

## **WIP: Effectiveness of Recruitment Strategies for Underrepresented Groups in an Engineering Bridge Program**

### **Dr. Xinyu Zhang, West Virginia University**

Dr. Xinyu Zhang is a Teaching Assistant Professor in the Fundamentals of Engineering Program of Benjamin M. Statler College of Engineering and Mineral Resource at West Virginia University. She received her Ph.D. in Environmental Engineering in 2012 from University of Illinois at Urbana-Champaign (UIUC). She is also a licensed Professional Engineer in North Carolina. Her research interests include STEM education, environmental engineering, and biomanufacturing.

### **Dr. Lizzie Santiago, West Virginia University**

Lizzie Y. Santiago, Ph.D., is a Teaching Professor for the Fundamentals of Engineering Program in the Benjamin M. Statler College of Engineering and Mineral Resources. She holds a Ph.D. in Chemical Engineering and has postdoctoral training in neural tissue engineering and molecular neurosciences. She teaches freshman engineering courses and supports the outreach and recruiting activities of the college. Her research interests include neural tissue engineering, stem cell research, attrition and university retention, increasing student awareness and interest in research and engineering, STEM education, and recruitment and retention of women and minorities.

### **Stefanie Paige Hines, West Virginia University**

Stefanie P. Hines is an innovative teacher, equality and inclusion activist, change agent, heirship expert, and energy professional. She received her B.A. from West Virginia University in philosophy and her Juris Doctor from West Virginia University College of Law. While born and raised in north central WV, Stefanie has lived and worked across the US for various energy companies. In 2017, Stefanie took her dream job as a faculty member in the Energy Land Management program at West Virginia University where she teaches future energy professionals using innovative and exciting teaching methods. Stefanie strives to bring diversity, equity, and inclusion to the forefront of conversations, and brings together her dedication to change with her expertise in land and title. Stefanie is also the creator and Director of the E3 Camp for underrepresented minority students where she seeks to create a more diverse and inclusive future for the energy industry through a weeklong experiential camp. Stefanie chairs and sits on a number of committees that are focused on creating a more diverse and inclusive world.

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## **Abstract**

The Academy of Engineering Success program at West Virginia University (WVU) is a cohort-based integrated Engineering Bridge Program designed for non-calculus ready first-year engineering students. During COVID times, AcES encountered challenges in recruiting underrepresented students. We realized that the recruitment method needed to be modified to attract them. After applying new recruitment methods for 3 weeks, AcES participants were diversified, resulting in 30% female, 20% underrepresented minorities, 30% low-income, and 20% first-generation in the cohort. Our research aims to (1) analyze AcES enrollment data before and after applying the new recruitment strategy, (2) conduct surveys to understand the effectiveness of different recruitment methods in diversifying the cohort, and (3) devise a plan to improve future recruitment efforts to attract engineering students with a diverse background, particularly the underrepresented populations. This paper reported progress of the first objective.

## **Introduction/Background**

The importance of diversity in the U. S. engineering workforce has been recognized. Lack of workforce diversity in engineering fields has been related to the poor recruitment and retention of educationally disadvantaged students or underrepresented groups in engineering [1]. Research has identified factors preventing those students from pursuing and completing a STEM degree and strategies to increase diversity in STEM programs such as summer camps/bridge programs, pipeline programs, pre-college programs, targeted programs, and integrated approach [2]. However, a limited number of projects have evaluated the effectiveness of different recruitment methods on recruiting underrepresented students [3]. Gender-fair languages and changes on recruitment materials have been suggested to reduce male bias in recruitment [4]. Other studies suggested the importance of family influences such as family socioeconomic status (SES) and parental involvement in the recruitment [5]. Alston et.al assessed student recruitment practices employed by Agriculture colleges in the U. S. and identified effective methods [6]. However, they did not identify which methods are more effective in recruiting underrepresented students.

At a large land-grant university in the Appalachian region, a program named the Academy of Engineering Success (AcES) was founded in 2012 for non-calculus ready first-time freshman (FTF) engineering students. AcES consists of a week of activities prior to the fall semester and a semester-long course in academic success and professional development, where students build professional networks and improve their success skills through team activities, field trips, math reviews, projects, academic success workshops, and career exploration. AcES charged a nominal application fee, but program specific scholarships were provided to remove the financial barrier for underrepresented students such as low-income, women, underrepresented minorities (URM), and first-generation. AcES faced significant recruitment challenges due to the institutional recruitment structure. AcES recruits from newly admitted FTF engineering students that includes a small number of minorities and women. The new AcES faculty leader for AY21 noticed that students who first applied to AcES were mostly not underrepresented students and social media did not help recruit underrepresented students, contrary to findings by Alston et.al [6]. Most studies on AcES cohorts focused on the relationship between self-efficacy and retention more than recruitment, thus it is very important to study the effectiveness of recruitment methods for

underrepresented students. Our research aims to identify and implement appropriate recruitment methods to increase participation of underrepresented students in AcES, and propose recruitment plans to improve the diversity in STEM students based on knowledge gained from this research. This work-in-progress (WIP) paper reported our methodology and AcES AY21 findings.

### **Proposed Methodology**

The research plans have been divided into four stages:

#### *Stage 1: Assess previous recruitment methods*

The plan is to analyze previous data to better understand if there is a relationship between recruitment methods previously used and the demographics/socioeconomic status of previous AcES participants. An IRB protocol has been approved for this stage of the study.

#### *Stage 2: Conduct surveys on underrepresented FTFT students and assess their opinions*

To understand why underrepresented students admitted to the College applied or did not apply to the AcES program, we propose to survey underrepresented populations in the admitted FTF engineering students to hear their opinions, their awareness of the existence of AcES, their preference on the AcES recruitment strategies, and their barriers of attending AcES if applicable. The survey will be implemented in a target population of approximately 700 students.

#### *Stage 3: Assess the effectiveness of the recruitment strategies in 2022*

In summer 2022, to address the observed recruitment challenges, we will run a pilot recruitment strategy involving targeted recruitment with inclusive language and assess its effectiveness. The target population for AcES AY22 is 25% FTF students from underrepresented groups.

#### *Stage 4: Propose a diverse and inclusive recruitment strategy*

After evaluating the previous and current recruitment methods as well as the survey results from underrepresented students, a diverse and inclusive recruitment strategy will be proposed.

### **Primary Results from AcES AY21**

AcES AY21 recruitment started in May 2021. In two months, only few women and one minority applied, with other underrepresented groups missing (no low-income, first-generation or URM). Targeted recruitment of underrepresented students started in early July 2021. Figure 1 illustrates the student demographics and socioeconomic status before and after this intervention.

Due to COVID restrictions, no in-person recruitment methods (e.g., high school visit day) were used in 2021. Recruitment methods before the intervention were general advertisements using emails, social media, and NSO presentation. The intervention was mainly targeted recruitment (e.g., phone campaign, email invitations with inclusive language to underrepresented students and their parents). Student body was significantly diversified after the intervention, with 30% female, 25% minority (20% URMs), 20% first-generation, and 30% low-income registered in AcES AY21(N=20). As a comparison, Fall 2021 official admission records showed that FTF engineering students in WVU were 80.9% male, 80.0% White (not of Hispanic Origin), and 84.2% non-first-generation (N=685). The low-income student ratio was unavailable. During the targeted recruitment, it was difficult to recruit female students from first-generation, low-income, and URMs communities due to an extremely small pool size, conflicts with their existing schedules, and COVID effects. Phone campaigns found that many underrepresented students

were not aware of AcES before the targeted recruitment. Some AcES participants learned about AcES from family members, confirming the importance of family involvement in the enrollment. Rural students in the state of West Virginia may not have reliable access to the internet and are thus unreceptive to recruitment via social media and email. Overall, the targeted recruitment was more effective on recruiting underrepresented students than general advertisements. In addition, another STEM program in WVU observed the importance of both pipeline recruitment in K12 and targeted recruitment directly to underrepresented communities rather than waiting until FTF situations as valuable to increase the recruitment of underrepresented students (unpublished).

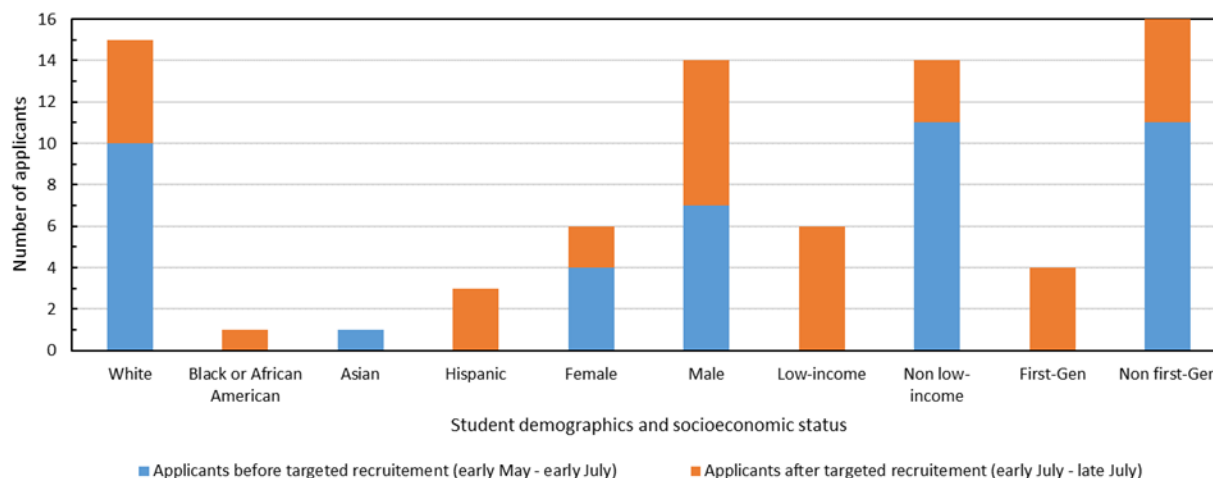


Figure 1 AcES AY21 cohort demographics and socioeconomic status before and after the targeted recruitment

### Future work

Currently, this WIP is requesting data from previous AcES program leaders to analyze the effectiveness of previous recruitment methods (stage 1). Surveys are being developed (stage 2) and a new recruitment strategy is being devised for the next cohort of AcES students (stage 3).

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