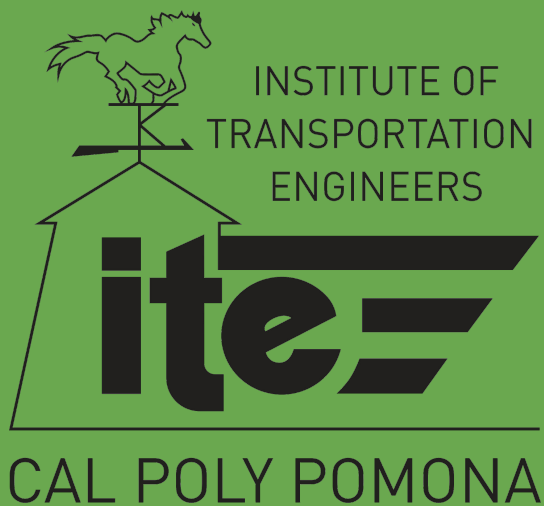




**Cal Poly Pomona ITE Student Chapter STEM  
Outreach Project Proposal**



December 17, 2021

Mr. Patrick Marnell  
Technical Committee Chair  
ITE Western District

**RE: 2022 STEM Outreach Proposal**

Dear Mr. Marnell,

We at California State Polytechnic University, Pomona ITE Student Chapter (CPP ITE), in conjunction with our Women in Transportation Seminar (WTS) Student Chapter, wanted to say thank you for the opportunity to submit this proposal for the 2022 STEM Outreach Project. We are always grateful for the opportunity to incorporate our university's motto of "Learn by Doing" in everything we can.

Our ITE Student Chapter has chosen to work with NCRF, an organization that works with schools to promote success. We chose to reach out to this program because they specialize in helping students with limited access to career resources by providing them with tools and bridges to learn about career paths, networking, college application processes, and career planning advice.

The STEM Outreach project will be overseen by CPP alumnus and professional ITE member, Brandon Wong, and two faculty advisors, Dr. Wen Cheng and Dr. Yongping Zhang. The project will be organized by CPP ITE student coordinators, Israel Sanchez and Juliana Hermosillo. CPP WTS participation is encouraged and ITE has invited their members to work on this project.

If awarded the grant money, CPP ITE would use it to help fund the DIY kits needed for this project while the remainder would go towards funding registration expenses for the 2022 ITE Student Leadership Summit or attendance at the ITE Western District's 2022 Annual Meeting in Palm Springs, CA. With this project, we would have the opportunity to provide the next generation with a hands-on learning experience by teaching transportation engineering and planning topics that would inspire them to pursue careers in transportation.

Again, we are grateful for the opportunity to submit this proposal and to be serving as student coordinators. We are happy to answer any questions and can be reached at [REDACTED] or [REDACTED] for Juliana Hermosillo and [REDACTED] or [REDACTED] for Israel Sanchez.

Sincerely,

Juliana Hermosillo  
STEM Outreach Student Coordinator  
CPP ITE Student Chapter

Israel Sanchez  
STEM Outreach Student Coordinator  
CPP ITE Student Chapter

### STEM Outreach Proposal Scope:

CPP ITE Partnered with the National College Resource Foundation, a STEM outreach organization located in Pomona, CA. NCRF was founded in 1999 and serves over 100,000 students. CPP ITE will host a half-day event at Marshall Middle School during their spring break where members will present on two transportation topics: high speed rail and autonomous vehicles.

The first transportation topic shall be railway systems, introduced through MagLev passenger train concepts. We will provide a brief presentation on current and future developments of high speed rail systems, followed by a short MagLev activity. We will apply basic physics concepts by demonstrating how magnetic fields impact rail systems. After the presentation, students will be separated into groups and guided by members to create a simple MagLev train using copper wire, batteries, and magnets. Students will experiment with various configurations and explore how the system functions. Following the activity, each group will participate in an open discussion and will share interesting properties they noticed while testing their system. Next, students will be asked to contemplate what they think engineers should take into consideration when creating life scale MagLev high speed rail trains intended for human occupancy. The activity will be concluded by members sharing real MagLev train designs and comparing the models students created.

The second transportation topic covered will be autonomous vehicles, specifically their safety and how they operate. We will begin by providing a presentation that covers how autonomous cars work, vehicle safety features, and how transportation infrastructure, such as signage and striping, enables lane assist and self-driving features. Students will then be separated into groups and to build a DIY Smart Car, while led by members. Once the models are built, groups will have the chance to drive the cars through an obstacle course using the cars' RC (radio-controlled) mode. Students will determine which mode is safer by comparing their performances with the cars' obstacle avoidance feature. Afterwards, students will be asked to report their findings and see how they compare to current data from companies such as Google and Tesla.

### Mentoring:

Brandon Wong, Cal Poly Pomona alumnus and Riverside-San Bernardino ITE section's student chapter liaison, is our mentor responsible for oversight, assistance, quality control and mentoring. Dr. Yongping Zhang and Dr. Wen Cheng, current CPP ITE faculty advisors and Transportation Professors at Cal Poly Pomona, will provide us with their expert opinion and support, as well as project guidance throughout all levels of this project.

### Schedule:

Task	Completion Deadline
Complete Presentation Slides	2/01/2022
Acquire Activity Materials	2/28/2022
Complete Trial Runs of Activities	3/01/2022
Verify the Latest COVID Guidelines	3/08/2022
Host Event	3/29/2022

Complete and Organize Event Data	4/16/2022
Send Draft Submission for Review	4/19/2022
Revise Draft Submission	5/08/2022
Submit Final Report	5/15/2022

**Level of Effort:** The activities will take place at a partnered school and will be a five hour workshop with five CPP students (including coordinators) present to help facilitate the event. Each activity will have two hours dedicated to it, leaving excess time for questions and for the students to play with their builds. The three volunteers will arrive an hour early to help set up and prepare for the event. We estimate two hours per coordinator or composing powerpoint presentations and one hour for presentation practice. We will have a five hour training session to teach volunteers how to build MagLev train models and DIY Cars. Both coordinators will be spending about 10 hours each organizing Post-Event Data and preparing the final report. In total we will have 81 person hours dedicated to the project.

**Key Personnel/ Project Management:**

Professional Mentor

Brandon Wong  
Transportation Engineering Associate III



STEM Outreach Partner

Veronica Kummerfeldt  
Director of Operations



Faculty Support

Yongping Zhang  
Ph.D., Civil Engineering



Faculty Support

Wen Cheng  
Ph.D., Civil Engineering



Student Coordinator

Israel Sanchez  
Cal Poly Pomona ITE Student Chapter



Student Coordinator

Juliana Hermosillo  
Cal Poly Pomona ITE Student Chapter



**Project Partners:** A huge thank you to Marshall Middle School for allowing us to present to their students and NCRF for giving us the means to do so. CPP strongly believes in its motto of “Learn by Doing” and we are grateful for the opportunity to apply our motto by inspiring the next generation of engineers and transportation professionals.

**Agreement to Hold Harmless:** The California State Polytechnic University, Pomona Institute of Transportation Engineers agrees to hold harmless and indemnifies the ITE Western District from any and all liability associated with the conduct and completion of this proposal, STEM Outreach projects and associated activity. In addition, we will follow the latest COVID-19 protocol from the Centers for Disease Control, Los Angeles Department of Public Health, and Cal Poly Pomona