

Dear Professional Engineers in California Government (PECG):

Thank you so much for awarding me the Professional Engineers in California Government Marilyn Jorgensen Reece Award at the 2021 Los Angeles County Science and Engineering Fair (LACSEF). I am thrilled and humbled by this honor. Mrs. Reece, the award's namesake, was a pioneer for women in engineering. I will strive to live up to her high standards. Also, thank you for your continued support of LACSEF. I know that the involvement of PECG has both enhanced the quality of the judging process and motivated the entrants to conduct ever more innovative research.

My project SafeBuild is an innovative overhead power grid design software. The current state-of-the-art software for modeling the effect of high winds on overhead components assumes that the loading of such components can be analyzed as small deformation, static cases. Based on the reference stress or wind pressure applied, the software assigns a safety factor to each overhead component. SafeBuild takes a completely different approach. SafeBuild models the mechanics of overhead components using finite element analysis that has been specially adapted to account for large-deformation, dynamic load cases. Given a reference stress or wind gust in miles per hour, SafeBuild uses predictive analytics to calculate a probability of failure for every overhead component. Probabilities of failure are easier to incorporate into risk analysis than the outdated concept of safety factors and enables engineers to perform risk analysis of entire segments of the power grid. For completeness, SafeBuild also models the electromagnetic and thermal properties of overhead components. By improving risk analysis of the power grid, and taking a holistic approach toward minimizing risks, SafeBuild can mitigate utility-caused wildfires, electrocutions, and injuries. I believe that PECG's recognition of SafeBuild reflect PECG's ongoing commitment toward enhancing the safety and quality-of-life of Californians.

For my future career, I hope to be both an engineer and a computer scientist. I would like to continue developing software and models that can be used to enable the design and construction of safer and more reliable structures. I am also interested in renewables and how California can achieve a green energy future. I feel that whatever path I take, my future might cross paths with PECG. Maybe I will be fortunate enough to become a member of PECG!

Thank you again for your tremendous support. I would also like to take the time to thank Ms. Melissa Klose, my research advisor at Palos Verdes Peninsula High School. Plus, I would be remiss if I did not thank my family for their continued love, assistance, and enthusiasm.

Sincerely,

Jennifer Lew
Palos Verdes Peninsula High School Class of 2022