



Building a Diverse and Inclusive STEM Workforce: The JUMP into STEM Program

Preprint

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Building a Diverse and Inclusive STEM Workforce: The JUMP into STEM Program

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Abstract. The JUMP into STEM program is a DOE-funded initiative jointly run by the National Renewable Energy Laboratory and Oak Ridge National Laboratory. Through this program, students from historically underrepresented backgrounds are engaged in the science of building energy-efficient infrastructure. Through program stages, students have opportunity to compete in challenges, competitions, and internship opportunities. We have conducted a study of past participants in the program. We find that 1) the program has been effective at engaging a diverse array of participants from a variety of backgrounds, including historically underrepresented backgrounds, and 2) the program has been effective at promoting career paths in STEM, and more specifically, in energy efficiency.

Keywords: Diversity, Equity, Inclusion, STEM Education, Efficient Infrastructure

1 Introduction

1.1 Background

JUMP into STEM is a student competition program designed to inspire students from diverse backgrounds to apply their knowledge and creative skills to solve real-world problems in building efficient infrastructure.[1] It is funded by the Department of Energy (DOE) through the Building Technologies Office and by industry sponsors. It is orchestrated jointly by researchers at the National Renewable Energy Laboratory (NREL) and Oak Ridge National Laboratory (ORNL). Recently, Pacific Northwest National Laboratory (PNNL) has begun to contribute to JUMP into STEM as well.

The program is designed to engage students from a variety of underrepresented backgrounds. Across multiple phases of competition, students have opportunities to make their voices heard, to network with STEM (Science, Technology, Engineering, and Math)—professionals, and to engage in career development. The competition framework is illustrated in Fig. 1.

In the fall, students assemble into teams. Interdisciplinary teams, comprising of members from a variety of educational focuses and backgrounds, are encouraged.

Together, team members submit a response to one of three energy-efficiency related challenges.

From the challenge submissions, winners are chosen. Eligible challenge winners are invited to a competition. At this competition, they present their challenge submissions and network with researchers and industry professionals.



Fig. 1. Schematic of JUMP into STEM competition format.

Eligible winners of the challenge competition are offered internships at National Laboratories. This provides valuable career development, networking, and training. It also benefits the national laboratories, as the interns bring their unique perspectives to the cutting-edge research projects they join.

1.2 Impact Tracking

Through the four years of the JUMP into STEM competition history, we have collected participant data, performed randomized participant interviews, and followed up with interviews to assess career outcomes for past participants.

2 Results and Discussion

2.1 Engaging a diverse participant pool

JUMP into STEM emphasizes inclusion of underrepresented groups. These groups include, but are not limited to, those based on race, ethnicity, and gender. According to demographic data collected from student challenge submissions, internship applications, and follow-up interviews, the JUMP into STEM program is achieving inclusion of underrepresented groups at a very high rate compared to that which is usually seen in STEM programs [2].

From 2018 to 2021, just over 45% of student participants were from historically black colleges or universities (HBCUs) or minority serving institutions (MSIs). Furthermore, demographic information conducted during participant interviews suggests that the total number of participants from underrepresented backgrounds exceeds the number of students from HBCUs/MSIs. As indicated in Fig. 2, 71% of randomly selected interview participants were from underrepresented backgrounds.

Furthermore, among interview participants, 65% identified as women, far higher than the national average in STEM fields. [3]

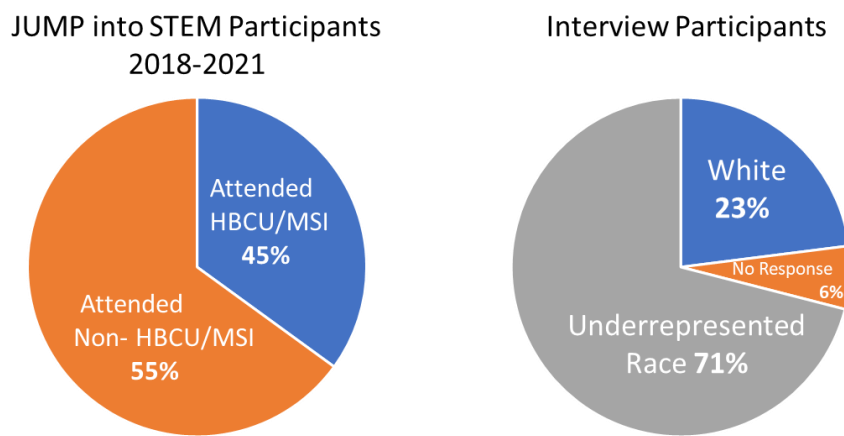


Fig. 2. Demographic data for JUMP into STEM participants.

2.2 Promoting career paths in STEM

More than 25 different majors and areas of focus are represented by JUMP into STEM participants. Each of these diverse focus areas has applications in energy and energy efficiency. However, these focus areas can be applied to many other focus areas as well. As the JUMP into STEM program encourages participants to enter the energy workforce, it was important to understand their career outcomes.

Based on follow-up interviews, 41% of JUMP into STEM participants currently work in fields related to energy or energy efficiency. As many past participants are still in professional training or educational programs, 18% are undecided. Fewer than 1/3 of past participants interviewed are working in unrelated fields. This is illustrated in Fig. 3. Thus, it is clear that JUMP into STEM participants are going into the energy infrastructure workforce at a higher than average rate.

Interview Participant Career Outcomes

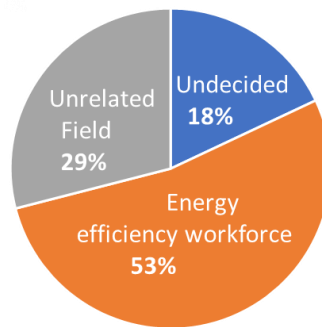


Fig. 3. Career outcomes for previous participants of the JUMP into STEM program who participated in randomly selected interviews.

3 Conclusion

Over the 4 years of the JUMP into STEM student competition program, it has successfully engaged a diverse array of participants. Furthermore, these participants have gone on to work in energy-related career fields. Thus, we conclude that the JUMP into STEM program has had, and is continuing to have, a positive impact on training, inspiring, and ultimately developing a diverse workforce for energy-related industries.

Programs like this are essential. It is critical that our energy infrastructure evolves in ways that meets the needs of the people it serves. Without engaging them in a fair and equitable manner, it is impossible to accurately gauge and ultimately meet their needs. Through programs like this, we can not only help students from historically underrepresented backgrounds succeed, but can also empower them to contribute to energy solutions in the future.

References

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