A NOTE FROM THE DIRECTOR:

JILL M. WILLIAMS, PHD
DIRECTOR, WOMEN IN SCIENCE AND ENGINEERING PROGRAM

The work of the Women in Science and Engineering Program is more important now than ever. The COVID-19 pandemic laid bare the deep inequities in our society and presented numerous challenges for women at all stages of their academic and career journeys. Moreover, it pointed to the importance of fostering the development of robust, diverse, and inclusive STEM communities along the K-16+ pipeline and in the workforce. Research shows that more diverse science and engineering teams are more innovative and produce solutions that more equitably impact society. These are precisely the kind of solutions we need to address the most pressing human and environmental challenges we face today.

The Women in Science and Engineering Program serves as the only institutionalized program at the University of Arizona dedicated to supporting the entry, persistence, and success of female-identifying students across the sciences and engineering. During the 2020-21 academic year, we worked diligently to pivot all of our programming to be offered 100% online, ensuring we were able to continue to provide critical educational, professional development, and support programs, while ensuring the safety of students and staff. Despite the challenges presented by the pandemic, we continued to offer near weekly environmental science and computer science programs to over 400 K-12 students; provided for-credit internships, professional development, and leadership to over 40 University of Arizona students; paired over 100 University students with STEM professionals through our structured mentorship program; and welcomed over 400 attendees to the annual Launching Your Career Symposium. Through it all, we saw students continually show-up excited to engage and willing to share their struggles and ask for support.

We are proud of the work we have accomplished over the last year and are happy to share some of our accomplishments with you. Thanks to our supporters for making this critical work possible and helping us thrive through uncertain times.
WISE PROGRAMS
2020-2021

STUDENTS DIRECTLY IMPACTED
963

K-12 STUDENTS
489
UNIVERSITY-LEVEL STUDENTS
474

STUDENTS BY
RACE/ETHNICITY

6% Black/African American
2% Native Hawaiian/Pacific Islander
3% American Indian/Alaskan Native
41% White
25% Latinx
18% Asian
3% Middle Eastern/North African
2% Other

STUDENTS BY
COLLEGE ENROLLMENT

Engineering
Science
Agriculture and Life Sciences
Social and Behavioral Sciences
Optics
Health Sci.
Other

0 50 100 150
The Bio/Diversity Project is an educational outreach and workforce development program led by the Women in Science and Engineering Program since 2016. This program works to foster more diverse and inclusive environmental science communities and organizations by increasing access to culturally responsive and inclusive education, training, mentorship, and paid work experience.

Each year, approximately 40 University of Arizona students from groups historically marginalized in environmental fields are recruited and trained as environmental science outreach educators. They then work with partner teachers at local K-12 schools to develop and deliver engaging, culturally-responsive, and place-based environmental science lessons to between 400-600 K-12 students each week. Trainings and workshops throughout the internship experience helps students gain knowledge and skills related to science communication, collaboration and cooperation, and the challenges and strategies associated with fostering more diverse and inclusive environmental organizations. Successful interns are then provided the opportunity to apply for paid positions with partner organizations including WISE and Saguaro National Park/Friends of Saguaro National Park.

Since its founding in 2016, the Bio/Diversity Project has built relationships with 18 different academic units so students are able to receive internship credit in a way that aligns easily with their academic plans. At the same time, the variety of knowledge and experience that students bring to the program from the different academic programs and majors helps to contribute to a well-rounded cohort.

Due to the COVID-19 pandemic, the Bio/Diversity Project was offered in a completely remote modality during the 2020-21 academic year. 36 students participated in the internship experience, including 3 who participated in both the fall and spring semesters. 75% of program participants reported that they had difficulty finding a remote internship experience that aligned with their academic plan before finding the Bio/Diversity Project.
Being an intern and a student worker with The Bio/Diversity Project has impacted my life in many ways. During my time with the program, I had the chance to build new connections with amazing and supportive staff/co-interns, allowing me to gain many network opportunities that eventually led me to be a Natural Resource intern at Saguaro National Park. The Biodiversity project has also impacted my life in that I discovered a new passion for environmental outreach. As I continue working with Saguaro National Park, I realize the skills and opportunities I have gained thanks to The Bio/Diversity Project.

- Berenice Chacon
During the 2020-2021 academic year The Bio/Diversity Project piloted a paid leadership development program aimed at providing students with additional opportunities to gain skills in project development, collaboration, and leadership, while working on projects that directly impact the University of Arizona and Tucson communities.

Twenty-nine applications were received in summer 2020 and 4 undergraduate students were selected to participate in the 2020-2021 cohort. All 4 students identified as female, Latinx/Hispanic, and first-generation college students and demonstrated great potential as emerging environmental leaders. They came from a variety of academic fields including environmental engineering, veterinary science, environmental science, and microbiology. Student leaders met weekly with Bio/Diversity Project staff throughout the Fall 2020 semester, and participated in interactive online workshops that helped them identify community needs and build skills. These workshops included networking with local environmental leaders in Tucson, learning about the importance of addressing both gender and racial equity, and provided students opportunities to practice public speaking and science communication skills. Students were challenged to research relevant issues and participate in frequent public speaking opportunities within the cohort.
At the end of the Fall 2020 semester, student leaders hosted a zoom panel with local high school students from Changemaker High School to discuss the importance of diversity and representation within the STEM fields, as well as answer questions and provide financial resources, including scholarship and grant information, for pursuing higher education.

In January 2021, the student leaders applied for and received a University of Arizona Green Fund grant to facilitate a 4-part panel series titled “Overcoming Racial and Gender Equity Roadblocks to Diversity Leadership in Environmental Sciences.” This panel series included 13 guest speakers from 12 different local organizations that highlighted their personal and professional experience around gender and racial equity within STEM and tangible steps that students can take to address these disparities.

The student leaders gained additional skills in public speaking by presenting their experiences at the Commission on the Status of Women Symposium in April and via an online webinar in June. You can watch a recording of the webinar by visiting: https://biodiversityproject.arizona.edu/events

Student leaders reported that participating in the program was transformational. It helped them gain knowledge around issues of diversity and inclusion in environmental fields, while enabling them to gain a variety of workforce readiness skills. Moreover, the program provided a key opportunity for students to build connections and supportive relationships with other students and staff, relationships that were critical to helping them weather the many challenges presented by the COVID-19 pandemic.

"[B]eing involved in this program was life changing. It gave me an opportunity to explore my passion for conservation and biodiversity. I got to do this during a time in my life when racial and gender inequity became an important topic for me to engage in, learn about, and work towards anti-racism. I changed my major because (thankfully) I was able to engage in these important topics throughout the year. Without these opportunities, I might not have finished my first year here [at the University of Arizona]. Some days, I do not feel like I have the energy to do anything, but the opportunity to engage in the things I found so important kept me inspired.”

- Leadership Program Participant
Each year, the Women in Science and Engineering Program (WISE) organizes the Launching Your Career Symposium (LYC), a day-long professional development and networking symposium targeting female STEM students. Through a series of presentations, interactive workshops, and panels featuring successful women in STEM, LYC enables female STEM students to gain the knowledge, skills, and relationships necessary to successfully launch their STEM careers. This past year was the first year the event was held completely online. Although, the in-person networking was lost, we were excited to successfully pivot the program in a way that increased accessibility and fostered an inclusive online experience for LYC participants. In total, over 469 individuals registered for the event, representing over 11 different UArizona Colleges.

LYC 2021 featured twelve workshop and panel sessions featuring a wide variety of academic and career pathways and opportunities for skills building and networking. Each session attracted between 60-180 participants.

The online modality of the event enabled us to recruit presenters from both within and outside the Tucson metro area. Jessica Esquivel, a research scientist at Fermilab, AAAS If/Then Fellow, and nationally recognized diversity and inclusion in STEM advocate, served as the keynote speaker. In her inspiring address, Jessica wove together her personal background and experiences as an Afro-Latina in STEM with her cutting edge research in particle physics.

"The most valuable part of LYC is that all these women in STEM share their own experiences so that we don't feel alone."

- LYC 2021 Participant

- Identifying & Employing Your Strengths, The Aerospace Corporation
- Public Engagement & Building Your STEM Career, AAAS If/Then Ambassadors
- Strategizing your Interview by Roche
- Intersectionality in STEM
- Éxito: ¡tú creas tu camino!
- Mental Health in STEM
- Imagine Your STEM Future
- LinkedIn 101
- Graduate School in STEM
We were also excited to collaborate with UArizona’s Mexico Initiatives’ program Amplifying the Voices of Women in STEM and Tecnológico de Monterrey (Monterrey Institute of Technology), to open the event to STEM students from Mexico as well. To ensure language equity, four LYC sessions were simultaneously translated from English to Spanish and one session presented in Spanish and translated to English by UArizona’s National Center for Interpretation.

Eight LYC sessions were closed captioned and four were real-time captioned thanks to UArizona’s Disability Resource Center in order to increase accessibility.

According to post-program surveys, LYC 2021 was impactful, inspiring, and productive, regardless of the remote modality.

**PROGRAM IMPACT & OUTCOMES**

**LYC PARTICIPANTS:**
- 97% reported increased confidence in their ability to succeed in STEM
- 99% reported an increased sense of belonging in STEM
- 99% reported that they felt more connected to other women in STEM
- 97% reported that the workshops and panels were productive in relation to their STEM career goals

**PROSPECTIVE WILDCATS:**
- 80% reported that this event increased their interest in attending the University of Arizona

**LYC WORKSHOPS AND PANELS**
Featuring a wide variety of Women in STEM from across UArizona Campus and the Tucson Community

- Dr. Cheree Meeks, Assistant Dean, UArizona Honors College
- Dr. Paloma I. Beamer, Assistant Professor, College of Public Health
- IngriQue “Q” Salt, Project Coordinator, Indigenous Teacher Education Program
- Stephanie Bermúdez, Founder, Startup Unidos
- Erica Williams, PhD Candidate, Pharmacology
- Dr. Liliana Ruiz Diaz, Research Scientist, Facebook Reality Labs

The 2021 Launching Your Career Symposium would not have been possible without continued support from our industry partners-

- W.L. Gore and Associates
- Roche Tissue Diagnostics
- The Aerospace Corporation
- Raytheon Missiles and Defense.
SUPPORTING FEMALE STUDENT PERSISTENCE AND SUCCESS THROUGH MENTORSHIP

The Women in STEM Mentorship Program was created in 2019 to fill a gap in mentorship for female-identifying STEM students at the University of Arizona. Research shows that mentorship is critical to supporting the persistence and success of female STEM students, yet students often find it difficult to find mentors. The Women in STEM Mentorship Program facilitates the development of impactful mentor/mentee relationships by pairing mentors and mentees based on a holistic approach to student success and providing training and support to help the relationships flourish.

Pairs are provided with discussion guides and short activities in order to facilitate conversation specific to the experiences of women in STEM and to help mentor/mentee pairs build a positive and productive relationship. Topics covered include internships and research experience, networking, life post-graduation, conflict management, work/life balance, mental health, and growth mindset. Pairs are also provided with individualized templates for mentors and mentees to work together to set and track goals. Mentorship Program staff conduct periodic check-ins with program participants (both mentors and mentees) throughout the academic year and provide support as needed to help mentor/mentee relationships thrive.

The program aims to increase the retention and success of women in STEM by:

**CONNECT**  
UArizona women STEM students with faculty, staff and industry professionals to create diverse, inclusive, and supportive mentoring relationships.

**EMPOWER**  
women in STEM at the University of Arizona by giving them the tools and guidance needed for success

**CREATE**  
a community of women in STEM and allies that spans the undergraduate and graduate level, and across the University of Arizona and the greater Arizona community.

University of Arizona graduate and undergraduate students are matched with faculty, staff, and industry associates based on their goals, career interests, and individual backgrounds. The mentor/mentee pairs meet once a month at their convenience to have conversations regarding their STEM trajectory.

MENTEE AFFILIATION BY UARIZONA COLLEGES

<table>
<thead>
<tr>
<th>College</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science</td>
<td>53%</td>
</tr>
<tr>
<td>Engineering</td>
<td>13%</td>
</tr>
<tr>
<td>SBS</td>
<td>10%</td>
</tr>
<tr>
<td>Health Sci.</td>
<td>7%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
</tr>
<tr>
<td>Health Sci.</td>
<td>10%</td>
</tr>
<tr>
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</tr>
<tr>
<td>OTHER</td>
<td>5%</td>
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<td>Science</td>
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<td>7%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
</tr>
</tbody>
</table>

2019-2020 PROGRAM LAUNCH EVENT

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a community of women in STEM and allies that spans the undergraduate and graduate level, and across the University of Arizona and the greater Arizona community.
The 2020-2021 mentorship program paired 149 university students with 122 STEM professionals from across industry and academia. Mentors hailed from over 18 different STEM companies including Raytheon Missiles & Defense, Roche Tissue Diagnostics, Intel, Pfizer, Honeywell, Critical Path Institute, Syncardia Systems, and a number of government organizations including NASA, National Center for Atmospheric Research, and the Bureau of Land Management.

The program surveys indicate that the mentorship program is highly successful in supporting the retention and success of women in STEM by increasing their sense of belonging, self-efficacy, and motivation, while simultaneously providing them with direct support to help them achieve their STEM goals.

Special thanks to Raytheon Missiles and Defense, the sponsoring partner of the Women in STEM Mentorship Program, for making this program possible.

For more information on the mentorship program or how to get involved (as a mentor or mentee) contact Gaby Perez Laurent at gperezlaurent@arizona.edu.

### OF POST-PROGRAM SURVEY RESPONDENTS:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>reported participation helped them persist in STEM</td>
</tr>
<tr>
<td>87%</td>
<td>reported participation made them feel more confident in their ability to succeed in STEM</td>
</tr>
<tr>
<td>94%</td>
<td>reported participation helped them achieve academic/professional goals (e.g., obtain scholarships, fellowships, internships, jobs)</td>
</tr>
<tr>
<td>100%</td>
<td>reported that participation made them more likely to actively work to build relationships with professionals in their desired career</td>
</tr>
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</table>
Girls Who Code (GWC) aims to close the gender gap in computer science and tech fields by increasing access to girl-focused computer science educational programming for middle and high school girls. The University of Arizona Girls Who Code club is run by the Women in Science and Engineering Program in collaboration with the UA Libraries and CATalyst. The program runs from September-May each year and is open to students in 6th-12th grades who are interested in learning more about computer programming. Although the program is open for anyone to join, the program is aimed at young women and the curriculum features women who use coding and other forms of tech to address real world problems. The club is free for participants and does not require participants to have any previous coding experience, lowering the barriers that often hold students back from learning computer science such as grades or finances.

During the 2020-21 academic year, regular weekly meetings were held virtually, rather than in-person. Throughout the year students learn the fundamentals of Python, while also learning about other women in science and STEM career paths and getting familiar with the University of Arizona and the academic programs offered. Common activities completed are:

- **Writing Python programs based on the topic of the week**
- **Work together to understand a woman in STEM, specifically their accomplishments, struggles, and key takeaways**
- **Complete a team-building activity to build connections and understand the importance of teamwork**

By the end of the school year, students can write basic Python code, reflect on a future in computer science, and think about what academic majors might help them achieve their goal. All while making meaningful connections with other participants and facilitators. With these skills, students can complete a final project of their choosing that combines all of the skills they used during the year. Once finished with the school year, students can join Girls Who Code again or even become a facilitator.

Girls Who Code facilitators are University of Arizona students studying or interested in computer science and related fields. Having facilitators in Computer Science and STEM majors is important because they serve as role models of college-going STEM students, while facilitating weekly lessons. Moreover, facilitators report that serving as a facilitator positively effects them in a number of ways including: increasing their motivation to persist in STEM, making them feel more confident in their ability to succeed in STEM, and making them feel more connected to the Tucson community and other women in STEM.
Girls who code has changed my life! In high school, I joined the club for fun and had no idea what a huge impact it would have on my life. I fell in love with coding and the idea that you can make almost anything you want just using a computer and your brain.

Girls Who Code offered such a welcoming environment for me to challenge myself and grow. The club influenced what I wanted to study in college and now I am a student at the University of Arizona double majoring in computer science and information science & technology. Using the skills I learned from facilitating girls who code after being a participant, I also became an undergraduate teaching assistant for the introductory programming class. My passion for promoting diversity, equity, and inclusion began during the conversations in Girls Who Code where we talked about the severe gender gap that exists in computer science, its implications, and how to navigate being a woman in CS. I wanted to help start the same conversation at the university, so I have been closely working with several staff members, faculty, and students to help start several initiatives to create a welcoming environment for all. I have found so much success in college and I credit a lot of it to my first experiences with programming at Girls Who Code. I am hugely thankful for my time at Girls Who Code and would recommend that every girl try it!

- SAGE PEZZULO,
  COMPUTER SCIENCE AND INFORMATION SCIENCE & TECHNOLOGY MAJOR
Over the last two years, WISE has worked with partners across the university to engage in research and discussions aimed at better understanding how disparities in STEM outcomes manifest at our institution and developing policies aimed at addressing them.

In 2019, we released the first comprehensive analysis of female student enrollment, retention, and graduation rates across the primary STEM colleges and departments at the University of Arizona. This report provided university administrators, policy makers, and student support staff with information necessary to understand trends in female student enrollment, retention, and graduation and the degree to which trends vary across colleges and departments. It also prompted important conversations on how STEM student outcomes are assessed and disparities evaluated.

A key question that emerged from these conversations was the extent to which sex influenced STEM student outcomes and the relationship between sex and other common axes of difference in shaping STEM outcomes. In particular, questions were raised regarding the degree to which underrepresented minority (URM) status, first-generation college going status, and Pell-eligible status affected STEM student outcomes differentially for men and women.

In early 2021, we received funding from the UA Office of Societal Impact and the Technology and Research Initiative Fund to conduct an intersectional analysis of STEM student outcomes, looking at the degree to which sex, URM status, first-generation status, and Pell-eligible status affect the entry, persistence, and success of students at the University of Arizona. This project provided an opportunity to better understand the local STEM landscape at UAZ, while also working to create a common system for assessing disparities in outcomes.

We analyzed over 40,000 UAZ student records from between 2014-2020 in order to determine baseline differences in entry, persistence, and graduation rates for female, under-represented minority, first-generation, and Pell eligible students in STEM fields. We then conducted statistical analysis to assess the degree to which membership in any of these four social groups influenced the likelihood of particular STEM outcomes, including persisting in STEM and graduating with a STEM degree.
The results of our analysis indicate statistically significant disparities in some STEM student outcomes across intersectional groups and offer a more fine-tuned understanding of the degree to which sex, under-represented minority status, first generation college status, and Pell-eligible status shape the likelihood that students will enter, persist, or succeed in STEM fields at UAZ. For example, our research shows that a Pell-eligible, first-generation, URM female who enters the University of Arizona as a STEM major has a 57% likelihood of graduating with a STEM degree, whereas a non-URM, non-first generation, non-Pell eligible male student has an 81% likelihood. This points to the continued importance of working to address disparities in STEM outcomes in a way that attends to the various factors, including and beyond sex and gender-identity, that shape student experiences in STEM fields.

This type of intersectional analysis is critical for increasing knowledge of our local institutional context, informing targeted programming capable of addressing disparities, and providing baseline data from which to measure success. As we work with partners from across the institution to increase access to STEM careers and foster workforce development in critical fields, this report will help guide this work. To read the full report visit wise.arizona.edu/research

### STEM & NONSTEM Degree Distribution

Overall, 72% of all entering STEM students who graduated received a STEM degree and 28% received degrees in non-STEM fields. Among all males, 76% received a STEM degree, whereas among all females, only 65% went on to graduate with a STEM degree. Disaggregation of these rates by race/ethnicity and first generation status are presented below.

<table>
<thead>
<tr>
<th>Category</th>
<th>STEM Graduation</th>
<th>NONSTEM Graduation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female URM First Gen</td>
<td>52.1%</td>
<td>47.9%</td>
</tr>
<tr>
<td>Female URM Non First Gen</td>
<td>36.3%</td>
<td>63.7%</td>
</tr>
<tr>
<td>Female Non URM First Gen</td>
<td>34.1%</td>
<td>65.9%</td>
</tr>
<tr>
<td>Female Non URM Non First Gen</td>
<td>31.7%</td>
<td>68.3%</td>
</tr>
<tr>
<td>Male URM First Gen</td>
<td>30.0%</td>
<td>70.0%</td>
</tr>
<tr>
<td>Male URM Non First Gen</td>
<td>19.7%</td>
<td>80.3%</td>
</tr>
<tr>
<td>Male Non URM First Gen</td>
<td>22.7%</td>
<td>77.3%</td>
</tr>
<tr>
<td>Male Non URM Non First Gen</td>
<td>17.8%</td>
<td>82.2%</td>
</tr>
</tbody>
</table>

Data from UA STEM Major Entry Cohorts 2014-2016
Chart: UA Women in Science and Engineering Program • Source: UA Analytics • Created with Datawrapper
MONTHLY STEM CHECK-INS
BUILDING COMMUNITY AMONG UARIZONA WOMEN IN STEM STUDENT GROUPS

In 2020, WISE began hosting monthly virtual check-ins where Women in STEM student groups at UArizona were invited to present on what their organizations are focused on and promote any upcoming events, opportunities, and programming.

This effort achieves a central goal of WISE's mission, to serve as a network for the many existing “Women in STEM” student groups and STEM departments.

2020-2021 COLLABORATORS
- Women in Psychology
- Women in Mining
- Association for Women Geoscientists (AWG)
- Genetic Counseling Club
- Women in Optics
- Phi Sigma Rho
- Women in Computer Science

SUPPORT WISE

The Women in Science and Engineering Program relies on the support of individuals, organizations, and companies to sustain our work. If you are interested in volunteering your time to support this work, contact WISE Director Jill Williams at JillMWilliams@arizona.edu.

Financial support is also critical to enabling our efforts to support the development of more diverse and inclusive STEM communities. If you are interested in making a financial contribution, please visit wise.arizona.edu/donate to donate electronically or mail a check payable to “UA Foundation for the benefit of WISE” to the address below.

To discuss additional giving avenues, please contact WISE Director Jill Williams at JillMWilliam@arizona.edu or 520-626-9152 or Gail Godby, Associate Director of Development in the College of Social and Behavioral Sciences at 520-626-3454.
Thank you to the organizations and individuals who make this important work possible.

WISE is housed in the Southwest Institute for Research on Women, a regional research and resource center dedicated to improving the lives of women and girls and addressing group-based disparities.