Justin Campanaro
Graduation Year: Senior
College: Engineering
Major(s): Mechanical Engineering
Minors(s): n/a
Scholar Group Membership: Pi Tau Sigma

Did you received other funding for this project?: Department of Mechanical Engineering
Could you have completed this project without CUSE funding? No
More details on CUSE funding assistance?

Project Title: Optimizing ICE Efficiency with Cycling: Methods for Evaluating Achievable Gains
Project Location: We presented our research in Montreal, Quebec, Canada
ND Faculty Mentor: Professor Peter Bauer of the EE department
Project Type: Conference - Presentation

Why did you undertake this project/experience? Deepen your knowledge of a topic or issue, Prepare for graduate school (MA or PhD), Career discernment and/or preparation, Internationalize your Notre Dame experience

Did your funded experience help you:
[Deepen your understanding of your coursework or field of study]: Very Much
[Discern your interests and post-bac goals]: Very Much
[Become confident in your ability to set and achieve your goals]: Very Much
[Gain a more nuanced view of local, national, or global communities]: Very Much
[Improve your written and verbal communications skills]:Very Much

Tell us about your experience.
Our original research was focuses on optimizing large diesel engine efficiency by cycling in a series-hybrid architecture. We developed guidelines for the number of engine operating points and where they should be (i.e. rpm and power levels) in order to maximize the time spent in high bsfc (energy efficient) regions. We further developed methods for evaluating achievable gains in fuel efficiency and verified our findings with simulations and theoretical analysis.

We applied to the conference because it is the worlds large hybrid electric vehicles conference, bringing together academia and industry. We were able to speak with leading industry professionals and companies and engage in dialogues and lecture sessions with prominent academics in the hybrid-electric field of research. Our learning experience was diverse and fascinating.

Describe the impact this project had, both on you as a student-scholar and on the people you worked with.

As a student-scholar, I learned that it was possible to engage in meaningful undergraduate research. My experience was rich with problem solving, critical and open ended thinking, and mastery of a particular subject matter. Further my experience publishing our paper will be valuable to me going forward as I look towards graduate school and continue to publish my findings, whether in academia or industry. My partner, myself, and my professor all learned to work together and I think was a positive experience in undergraduate research for us all. It is important to know that our research is motivational and will hopefully help the world move towards more energy efficient power source and engine operation.

Describe how this experience is connected to your plans as a student or future professional.

As I mentioned earlier, I absolutely believe my experience going through the publishing and professional presentation process will be invaluable as I look to publish more findings in my future. I now know that I would love to continue my engagement in cutting-edge conferences, regardless if I'm a graduate student or industry professional.

What advice would you give other students who are planning to pursue similar projects?

I would certainly advise students to pursue publishing their research. As an undergraduate it is important to undertake meaningful projects regardless of year, and professors who understand the field can offer key advise to take steps towards getting published (i.e. which conferences are appropriate, what is expected in abstracts and presentations, etc.). It is a fantastic experience, both to have as a memory and to be able to talk about going forward with jobs and schooling.

I acknowledge that this form has been filled out truthfully and to the best of my ability. I understand that this information will be shared with many different CUSE constituencies. As such, I have provided as much useful information as I was able. I understand that CUSE will not complete my award disbursement until this form is successfully completed. If I have any questions or concerns, I will contact CUSE before submitting this form. To illustrate that you understand all of these points, please enter your Notre Dame email in the box below.

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