

STEM TRAINING

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Summer WISE Camp Attracts Local High School Girls to Engineering



Engineering Design and Applications Targeted to Female Students

Women in Science and Engineering (WISE) at the State University of New York (SUNY) at New Paltz is a student group that consists of 95 females in the Sciences, Technology Engineering and Math (STEM) fields. This group was created in 2014 by Assistant Professor Dr. Reena Dahle, from the Division of Engineering Programs, to bridge all the ideas and support from different disciplines. This has created an active and strong network of female students and alumni that collaborate and rely on each other through their academic experiences and professional careers. Some of the programs and events run by WISE target several factors that result in female attrition including environment, grades, self-efficacy and self-confidence, high school preparation, and gender. One of these events, W.I.S.E Summer Engineering Camp, is a week-long camp that targets female students grades 9-12, and connects them to WISE counselors and WISE alumni. These WISE female members mentor, inspire and introduce the high school girls to the field of engineering.

The WISE Summer camp was created and designed to help dispense common misconceptions about engineering that prevent women from entering this field. Developed by Professor Dahle and WISE students, the program allows girls to explore, create and design with actual cutting-edge engineering applications. The students complete the program with exposure to engineering and a hands-on practical understanding of materials, problem-solving, design and process. Working with high schools to engage females in the engineering field could aid in increasing awareness of the field. Informing females of the diverse areas of study in the engineering field as well as encouraging more female students to take classes such as physics and calculus in high school helps boost their confidence when entering college as an engineering student. With the assurance of successes in classes and camps such as this camp, females feel more comfortable choosing an engineering major.

Gender and minority are key elements that contribute to women avoiding and/or leaving the engineering field. Some women find it challenging to thrive in an area where they feel isolated and outnumbered. Students in general feel comfort in similarity and unity, which is one of the reasons why this camp has been created specifically for female students. Programs such as Alliance for Minority Participation (AMP) and Collegiate Science and Technology Entry Program Community Program (CSTEP) as well as WISE are programs adopted by SUNY New Paltz to provide academic support and enrichment for students intending to major in the STEM fields.

Another unique aspect of this camp is the integration of art into the hands-on projects the camp participants are exposed to. Combining the study of art with engineering takes highly practical concepts and adds a visual component to it [2]. In a recent study on how to inspire the next generation of engineers, when girls and boys in grades 9 to 12 were asked what their favorite subject was, a significant difference was found. Results demonstrated that girls enjoyed art (57%) and music (41%), much more than the STEM subjects [1]. It has been shown repeatedly that female students respond exceptionally well to the creative facets of engineering. When they experience the creative aspects of design in engineering, an increased number of girls who favor art, but are less motivated about STEM, do end up considering engineering for a career [1]. Creativity and critical thinking in engineering are crucial for both invention and innovation of new technologies. Blending art with engineering provides the students with a fresh approach of seeing, interpreting and interfacing with technology and design [2]. As Professor Beren stated in a TED talk, “Art is everywhere around us and necessary for life. Art is not about being decorative, but a different way of communicating ideas, and could bridge the world of knowledge and insight” [3].

Many of the jobs that are most appealing to women in



The WISE Summer Camp winning team from Summer 2016 with their completed geodesic dome using rolled newspaper.

engineering are device design and designing experimental setups to test new advances in many of the engineering fields. Male students are more motivated through an understanding how things work, whereas a majority of females are more motivated by the creative applications of technology [1]. Female engineers also seek out opportunities to use creativity, ideation and iteration in solving engineering problems.

By combining the two fields of art and engineering, more creative thinkers and problem solvers result. Working on engineering problems from an art perspective puts the focus on creativity. Fusing engineering with art provides a deep understanding of materials and process. Moreover, working in art often involves more hands-on projects, a very visual process that allows the student to see the applications of what they are learning with an “instant satisfaction”. Art education teaches

the kind of risk-taking and creative problem solving that can be applied to many engineering applications [5]. Female students have a strong need to express themselves. An experiential approach to engineering, interplay with the liberal arts, and program flexibility creates a very welcoming environment for these students.

In this five day camp, the participants will be exposed to hands-on projects that integrates mechanical engineering, computer engineering and electrical engineering with art. With the use of 3-D printing technology and conductive ink, the camp participants will create and design structures and learn how to control them through programming. Company tours are also included in the program including companies such as Global Foundries. These tours will expose the students to the different aspects of engineering and their true practical application, and will allow the students to see a physical example of what engineers do. The camp counselors are WISE students pursuing a degree in engineering and make excellent role models for the camp participants. This camp will be running July 31st till August 4th this summer at the Division of Engineering Programs at SUNY New Paltz. For more information about the WISE camp please visit: <http://wisewpaltz.wixsite.com/npwise/wise-summer-camp> or contact the WISE team at npwisecamp@gmail.com.

[1] The Institution of Engineering Technology, “Inspiring the Next Generation of Engineers: Understanding the perceptions of engineering that parents and young people have today and how we can change them,” , January 2016.

[2] D. Hockemeyer, “Blending Art with Engineering”, Purdue Engineering Impact Magazine, Fall 2010. Available Online: https://engineering.purdue.edu/Engr/AboutUs/News/Publications/EngineeringImpact/2010_2/IEIssue/BlendingArtWithEngineering

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