"We Make the Village" - Inspiring STEM Among Young Girls and the Power of Creative Engineering Education in Action

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***Abstract*— In this Innovative Practice Full paper, we use an autoethnographic approach to describe first-hand the experiences and learnings from launching an initiative to help school children, especially girls, familiarize themselves with STEM and cybersecurity. The primary authors and ethnographers are founders of STEM initiatives for young learners. One is a recent high school graduate who is now majoring in an engineering field as a college freshman and continues mentoring the program, and two others are at sophomore and junior levels in high school, currently leading these initiatives. With the help of three engineering educators, they use their individual self-narratives to develop a deeper understanding of the broad question of how STEM-related interactions with peers helped develop their own commitment to the professions of engineering and education. It is hoped that this work will be of value to fellow engineering professionals, minority engineering networks, as well as administrators and students, as we introspect, reflect, and design programs to help better prepare girls for careers in STEM and engineering.**

Keywords— Engineering Education; autoethnography; STEM workshop; K-12; women in engineering; leadership

I. Introduction

There is no dearth of evidence to indicate that there is a need for increased equality in gender representation in STEM, particularly in Engineering. Women make up about half of the total U.S. college-educated workforce, but only 28% of the science and engineering workforce, as observed in a report by the National Science Board [1]. Further, researchers have found that even though 52% of the college educated workforce comprises women, only 29% of the STEM workforce is female [2]. Similarly, James and Singer [3] found that female scientists and engineers are concentrated in different occupations than are men, with relatively high shares of women in the social sciences (60%) and biological, agricultural, environmental, and life sciences (48%) and dismally low numbers in the hard sciences of engineering (15%) and computer and mathematical sciences (26%).

Several researchers in the field have closely studied the low representation problem. While some have attributed the low numbers to the 'leaky pipeline' anecdote (e.g., [4],[5]), others have critiqued the icy clime in engineering and attributed it to lowered sense of belonging among women in the field. Other researchers have found that a paucity in female role models may be discouraging women from taking up careers in STEM and Engineering (e.g., [6]). There is also considerable and important research, across the globe, that investigates why women drop out and strategize how better to retain women in engineering classrooms and in the workforce (e.g., [7], [8],[9], among others).

But how can we help schoolgirls to begin to consider careers in STEM?

Our paper looks at the problem of low gender representation from the lens of attracting young girls into STEM fields. We acknowledge the benefits of STEM initiatives targeted towards attracting girls in school to consider pursuing Engineering degrees and careers. Further, we consider initiatives aiming to address this disparity as significant and irreplaceable. We build on this narrative to posit the significance of such initiatives introducing young schoolgirls to STEM, on the student leaders ideating and championing such initiatives. Specifically, in this paper we present an autoethnographic analysis of the impact of a STEM-focused initiative on the founders and current young leaders of the program.

II. PURPOSE

Sisters in STEM (SiS) – the initiative addressed in this paper - was founded in 2018, by three young women who held student leadership positions in robotics at Saguaro High School in Scottsdale, Arizona. This initiative, which started as a means to introduce more young girls to STEM concepts such as robotics and cybersecurity, has since evolved into an school District-wide initiative comprising several programs furthering engineering and STEM education among school children.

In this paper we not only describe the Sisters in STEM (SiS) initiative, but go beyond to gain a deeper understanding of how STEM-related interactions with peers and leadership in STEM Education initiatives can help founders of these initiatives to develop their own understanding of the broad range of engineering professions available to young adults

today. There is sparse literature within Engineering Education highlighting the experiences of young leaders of STEM and Engineering initiatives, or to provide them an opportunity to

narrate and reflect upon their own experiences. Our paper addresses this particular gap.

Specifically, we answer the research question: **What was the impact of the initiative on the young leaders contributing to the development and implementation of the program?**

III. METHODS

Through this paper, we consider the history, challenges and successes, and future of the Sisters in STEM initiatives from the viewpoints of several student leaders, parents, and engineering educators. Our reflections are presented in an autoethnographic format, thus allowing the authors to narrate their stories and capture thoughts, but also goes a step further by providing a metacognitive exercise allowing them to reflect on the learnings. This endeavor promotes convergence as well as increased inclusion within engineering education, by bringing in more voices and helping develop budding leaders into lifelong contributors to the engineering education community.

A. An Exercise in Autoethnography

Creswell and Creswell [10] describe autoethnography as a research methodology that analyzes a phenomenon through the use of self-narratives, which would otherwise remain "private or buried." Auto ethnography was an appropriate strategy to use in this study because it provides the primary authors the opportunity to shift from being an outsider to an insider in the research, which further enables their voices to be better heard within the community, thus promoting convergence and inclusion. Similar to Matusovich, Murzi, Gray, Chambers and James [11] we undertook an analytical autoethnography approach, borrowing from Anderson [12], and focused on pragmatic reflections and takeaways rather than emotions related to a phenomenon.

The authors of this paper documented the events and individual personal experiences of the SiS leadership team members, then collectively discussed and analyzed the impact of these experiences on individual career interests and trajectories as well as broader perceptions of engineering in general. The six author-participants of this study include two co-founders of STEM initiatives serving school students - one is currently a freshman in engineering at a Private University in Northeastern United States, while the other is a junior in high school. Another participant is a newer member of the student leadership of the initiative, and identifies himself as a leader and advocate for girls and women in STEM and engineering. Two of the remaining three authors are early career Engineering Educators, who identify as women of color in engineering and are passionate about increasing representation in the field. Our final author-participant is an educator and mentor, as well as mother to two children pursuing STEM careers.

B. Data Collection and Measures of Quality

The six participants are representative of important stakeholders of the engineering education community, including high school students, undergraduates in engineering, parents, and educators/mentors. Fig. 1 gives an overview of the backgrounds of the six participants and authors of this paper.

Name (Gender)	***Race/ Ethnicity***	***Background***
Kayli (Female)	White	Freshman in engineering at a large private research university in the U.S with plans to also minor in Art and Education. Co-founder of the Sisters in STEM initiative with over 4 years' experience in leading Sisters in STEM initiatives and Robotics teams. Designer and creator of SiS website, SiS videomarketing materials, and *Jada Saves the Day* children's book.
Natalie (Female)	White	Junior in high school. Current leader and co-founder of the Cyber SiS initiative, with 2 years' experience in planning, content development and execution of the initiative. Current Robotics team Vice President.
Kritin (Male)	Asian	Sophomore in high school. Current President of Bookworms Club, leading development, and publication of *Jada Saves the Day* spinoff series. One year of involvement in Sisters in STEM as a volunteer and now leader. Robotics leader. Violinist.
Lissa (Female)	White	40 years in Finance & contract negotiations, Aerospace industries. Currently CFO, Battel Engineering; Board of Director positions for private K-8 school and parent Board, Scottsdale Math & Science Academy. Mentor, SIS and Cyber initiatives
Lilianny (Female)	Hispanic	12 years combined experience spanning industry and academia, with 3 years post-PhD experience in engineering education. Currently an Instructional Assistant Professor at a large public university in the South Eastern United States.
Sreyoshi (Female)	Asian	11 years combined experience with 3 years post-PhD experience in engineering. At the time of writing this paper, Sreyoshi managed a global research team at a large education company. Currently she is a Research Scientist at a leading tech company. Her interests include return to work, inclusion, belonging, diversity research and ethical use of AI in the 21st century workforce.

Fig.1. Backgrounds of Participants and Authors

Research quality was of utmost importance as we conducted this autoethnographic exercise. The team ensured that the methods followed were in line with recommendations of experts in the field. We began with a reflection protocol which was developed collaboratively during multiple meetings and generated several pages of documents per each of the four participant-authors who completed this assignment. The protocol was intentionally kept broad and general and did not align with any specific Theoretical Framework (such as those related to Identity Development or Motivation), thus allowing reflections to be grounded in the insights of the participants' experiences, and the themes to be emergent and analysis exploratory.

The complete reflection protocol is included in the Appendix. Although narratives were read and discussed cohesively, the primary questions driving this paper include:

1. Did you grow up with exposure to STEM/Engineering in your family? What is your

earliest recollection of engineering related memory/conversation/activity that you participated in?

2. What was your perception of STEM before you embarked on contributing towards these initiatives? How and why did you get involved in this program?

3. What changes do you see in yourself and your perceptions and motivations, because of the initiatives?

IV. Sisters in STEM (SiS): A Brief Overview

Saguaro High School, where Sisters in STEM was founded, is located in Scottsdale Unified School District. It has 1500 students currently enrolled, predominantly white (64%) and male (54%). 23% are part of a free/reduced lunch program and 20-25% of the total school population participate in the Scottsdale Math & Science Academy. The District has a 93% graduation rate; 21% proficiency points higher in school than the state of AZ. The initial inspiration for an introduction to STEM event was the unexpected cancellation of a separate local event, 'Girl Powered,' typically sponsored by a local college and co-coordinated with Saguaro Robotics' female leadership. Intended to introduce young girls to engineering and robotics, Girl Powered Workshops typically drew between 8 and 40 participants. After the Girl Powered Workshop's cancellation, we felt that STEM exposure was a critically needed opportunity for the community and approached our school administration with a plan to launch our own STEM event. Thus, the first Sisters in STEM event was conducted in November 2018, with a tripartite goal of: a) introducing young girls to STEM, b) helping them engage with student and industry role models to get a sense of the rich academic and career potentials of a future in STEM, and c) helping them find the simple discovery and joys of STEM in everyday life. Since this event was unique and newly formed, the only design constraints consisted of resource and time limitations - no funds and scarcely three weeks total to formulate, assemble, recruit, market, and produce our STEM event. To make up for this shortfall, thinking 'outside the box' became a critical component of any possible success, as well as imagination and people, our primary resources.

With no material constraints, typical preconceived ideas of what a community STEM event should look like -based on normal resources utilized in traditional Robotics events - were eliminated. The unexpected decision was made to expand, not contract, the intended STEM footprint, in spite of our time and resource limitations. Sisters in STEM, thus, quickly grew to encompass all STEAM disciplines (science, technology, engineering, math as well as artistic creativity) for which any resources and knowledge was available. The initiative led with the primary objective of having hands-on, experiential activities utilizing any and all materials at hand. The result was an opportunistically broad range of STEM stations, encompassing coding existing robots, remote control of robots, CAD design principles, using microscopes, handling worms, acoustics games, creating light sculptures, and more - for each discipline, heavily engaging students between the ages of 5 and 15 years old in doing science versus watching science. In the following year, considerable growth both in the event itself and in its audience, was observed with far-reaching impact on the community it sought to serve.

A. *Impact of SiS*

What started out as a mere idea pitched by three girls, snowballed into an initiative with ever-expanding reach into STEM partnerships and 'spinoff' initiatives, with no end in sight. Rather than the anticipated 20-40 attendees we had seen at prior Girl Power events, the SiS launch generated a much larger presence - 130 young children and 100 adult participants - with only one week of limited marketing to the public. This watershed event, held on the Saguaro High School campus, spanned four hours for one evening, and generated several unexpected STEM outreach initiatives with local elementary schools in the District, when the SiS team was approached by elementary schools interested in launching their own STEM initiatives.

Fig.2. Photographs from the in-person STEM programs part of the SiS initiative.

B. *Pivoting to Virtual*

In its third year, the SiS strategy had to again be reimagined with the advent of Covid. Recognizing early in Spring of 2020 that the live venue utilized in prior years would potentially be unavailable, the SiS team convened and chose to make an early 'pivot' to an online, live platform, rather than wait for a hoped-for resolution of the pandemic. This proved to be, for us, in many ways a fortuitous decision. Besides the initial work effort of converting all planned activities to a live remote platform, SiS was able to continue all activities without any significant stoppage - and gained significant expertise in providing live, active educational opportunities in our new, virtual learning environment.

Fig.3. Zoom screenshot of an ongoing interaction between parents, young learners and SiS leaders and volunteers from the virtual program conducted in 2020 during the pandemic.

While initially driven by need, Sisters in STEM has now embraced using virtual means to reach a much broader community. Use of a virtual outreach platform began in the spring of 2020, through cybersecurity lessons taught to local third grade students in virtual classrooms. This program, CyberSIS, grew to encompass lessons for 2nd-5th grade students over the Fall Semester of 2020. In January of 2021, the third annual Sisters in STEM event was held virtually, via Zoom. Despite the unique challenges posed by the pandemic, the annual SIS event maintained its interactive learning style with experiments that could be conducted in the students' homes.

The SiS footprint continues to expand, now encompassing three CyberPatriot high school level virtual summer camps sponsored by Northrop Grumman for students across all AZ District school lines; a Partnership with NY SWE; the Launch of 'First Fridays' monthly remote hands-on Engineering/STEM lessons for 40-150 online participants per session; the production of the 'Jada Saves the Day' book series in process of publication; the launch of remote/live cyber training across broader AZ and national platforms; and our District's request for 'best practices' deployment of SiS initiatives across the full District and exploration of CyberSIS training materials as part of the District's standard elementary class curriculum. Appendix B provides an overview of the growth of the Sisters in STEM initiative from Year 1 to present.

V. Results and Discussion

Our results are organized to answer the research question: What was the impact of the initiative on the young leaders contributing to the development and implementation of the program? The following paragraphs delve into the major themes that emerged from the individual reflections of the authors.

A. Individual Experiences – Involvement in and Impact of the Initiative

Kayli: "It changed everything!"

The primary author's experience, for example, suggests that these types of programs can be effective even for students already influenced by having engineering role models. She reflects, "my brother and father being in engineering didn't really make me interested in engineering", instead, leading the program and being involved in the initiative "changed everything" for her.

"Sisters in STEM was single handedly what pushed me into going to Tufts for Human Factors Engineering. I'd been drifting in a sea of possible careers beforehand, but the event (and the follow-ups and spinoffs) pulled me back onto the ground".

This co-founder thus reflected on how one doesn't have to grow up building legos to take up engineering, but rather, it is important to find the right environment and people that can make one see oneself as successful in such a field. Also important is having fun in and with engineering. The author agreed that this initiative changed her perceptions of engineering and allowed her to understand that engineering involves a lot of creativity and thinking outside the box and does not necessarily ascribe to stereotypical traditional engineers' representations, which may seem masculine or overly constrained. Ultimately, the flexibility and freedom she has experienced with the creation of the SiS STEM program, has profoundly changed her intended career path, now redirected to HFE, STEAM, and leadership roles in community STEM outreach.

Natalie: "It taught me about myself."

"[I] wanted to provide kids with the same opportunity to experience STEM in a fun way; this was one of my first intros into teaching and curriculum development. I knew how important the SiS program was to so many so I went to my team and brainstormed how we could make it work with Covid. I was always intrigued by how much engineers were able to change the world. I enjoy talking and working with others to create a greater change for the betterment of the community".

For this co-author, the most significant arc of personal growth was the realization that working on an initiative with such a profound impact on so many, was both possible at a young age - and exceedingly empowering. This has allowed her to re-envision her role in future programs - and her career path, which now encompasses all STEM disciplines and a heretofore unknown love of teaching. The skills of leadership, curriculum development, and public speaking expanded her existing Engineering skill set from her work in Robotics, allowing her to re-imagine her role in a larger world.

Kritin: "I know now how to be a leader."

"I realized that STEM is for everyone and everyone should have an opportunity to follow their passion if they want. My perception of STEM has changed to a more inclusive one. I'm much more determined and motivated to help others achieve their STEM goals. This has helped me get into a better mindset about the initiative and school in general because I am more disciplined because I know other people are counting on me!"

This co-author's experience, unique in providing a male perspective on involvement in a program supporting girls in STEM, has reflected a deep evolution of both personal perspective on teaming with and supporting women in STEM, as well as personal growth of his own interests and engagement in the STEM fields. The ability to support young girls, and ultimately young boys as well, in their discovery of engineering and STEM disciplines has been both liberating and inspirational. Interestingly, while the author expected that the opportunity to work for and with women in the SiS program would significantly expand his interpersonal and teaming skills in a co-ed environment, it was the personal growth in creativity and a new perspective on STEM as a highly inventive, playful field, that came as the biggest surprise. The opportunity to step outside of previous, relatively rigid Engineering norms for males, became a pivotal moment in his change in perspective on STEM academics in general, and personal future academic and career plans in STEM-related fields.

Lissa: "We Make the Village"

It is encouraging to learn from Lissa's experience that mentors can serve as means to empower students to take the lead in these types of projects. Teachers' perceptions of engineering as a career accessible for only some of their students has been reported as an issue in K-12 education for a long time (e.g., as early as 1980 by Cummings and Taebel [13]). Lissa's reflection is not just relieving but inspiring:

"The observation of the dynamics that played out, again and again, in this environment created a personal resolve for me, to help in whatever way I could to give students – all students - the opportunity to bootstrap themselves up and out of the extremely disadvantaged circumstances they had been born into. In my world, there is no better vehicle for achieving this, than an education in the STEM fields; because this is something the students themselves will own, that no one can take away from them"

Outreach efforts from engineering education are still necessary to provide leaders and mentors, like Lissa, with the support and visibility they deserve. There is a current call to action for collaboration with students, families and educators nationwide in the U.S.

So, *how can we as part of the engineering education community better support these leaders to implement and sustain this type of programs in their schools?*

The authors of the paper agreed that open, targeted conversations amongst all stakeholders interested in promoting the STEM fields, are integral first steps to understand how engineering educators in higher ed can better support mentors and teachers at the school level to bring about much required changes to the engineering ecosystems.

Fig.4. Group photo of SiS leaders and volunteers at an in-person STEM event.

B. *Learning From and Expanding on the Individual Experiences*

Based on our experience, high school students are far more capable of managing the development of powerful Engineering/STEM messaging and materials than is generally accepted. By getting out of their way, we have empowered them to design their own programs and ideas without relying on the 'adults in the room', - and the SiS program is much stronger for that. We do not presume that we know better than our students, how to teach love of engineering and STEM.

Thus, in summary, the opportunity to reflect on the experience of leading the STEM and cybersecurity initiatives for young learners confirms existing literature [e.g., [14]) on interventions that can be useful in increasing girls' perceptions of ability and competence in STEM fields. Even more interesting is that the founders' reflections about this experience suggest that they came to realize engineering value through the experience of participating in these initiatives. This is an important suggestion that confirms research findings indicating that while ability and competency is a strong indicator of engineering achievement, values (i.e., how much individuals want to do a determined task) play an important role in students' decision to pursue an engineering degree, as espoused by researchers in the field (e.g., as showed by Matusovich, Strevler, Loshbaugh, Miller and Olds [15]).

C. *Closing thoughts and Road Ahead*

We acknowledge that perhaps adding a conceptual framework as a lens to look at these reflections would make it easier in determining final assertions for this specific paper. However, as we started having access to the views and feelings of the participants, we didn't want to embark in such a study without giving enough and adequate forethought to all the leaders' experiences in contributing to the development and implementation of the Sisters in STEM (SiS) initiatives.

Furthermore, our engagement in reflecting about the leaders' experiences revealed a number of opportunities for future work. First, we would like to explore engineering identity and sense of belonging over time with participants of these initiatives and include members from underrepresented groups. Like Taylor, Waters, Bhaduri, Lutz and Lee [16] we want to explore the student leaders attitudes towards diversity and allyship. We would like to examine more deeply, for example, how male allyship in these types of initiatives help young boys develop their own engineering identity over time. In addition, we would like to explore alternatives on how we can do better, as engineering educators, to broaden the participation of high school educators in the field. We would like to explore existing and new strategies to integrate, recognize these mentors' work and passion about helping our efforts to involve and attract a diverse pool of students to sustain the nation's role as the global leader in STEM literacy and innovation.

Fig.5. Picture of SiS co-founders at an in-person STEM event.

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AUTHORS' NOTE

At the time of submission, two of the authors of this paper were in high school, while another author was a Freshman, Undergraduate at a College of Engineering. We appreciate educators and leaders reaching out to us with comments and thoughts to help us improve and further our mission. We also hope this paper encourages more younger leaders, possibly intimidated by the larger Engineering Education community to seek visibility, mentorship, and critique through participation at International conferences of repute such as the Frontiers in Education (FiE 2021). This endeavor truly imbibes the theme of the conference, around Convergence.

Finally, the views expressed in this paper are those of the authors' alone and do not necessarily represent that of their affiliated institutions/organizations.

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APPENDIX A: AUTOETHNOGRAPHY REFLECTION PROMPTS

Reflection related to attitude towards engineering

1. Did you grow up with exposure to STEM/Engineering in your family? What is your earliest recollection of engineering related memory/conversation/activity that you participated in?
2. What was your perception of STEM before you embarked on contributing towards these initiatives? How and why did you get involved in this program?
3. When and how, if at all, did your attitude towards Engineering change?
4. Have you noticed a change in attitude of those around you towards Engineering or you?
5. What external factors contributed to the experiences that you have had through participation in the initiative (good and bad)?
6. What changes do you see in yourself and your perceptions and motivations, because of the initiatives?
7. What has been your favorite feedback from others about the program? How did that impact your perceptions of engineering?

Reflection questions related to recommendations for others

1. Why do you think your initiatives were successful?
2. What were some of your challenges? What changes did you make along the way based on what worked and what did not work?
3. What are some things you would do differently, having learned from your experiences?
4. What are some additions to the initiative that you see yourself working on in the coming months?
5. What are some recommendations for others, like you, who may be interested in doing similar initiatives across the globe?

APPENDIX B: SIS THROUGH THE YEARS

Year 1: 2018-19

Number of Participants: 130 children, 100 adults
Number of Volunteers: 40 including school students and professional volunteers
Program Overview: 10 educational/ industry sponsor event participants; 15 STEM stations including Robotics; CAD; 3D printing; Bio; Chem; Math; astronomy; sound wave acoustics; art in STEM; chromatography; chemistry.
Highlights – Program Growth:

- Tutoring program at Title 1 elementary school
- Girls' coding club
- Website design and launch (sistersinstem.net)

Year 2: 2019-20

Number of Participants: 200 children, 140 adults
Number of Volunteers: 50 including school students and professional volunteers
Program Overview: 15 educational/industry sponsor event participants; 18 STEM stations in Robotics; Engineering; CAD; 3D printing; PSYCHE space mission; astronomy; mathematics; chemistry; physics; geology; paleontology; entomology; oceanography; Biology; Environmental Science; STEAM **Highlights – Program Growth:**

- Partnership with Northrop Grumman in cybersecurity fields; Design and initial curriculum development for CyberSIS - cyber safety program for 3-4th grade students

- *In the midst of Covid lockdowns:*
  - CyberSIS cyber safety program re-engineered for online live platform
  - Launch of online live CyberSIS training for local elementary schools

- Development of full online curriculum for CyberPatriot high school camp
- Week long CyberPatriot camp deployed with live online platform
- Development of CyberSIS training modules for 4-6th grade students
- Launch of online Cyberpatriot clubs (3 teams including 1 all girls team)
- Student design and development of Jada Saves the Day childrens' book addressing STEM empowerment for girls in a multicultural community

Year 3: 2020-21 (Covid Times)

Number of Participants: 155 signups for online SiSnight
Number of Volunteers:

- 31 student volunteers
- Keynote speaker: Dr. Kathryn Flanagan, Senior Scientist at the Space Telescope Science Institute
- STEM speaker panel with 8 Engineering and STEM professionals

Program Overview: 6 unique STEM disciplines; student-led, online presentations for each of 6 Zoom Breakout Rooms in the areas of biology, physics, chemistry, mathematics, environmental science, and engineering. Main room open for parents and community members to ask questions and hold discussions with Panelists
Highlights – Program Growth:

- Launch of Saguaro's "Bookworms" club, furthering the development and publication of a children's STEM book series, founded on the Jada Saves the Day book.
- Development and implementation of "First Fridays"; monthly live, virtual, STEM-themed events held via Zoom, in which participants perform STEM activities from home, total of 72 children participating over 2 completed events.
- Planned launch: Sisters in STEM Roadshow, using fully stocked, STEM demo trailer to take SiS events to outlying, underserved communities in Arizona

APPENDIX C: BRIEF BIOGRAPHIES OF THE AUTHORS

Kayli Battel
Kayli Battel is currently a sophomore at Tufts University, majoring in Human Factors Engineering and minoring in Education and Art, interning in the summer of 2021 leading a large STEAM collaborative project for Scottsdale Arts Learning & Innovation in Arizona. One of SiS's three original founders, she organized, led, marketed, and fundraised the program from 2018-2020, and continues to mentor SiS to this day. As a leader then President of Saguaro's FRC Robotics team, Kayli led numerous STEM outreach events at local middle and elementary schools, and beyond. The success of the SiS program earned Saguaro's Robotics Team 4146 their first FRC Chairman's Award, in 2020. Kayli is one of Junior Achievement's 2020 Arizona 18 Under 18 award recipients; was chosen as the Scottsdale Charros Female Student of the Year; graduated with distinction from Saguaro's Math and Science Academy; and was a 2020 Saguaro Valedictorian. Kayli is passionate about STEM and STEAM education for all children, and devotes much time to exploring the interplay between the Art and STEM fields.

Natalie Foster
Natalie Foster is a current high school senior at Saguaro in Scottsdale, Arizona. She is the president of the school's FRC robotics club and has been a member of the team since her freshman year. During her time on the team she has served as an outreach representative as well as a lead engineer. Through her involvement with Sabercat robotics she was introduced to the Sisters in STEM. Natalie has been the director of Sisters in STEM since the fall of 2020, overseeing the initiative's online transition during the pandemic. She is also a founder of a spin off program called CyberSIS, which was launched in the Spring of 2020.

Dr. Lilianny Virgüez Barroso
Dr. Virgüez is an engineering educator with several years of teaching experience at the first-year level. Her research interests include motivation to succeed in engineering with a focus on first-year students. She has work experience in the telecommunications industry. Dr. Virgüez holds a Ph.D. in Engineering Education and a Masters' degree in Management Systems Engineering from Virginia Tech and a bachelor's degree in Telecommunications Engineering from the National Experimental University of the Armed Forces in Venezuela. She is a member of the American Association for Engineering Education (ASEE).

Dr. Sreyoshi Bhaduri
Dr. Sreyoshi Bhaduri is an Engineering Educator and People Researcher. She has led Global People Research and Analytics at McGraw Hill, and is currently a Research Scientist at Amazon. Her research leverages employee data to generate data-driven insights for decisions impacting organizational Culture and Talent. Her research interests include employing innovative, ethical and inclusive mixed-methods research approaches using AI to uncover insights about the 21st century workforce. Sreyoshi is passionate about improving belonging among women in STEM and Engineering, and was elected as Senator at the Society of Women Engineers - a not for profit organization with over 42,000 global members and the world's largest advocate and catalyst for change for women in engineering and technology. Learn more about her work and get in touch at www.ThatStatsGirl.com

Kritin Mandala
Kritin Mandala is currently a junior at Saguaro High School in Scottsdale, AZ. His interest in engineering education began when he attended the first Sisters in STEM (SiS) event as a student in 2018. Since then he has become a team leader in Saguaro's FRC robotics club and Sisters in STEM initiative. Kritin is a co-founder of Saguaro's CyberSiS program which is an offshoot of SiS that aims to teach students in grades K-6 about cybersecurity. He is also leading a team of highschool students in writing, illustrating, and publishing an innovative children's book series focused on STEM and cooperative principles.

Lissa Erickson
Lissa Erickson is the CFO at Battel Engineering Inc. (http://www.battel-engineering.com/), a consulting and instrument design company in the space sciences, for the last 18 years, previously employed at Honeywell International in the fields of finance, contract negotiations, and project management. She has served as Board member and Treasurer at a private k-8 school in Phoenix, Arizona, and as President of the parent board of the Scottsdale Math and Science Academy (SMSA) from 2015-2020, currently mentoring the SiS program and cybersecurity initiatives within the SMSA. Committed to providing outreach and educational opportunities for all children, Lissa enjoys the process of envisioning, collaborating, and launching STEM programs within her local academic community and beyond.