92 students and educators were recognized for their efforts during an in-person event ceremony. The award ceremony was hosted on campus with over 150 people in attendance. Additional outreach support is given through the Aspire IT grant program. We currently support high school student-run programs run by students at Montgomery, Blair and Poolesville high schools. These programs support current high school girls in running after-school programs that teach programming skills.

## **5. Current Students**

Throughout the year, I4C offers a wide array of professional development, community building, and tutoring support for our current students. More than 800 current students participated in one of our programs over the last academic year.

### **Tutoring Program**

I4C tutoring is offered each semester for CMSC 131, 132, 216, 250, 330 and 351 from the second week of the semester to the end of the semester. In Fall 2021, I4C added tutoring in CMSC 122 and 125. Undergraduate tutors offer both 1:1 tutoring and specific Guided Study Sessions. Each semester, 12 to 14 students are hired as tutors (17 unique tutors). In 2021-2022, over 300 unique students benefited from the tutoring program during the academic year, with more than 630 tutoring sessions completed. 1:1 tutoring and Guided Study Sessions were offered virtually and in person for the 2021-2022 academic year.

#### *Key Stats for 2021-2022:*

- 14 undergraduate tutors in Fall 2021
- 15 undergraduate tutors in Spring 2022
- Over 50 hours of virtual 1:1 tutoring offered each academic week
- Over 40 hours of in-person 1:1 tutoring offered each academic week
- 1,142 1:1 tutoring appointments attended
- 12 Guided Study Sessions offered each academic week
- 418 students in Guided Study Sessions

### **Peer Mentoring**

In Fall 2020, we revamped the I4C Peer and Alumni Mentoring Program by moving it to Terrapins Connect, UMD's exclusive online mentoring and networking platform. This platform provides tools, tips and resources, and connects students and alumni with mentorship opportunities. With Terrapins Connect, we provided students a virtual mentoring experience during the 2020-2021 academic year. In the 2021-2022 academic year, we continued to offer virtual, as well as in-person, mentoring. Over 150 students expressed interest in the program. Students were paired with mentors based on preferences (experience, identity, etc.). Large group meetings on professional development topics—such as academic success, networking and imposter syndrome—were held monthly. Each meeting was followed by a hands-on technical workshop. 85 students and 31 alumni participated across the academic year. The Peer Mentoring team was led by Veronica Sanchez and Amy Vaillancourt along with I4C Ambassadors: Tara Choudhary, Ambika Sikri, Sarah Patrick, Vicki Ma and Utsa Santhosh.

### ***Diversity Conference Support***

We sent more than 170 students and 30 faculty and staff to Diversity Conferences in the 2021-2022 academic year. Students who receive scholarships attended a virtual orientation as well as virtual conference preparation workshops. Students attended Richard Tapia Celebration of Diversity in Computing, Grace Hopper Celebration, oSTEM, AfroTech and BEYA STEM Conference. They gained valuable connections, resources, career opportunities and advice.

*\*All Fall 2021 and Spring 2022 diversity conferences were attended virtually by UMD students.*

Key Stats for 2021-2022:

- [Richard Tapia Celebration of Diversity in Computing](#)
  - September 2021
  - 22 students, 5 faculty and staff members
- [Grace Hopper Celebration](#)
  - September/October 2021
  - 121 students, 17 faculty and staff members
- [oSTEM](#)
  - October/November 2021
  - 6 students, 1 faculty and staff member
- [AfroTech](#)
  - November 2021
  - 33 students, 3 faculty and staff members
- [BEYA STEM Conference](#)
  - February 2022
  - 6 students, 0 faculty and staff members
- Additional Conferences: 7 students, 2 faculty and staff members

### **Diversity Celebration**

I4C and Break Through Tech DC hosted the Diversity in Tech Celebration to celebrate students who participated in Break Through Tech programs and the Peer & Alumni Mentoring Program and/or attended a Diversity Conference in Fall 2021/Spring 2022. Student attendees, corporate partners, faculty and staff came together to share and celebrate the positive experiences of attending these events.

### ***Student Advisory Board (SAB)***

The Computer Science Department Student Advisory Board (SAB) represents the computer science student body and interacts with department leadership on issues and programming pertaining to academics, diversity and inclusion, and student support. The SAB works to foster a good relationship between students, faculty and staff; voices student feedback and concerns; and shapes programming and resources to provide for the CS community. The SAB is no longer directly affiliated with I4C and instead is run by the Department of Computer Science. The SAB is led by the Assistant Director for Undergraduate Academic Affairs, Monica Hilliard, and supported by one I4C staff member and one academic advisor.

## ***DICE Lounge***

The Diversity in Computing Education Lounge (DICE) provides an inclusive space for students to gather, study and build community. Tutoring, corporate events and many socials are held in this space on the first floor of the Iribe Center. In order to support students virtually, I4C pivoted our lounge to a Slack workspace branded as the virtual DICE Lounge. Students engage on this platform to build community, ask questions, learn about events and connect with each other. Over 700 students joined our virtual DICE Lounge on Slack.

## **Diversity and Inclusion Newsletter**

In order to increase awareness around diversity and inclusion issues, a Diversity and Inclusion spotlight is sent out each month to all 4,000+ undergraduate and graduate students. Each month features an affinity group spotlight, as well as the DICE Roll-up Tip. You can view the 2021-2022 newsletters below.

- [September – National Hispanic-Latino Heritage Month](#)
- [October – Disability Awareness Month](#)
- [November – National American Indian Heritage Month](#)
- [December – National Human Rights Awareness](#)
- [February – Black History Month](#)
- [March – Women's History Month](#)
- [April – Campus Pride Month](#)
- [May – Year in Review \(2021-22\)](#)

## **Community-Building Socials**

Each month, we held community events to support creating space and awareness of unique inclusion issues for these students. Additionally, we used social media to share resources, events and build community in a virtual space.

### *Fall 2021*

In Fall 2021, over 250 students participated in at least one of the following events. All events returned in person in Fall 2021.

- Peer & Alumni Mentoring Information Session
- I4C Welcome Back Social
- I4C DICE Lounge Ask Me Anything (AMA)
- Turtle Painting w/ I4C
- Diversity Conference Overview
- Penthouse Sweets: Hispanic Heritage Month
- Grad Women Imposter Syndrome Workshop
- Inclusion Speaker Series w/ Technica
- Penthouse Sweets: Disability Awareness Month
- Tech Workshop in the Singh Sandbox
- Pumpkin Decorating Social
- Trick-or-Treat around I4C
- Penthouse Sweets: First-Generation Students
- Gaming Night w/ XR Club
- Puppy Therapy, sponsored by Wellness Center
- Winter Wonderland Craft Social
- Diversity in Tech Celebration
- Senior Send-Off

### *Spring 2022*

In Spring 2022, over 350 students participated in at least one of the following events.

- Peer & Alumni Mentoring Program
- I4C Spring Welcome Social
- I4C Valentine's Social
- Penthouse Sweets: Black Women in Tech
- International Women's Day Social: Women in Tech
- Inclusion Speaker Series – Aboli Kumthekar
- Penthouse Sweets: Transfer Students



- Tech Workshop: Sandbox
- Diversity Conference Overview
- Penthouse Sweets: Campus Pride Month
- DICE Lounge: Game & Craft Social
- Inclusion Speaker Series (Collaboration w/ Technica + Code Black)
- Diversity in Tech Celebration
- Senior Send-off

### **Tech + Research: Welcoming Women to Computing Research**

UMD's CS Department and MCWIC presented the third Tech + Research: Welcoming Women to Computing Research three-day workshop geared toward engaging undergraduate women and nonbinary students in computing research. In collaboration with Technica, the largest all-women and nonbinary hackathon in the nation, 75 students from across the country and world participated in the research track. Students came together and worked collaboratively to use technology to solve pressing issues through a total of 11 hands-on research projects with UMD faculty.

Along with providing hands-on research experience in a dynamic hackathon setting, the weekend workshop included sessions introducing attendees to the basics of computer science research (CSR) and highlighting the exciting opportunities that come with pursuing a graduate degree in computer science. Students presented their projects as part of the demo session at Technica. The Tech + Research workshop was virtual and in person this year. This project was funded through Google's Explore CSR. Thank you to Dave Levin for leading the Computer Science Research Bootcamp. Thank you to the nine faculty leads and their graduate students for serving as mentors on the leading research projects:

- Build a Question-Answering System (Lee Boyd-Graber)
- Detecting Internet Censorship (Levin)
- Digital humans that move, interact, express and feel, just like us! (Virtual) (Bera)
- Enhancing the Financial Lives of Older Adults Through an Online Platform (Virtual)(Reitz)
- Human-Body Reconstruction – Virtual Try-On Systems (In-Person or Hybrid)(Lin)
- Learning By Observation – Building AI Systems that Learn Through “Common Sense” (Hybrid)(Feizi)
- Modern Query Federation (Hybrid)(Abadi)
- What Did I Say Wrong? Surveying Experiences of Content Moderation in Online Communities (Virtual)(Mazurek/Daumé/Shilton/Gilbert)

You can view the full 2021 Technica [annual report here](#).

In addition to hosting the workshop, we submitted a full research paper to the 2021 Annual Conference on Research in Equity and Sustained Participation in Engineering, Computing, and Technology (RESPECT) that was accepted. Our paper titled “First-generation undergraduate women and intersectional obstacles to pursuing post-baccalaureate computing degrees” discusses the impact of the Tech + Research workshop on student participants with a specific focus on the experiences of first-generation undergraduate students. The complete paper can be accessed [here](#).

### ***Employer Spotlights***

As part of our corporate partner program, partners hosted employer spotlights. Partners were spotlighted across multiple channels with programs, workshops, talks and opportunities highlighted about each partner.

## **6. Break Through Tech DC**

On March 2, 2021, UMD announced a grant from Break Through Tech to propel more women into computing degrees and careers in tech through curriculum innovation, career access and community building. The grant's goal is to increase the number of women graduating with a tech degree at UMD by at least 12% by 2026. At UMD, this increase to CIP code 11 means that 35% of computing graduates will be women and at least 200 additional women will graduate with computing degrees by 2027. Since 2016, UMD's CIP code 11 has increased the number of women graduating by 5.8%. Led by I4C and the College of

Information Studies (iSchool), Department of Computer Science, the iSchool iConsultancy, the Institute for Advanced Computer Studies (UMIACS), the Office of Undergraduate Studies (UGST), and the College of Computer, Mathematical, and Natural Sciences (CMNS), UMD is excited to implement the Break Through Tech model of curriculum innovation, career development, and community-building.

### **Guild at UMD 2021**

The University of Maryland hosted its first Guild in August 2021 with 54 students enrolled and 51 students who completed the program. Students completed the one-week program virtually with ~30 students per session. They were led by two instructors and three teaching assistants. 84% of these students were woman, transgender, nonbinary/gender-fluid/third gender while 21.5% identified as BLNA. 50% of these students were undeclared.

Four organizations provided employees to support Guild at UMD, including Accenture, Capital One, M&T Tech and Microsoft, and these industry mentors remained active with Break Through Tech programs all year.

Recruitment was focused on women accepted to the University of Maryland in Fall 2021 who preferenced computing majors but were not accepted into the major. All students who identified as women and were accepted into computing majors were also included in the recruitment if they did not already have credit for the first course in the computer science sequence. We also targeted outreach to the UMD Freshman Connection program, which admits students into the Spring semester and focuses on building community in the Fall semester. Students who had credit for CMSC 131 were explicitly excluded from Guild 2021. Students were directly emailed during their admitted student window at UMD and after they accepted. Specific collateral was shared with advisors and orientation leads. Instagram and Twitter were used to promote the program in advance of August and during/after Guild's conclusion. Moving into 2022, outreach across campus will expand as well as marketing to more majors and admitted students in every college.

### **Sprinternships 2022**

Break Through Tech DC launched its first Sprinternship program in January 2022. 58 UMD students completed a Sprinternship with 14 different host organizations. 83% were woman, transgender, nonbinary/gender-fluid/third gender. 21% were BLNA. Hosts were from the larger DMV region as well as campus offices that support technical needs, including UMD DIT. Major supporters of Break Through Tech DC included Two Six Tech, Easy Dynamics and GoodShuffle.

Recruitment was focused on first- and second-year students who had not previously had a tech internship. We targeted outreach to UMD's Freshman Connection program, which admits students into the Spring semester and focuses on building community in the Fall semester. Our first career workshops were broadly advertised and open to all to encourage more students to start a Sprinternship application. Once students started an application, they were added onto our ELMS page and received communication about all of our programs. Over 200 applications were submitted for Sprinternship.

### ***Outcomes for Programs***

#### *Affective Outcomes*

Programs at the University of Maryland for Break Through Tech have shown an overall positive experience for students. Both programs especially increased students' perception that they belong in computing and feel welcomed in computing. 15 students participated in both Guild and Sprinternship. Once students engage with one of our programs they tend to stay engaged all year.

### **Curriculum Innovations**

During the 2021-2022 academic year, we launched three new courses: CMSC 125 Intro to Computing, CMSC 100/INST 101 Bites and Bytes of Computing and CMSC 395 Teaching Techniques for Computer Science, and hosted our first Summer Guild. The iSchool also hosted a Summer ARTS curriculum.

**Guild:** We internally developed a Guild curriculum based around Python and design thinking principles. Students took a pressing local issue of transportation around campus and developed comprehensive prototypes. Students also learned all the key programming structures necessary to feel confident enough to take a coding course on campus. Students were integrated into our Canvas learning systems to better understand how their first college courses would operate.

**CMSC 125:** We expanded the Guild Curriculum to build out an Introduction to Computing Course (CMSC 125). This brand new course took students through many of the key topics in Computing as well as learning more about the different majors on campus. Additionally, students were taught sound coding and debugging practices that prepare them for switching to a computing major on campus. 54 students enrolled in CMSC 125 during the last academic year (35% women). Many of these students go on to take another computing course.

**CMSC 100/INST 101:** In Fall 2021, we revamped and updated a one-credit course geared for other first-year students taking computing courses to help with the adjustment to large college class sizes. Some of the career and major exploration from CMSC 125 is also integrated into this course. 98 students enrolled in this class during the last academic year.

**CMSC 395:** In Spring 2022, we worked with experienced TAs to create a curriculum for a one-credit TA training course. This curriculum expands the asynchronous online TA training, which had been in place for several years, getting more information about classroom management, differentiated instruction and cultural differences. This class was taught as a small pilot in Spring 2021 and will be taught for the first time as a full course in Fall 2022.

**ARTS (Anti-Racist Teaching Seminar):** In Summer 2021, several faculty members from all of the various computing programs began their participation in a year long workshop designed to make our courses and teaching more inclusive, equitable, anti-racist and anti-oppressive. Ten faculty members planned innovations for intro computing courses and were supported by Break Through Tech. The program was offered through the iSchool and has the structure of content learning during the summer followed by specific class modifications and feedback during the subsequent Fall semester.

### **Overall Outcome Data**

The number of women computing majors and graduates with computing majors at UMD have both increased by close to one percentage point this year. We expect to see greater increases in this rate in the coming years, as Break Through Tech programming reaches more students, and new majors continue to grow. We are already seeing a rapid increase in women majors in Information Science and in our newest major, Immersive Media Design. We will welcome our inaugural cohort of Social Data Science majors in Fall 2022 and Information Design majors in Fall 2023. It's difficult to predict the number of Computer Science majors that we will enroll in the future, because even though it has been designated a Limited Enrollment Program, we have not seen a significant decline in the number of majors and may actually see the major grow in the future. The percentage of Computer Science majors who are women has remained fairly stable; we do expect this to grow, but at a slower rate than other computing majors.

[Break Through Tech DC website](#)

[About Us and Staffing](#)

[UMD Annual Report for National 2021-2022](#)

[2021-2022 Strategic Plan Overview](#)

## **7. Research Efforts & Special Projects**

### ***Faculty Diversity and Inclusion Training***

Monthly Full Faculty Lunches continued through the virtual setting with a departmental data review of challenges and opportunities, Dept BPC plan and overall inclusive teaching.

### ***CompSciConnect/Laboratory for Telecommunication Sciences***

I4C and MCWIC regularly evaluate their programs to understand how exposure and access to computing in the K-12 landscape affects girls and BLNA students' confidence in pursuing STEM majors and careers. Through one-day workshop-style events, summer camps and after-school programs, pre- and post-surveys are collected from student participants. An initial analysis of surveys collected shows several trends in the lack of encouragement and exposure to computing that girls and BLNA middle school students receive. Analysis also shows that our outreach efforts, including our virtual programming, have a positive impact on student confidence and interest in the field of computing. During the last year, the following submissions were accepted:

- **Informal near-peer teaching models: The complex relationship between intersectional computing identities, mentoring and teaching.** *2021 American Educational Research Association Annual Conference (Poster)*. Primary Author: Kristina Kramarczuk
- **[Exploring the Relationship Between Undergraduate Near-Peer Intersectional Computing, Mentoring, and Instructor Identities.](#)** *2022 ACM Technical Symposium on Computer Science Education*. Primary Author: Kristina Kramarczuk
- **[Women's Longitudinal Career Trajectories Following Their Participation in a 3-Year Computing Camp](#)**
- *2022 ACM Technical Symposium on Computer Science Education*. CUR Award | SIGCSE TS 2022. Primary Author: Maya Narayanasamy
- **[Training Near-Peer Mentors for Instructional Roles in Informal K-12 Computing Programs](#)**
- *2022 ACM Technical Symposium on Computer Science Education*. Primary Author: Kristina Kramarczuk
- **[The Power of Mentoring Programs in Retaining women and Black, Indigenous, and Students of Color in Undergraduate Computing Majors.](#)** *2021 International conference on Computational Science and Computational Intelligence (Paper)*. Primary Author: Kristina Kramarczuk
- **[First Generation Undergraduate Women and Intersectional Obstacles to Pursuing Post-Baccalaureate Computing Degrees.](#)** *2021 Conference on Research in Equitable and Sustained Participation in Engineering, Computing, and Technology (Paper)*. Primary Author: Kristina Kramarczuk

### **CS for All Commitment**

I4C and MCWIC represent two of 147 organizations committed to broadening participation in computing through the CS for All movement. CS for All is a political initiative launched in 2016 that aims to make computer science an integral part of the K-12 educational experience. The policy specifically emphasizes broadening the participation of students historically underrepresented in the field (e.g. girls and BLNA students). I4C and MCWIC's specific commitments are as follows:

- MCWIC will collaborate with Girl Scouts of Nation's Capital and Rise Up 4 CS to provide workshops in the areas of coding basics, app development, game design, cybersecurity, and Advanced Placement Computer Science A (Java) to 600 middle school and high school girls in Maryland and Washington, D.C., as of June 2022.
- I4C offers summer academies and workshops to 800 middle and high school-aged students who identify as girls or non-binary and/or Black, Latinx, or Native American in Maryland and Washington, D.C., as of June 2022.

More information about the CS for All national non-profit organization can be found [here](#).

### **Maryland Center for Computing Education (MCCE)**

For many years, I4C has partnered with other programs improving the computing education K-12. This began with the CS Matters in Maryland Project, expanded to Jan Plane's chairing the statewide steering

committee for computer science education and serving on the advisory board for the MCCE created as a USM center by Maryland state statute. The goal of the steering committee is to help develop policies through broad representation to improve education for computing at all levels. 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.

In partnership with Prince George's County Public Schools (PGCPS) and MCCE, Charlotte Avery has conducted professional development for 55 current PGCPS middle school teachers in the areas of HTML, CSS, JavaScript, Computational Thinking, curriculum development and student engagement. We have also assisted with their Family Coding Night event in Fall 2021, serving 300 participants.

## 8. In the News and Recognition

- Which state is doing the best to improve access to computing education? ([Part 1](#)) ([Part 2](#))
- [Champion for Women and Underrepresented Students in Computing Retires from UMD](#)
- [Three Honorees to Be Recognized at Women of Influence Awards](#)
- [60 Terps to Lead Commencement Procession as Senior Marshals](#)
- [UMD Students Kickstart Their Tech Careers with Micro-internships](#)
- [Computer Engineering Students Participate in Break Through Tech's Inaugural Micro-Internship Program](#)
- [Seven iSchool Undergraduates Join UMD's First Sprinternship™](#)
- [Goodshuffle Pro is Partnering with Break Through Tech's Sprinternship Program](#)
- [Easy Dynamics Partners With Break Through Tech DC, Welcomes Group of Female UMD Students as "Sprinterns™"](#)
- [A VR View of Black Broadway: Students Create Virtual Tour to Showcase Decades of U Street Culture](#)
- [Upcoming Workshop Offers Positive Undergrad Research Experience](#)
- [Research Projects Open Doors for High School Students](#)
- [Undergrads Explore Tech Careers by Building Apps to Solve Transportation Challenges](#)
- [How the Iribe Initiative's Alumni Mentoring Program Prepares Undergraduates for the Professional World](#)
- [Five Computer Science Graduates Turned Internships into Full-Time Jobs](#)
- [Kate Atchison receives Department staff award](#)
- [Jan Plane receives Provost's Excellence Award](#)
- [Donna White named Break Through Tech DC Director](#)
- [UMD iSchool, CMNS & I4C Celebrate Break Through Tech DC Partnership to Foster Diversity in Computing](#)

## 9. Additional Department Diversity Efforts and Student Support

Dr. Jan Plane, Kate Atchison and Veronica Sanchez are all active on the CMSC Diversity Committee. The Committee has been active in collecting survey data from faculty, staff and students and aligning that survey data with the university's efforts in the same area. Faculty actively recruited graduate students and faculty from diversity conferences and list-serves targeted towards underrepresented communities. The committee is specifically looking at hiring practices and graduate student admission practices to better understand diversity and inclusion in these contexts as well as better connecting undergraduates to research opportunities next year. You can view the highlights of the 2021-2022 work on the [CS diversity tab](#).

In partnership with David Mount, CS offered regular TA Training for all undergraduate and graduate TAs in the department. Through online ELMS modules, a site was launched to continue sharing resources and training for TAs. Looking at the next academic year, the TA team is reviewing survey data, best practices and feedback on how to grow and improve the TA process. In Spring 2022, a formal TA Training course was offered for the department, with new TAs encouraged to take the one-credit course, CMSC 395.

In August 2020, President Pines directed all colleges to provide a TerrapinSTRONG training for all incoming undergraduate students. Kate Atchison and Natalie Lightfoot-Solomon served on the CMNS committee. Four staff members helped host TerrapinSTRONG sessions in September 2021. Over 1,000 students participated in this effort.

In September 2020, Dean Varshney created the CMNS Diversity Council. Dr. Mihai Pop and Kate Atchison were appointed for a two-year term. Jai Upadhyay serve in student role. Many CS faculty and staff were active participants in the CMNS Inclusion Summit in March 2022.

## **10. Mission for Iribe Initiative for Inclusion and Diversity in Computing**

### ***Mission:***

We are committed to diversifying the tech sector and making all areas of computing inclusive across the intersections of gender identification, race, ethnicity, socioeconomic status, sexual orientation, and disability status.

### ***Vision:***

We aim to create a supportive, vibrant and inclusive community of students, educators and researchers coming together to increase the involvement—and success—of all individuals from historically marginalized populations in computing.

### ***Goals:***

- Support, educate and mentor students from populations underrepresented in computing majors and minors at the University of Maryland
- Collaborate with the K-12 community to encourage all students, especially those from historically marginalized populations, to become creators and leaders within computing
- Foster a safe space for faculty and staff along with undergraduate and graduate students in computing to connect across intersections of their identities through social, academic and professional programming
- Train, teach, and model community-building and advocacy skills so our community members are equipped with the tools and resources to advocate for change and make the computing field more inclusive.

In the Iribe Initiative for Inclusion and Diversity in Computing, we base the foundation of our definition for “underrepresented populations in computing” on the National Science Foundation (NSF) statement below.

“Across the computing workforce at all levels, there is underrepresentation of various populations including women, minorities (African Americans/Blacks, Hispanic Americans, American Indians, Alaska Natives, Native Hawaiians, Native Pacific Islanders, and persons from economically disadvantaged backgrounds), and persons with disabilities.” (<https://www.nsf.gov/pubs/2018/nsf18101/nsf18101.jsp> or <https://www.nsf.gov/cise/bpc/>)

***Definition of Computing:*** Computing refers to academic and job-related activities that involve coding, software engineering, information science, immersive media, artificial intelligence, data science and other applications of computer science knowledge and skills.

## 11. Supporters and Funding

### Fiscal Year 2022 Budget Total:

#### Annual Budget Allocation

\$50,000 – College of Computer, Mathematical, and Natural Sciences

\$25,000 – Department of Computer Science

\$25,000 – UMIACS (University of Maryland Institute for Advanced Computer Studies)

#### Additional Financial Support

- \$1,000,000 gift from Brendan Iribe to start the Initiative
- \$2.9 million grant from Break Through Tech via Pivotal Ventures and Cognizant Foundation
- \$10,000 from AI4ALL National Organization for the AI4ALL Summer Camp
- \$26,000 yearly – AFCEA Bethesda
- \$40,000 yearly from NSA's research lab – Laboratory Telecommunication Science (LTS) – earmarked for research
- Corporate Partner Support/Alumni Giving- ~\$46,000 for 2021-2022
- Registration Fees for summer programs and workshops
- Various Gifts and Grants – NCWIT, CSMatters-NSF and Reboot Representation

#### 2021-2022 Sponsors

##### Advocate Level (\$4000+):

AFCEA Bethesda

Amazon Pay

Capital One

DropBox

Huntington Ingalls Industries

Google

##### Additional Support (\$2000):

Accenture

Appian

Easy Dynamics

Fact Set

Fannie Mae

Leidos

Lockheed Martin

M&T Tech

Qualcomm

Stripe

Two Six Technologies

Zillow