



The benefits of engineering design competitions

Dario Schor and Thanos Kakarountas

During student orientation week at the University of Manitoba, Dean Emeritus Doug Ruth used to tell incoming classes, “Don’t miss 50% of your education by attending 100% of your classes.” After a short pause, he would qualify that statement by encouraging students to take advantage of learning opportunities, like engineering design competitions, that are found outside the classroom.

Engineering design competitions complement the engineering curriculum by exposing students to complex and interdisciplinary projects that would otherwise not fit within a semester-long course. Such projects motivate participants to realize ideas, apply the knowledge acquired from university courses, and solve real-world engineering problems. This procedure helps students appreciate the tradeoffs of their design decisions in order to respect constraints and meet the specifications of a complex system. Moreover, such competitions provide practical experience as participants conceptualize, design, test, and iterate through the design flow steps needed to realize the desired results.

Another important benefit for students participating in these challenges is the ability to grow as professionals. This involves developing nontechnical skills in project management, leadership, teamwork, and communication that students will carry with them in many aspects of their lives. Over and above that, the competitions encourage students to collaborate and seek advice from faculty and industry mentors who can provide career outlook, highlight scientific and professional opportunities, and even help find the appropriate job position after graduation.

However, this is by no means an exhaustive list. There are many other reasons why thousands of



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students participate in engineering design competitions every year; faculty members go above and beyond to ensure teams have everything they need to succeed; and industry is happy to help through mentorship, financial assistance, and in-kind support. Ultimately, this means that each student team, university, and competition develops its own unique approach to provide the best educational experience for those participating in engineering design competitions.

This issue of *IEEE Potentials* pays tribute to engineering design competitions and their role in education. The five theme articles highlight different competitions and their impact on the students, university, and community at large. As you read them, consider ways in which you can get involved. If you are looking for even more inspiration, search for “design competitions” in IEEE Education Society publications.

Issue highlights

We begin with “Fostering Career Exploration and a Global Perspective,” where Jessica Baker and Tojan Rahhal describe how a design competition can be used to improve health-care delivery in low-income countries. The article includes a survey of why students participate in these types of competitions and their impact post-graduation. For instance, the authors describe how some teams have gone on to improve their designs and pursue entrepreneurial opportunities with their products. Above all, the article emphasizes how these competitions can serve to moti-

vate students in their studies and their careers.

In “Engineering Competitions: Building Capabilities for the Future,” Lawrence Reeves reflects on the 10-year anniversary of the Canadian Satellite Design Challenge, discussing its evolution and impact in both pre-university science, technology, engineering, and mathematics (STEM) education and the space sector. More importantly, Reeves shares valuable lessons about engineering design competitions that are applicable to students, faculty advisors, and even event organizers. Furthermore, he addresses misconceptions about the need for experience or large budgets and shares examples of how teams can overcome these obstacles to succeed in the competition.

“Robotic Football: Developing Engineering Leaders Through Competition,” by Sami Khorbotly and Craig Goehler, tells the story of how Valparaiso University became a hub for robotic football. The authors begin by describing the structure of the team and their experience trying out capstone versus extracurricular management models to find the right fit for their institution. In addition, they also describe the interdisciplinary impact for the university, how the competition helped in STEM outreach and recruiting, and even how it is being used to stay connected with alumni.

In “Pakistan’s First Integrated Circuit-Based Superheterodyne Receiver Design Competition,” Noshewan Shoaib describes how a competition is not just an educational tool but also a way to help the radio-frequency and microwave-related industries in Pakistan. This inspiring story exemplifies how universities and local industry can collaborate and share resources in ways that benefit all those involved. Moreover, it shows the type of role IEEE can play in organizing these competitions.

The final article deals with time management while participating in engineering design competitions. In “About Your Competitive Impulses,” Greg Linton and Dario Schor suggest that students think about what they want to get out of the competition and understand their own priorities before joining a competition team. Based on the authors’ experiences, the article highlights the qualities raised that will help students balance life between academic and personal progress.

About the authors

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