

CIRCUITS SESSION TRANSCRIPT

NOVEMBER, CIRCUITS

Dr. Alan Chalker

Hi. I'm Alan Chalker, Director of Strategic Programs at the Ohio Supercomputer Center. This year marks my 30th year of being involved in Science Olympiad, starting all the way back when I was a competitor at Centerville High School. One of the events I competed in then, and happened to win this gold medal at nationals in 1994, was Circuit Lab, the topic of this month's MY SO competition. Since then, in order to pay it forward, I've been involved in nearly every possible role in Science Olympiad, including as National Event Supervisor for Circuit Lab in the late 2000s, to my current role as chair of the National Physics Committee which has oversight over many events, including Circuit Lab.

Like so many people, Science Olympiad has had a profound impact on my life, with the first exposure way back when in electrical engineering 3 decades ago, directly leading to my current role working with some of the most powerful supercomputers in the whole wide world.

I'm also proud to be a long-term member of the IEEE, the Institute of Electrical and Electronics Engineers, which is partnering with Science Olympiad on Circuit Lab. I'm pleased to introduce Burt Dicht to tell you more about that.

Burt Dicht

Hello everyone, my name is Burt Dicht and I am the director of Student and Academic Education Programs at IEEE. IEEE, or the Institute of Electrical and Electronics Engineers is the world's largest technical and professional association dedicated to advancing technology for the benefit of humanity.

Our members focus on developing technologies associated with electrical engineering, computer engineering, and many other associated fields. IEEE has members in more than 160 countries around the world, and they work in many areas including power, where we get our electricity, medicine, where they develop machines to help doctors, communication, where they try to develop the next generation of phones to computers to transportation and even entertainment.

IEEE members are involved in almost everything that touches your daily lives. While working on the newest technologies, IEEE and its members are also focused on the future of the profession, we need talented, curious, and enthusiastic students to choose what we call the STEM fields - Science, Technology, Engineering and Math - as a career field. So we, as an organization, along with our volunteers, invest our time and our resources to make students like you aware of the excitement and rewards of choosing a STEM career.

I myself am a mechanical engineer, and I spent my career in aerospace, where I worked at NASA as an intern, then Northrop Grumman, and Rockwell Space Transportation Systems. It was a lot of fun designing advanced fighter planes and working on the space shuttle program.

Now my job at IEEE is to help our members and volunteers inspire the next generation of engineers and technology professionals. We have a number of programs, like Tryengineering.org, which is an online resource committed to raising

interest and awareness for engineering, computing, and technology and aspires to help students discover the engineer within them. For teachers, there are more than 130 hands-on, lost-cost engineering lesson plans. These lesson plans enable teachers to bring engineering into their classrooms, along with the tips and tricks to keep their students engaged. For students, we have engineering games, profiles of practicing engineers, and descriptions of the many fields of engineering, including electrical engineering, a great way for students to explore engineering and learn about how to make our lives better, and what students can do themselves to get on an engineering career path. So check it out today.

All we do, we can't do this alone. That is why IEEE has partnered with a great organization like Science Olympiad. The emphasis on hands-on group learning as students try to solve hard problems as part of a fun competition, is one of the most effective ways to introduce the wonders of engineering and technology. The involvement of teachers and parents in the activities also demonstrates that engineering is a team sport and requires a diversity of ideas and thinking to solve problems.

Dr. Alan Chalker

Thanks Burt, I'm sure you'll see a lot of new visitors at Tryengineering.org. Now I'd like to introduce Gordon Lipsy, an IEEE member passionate about Science Olympiad to hear his opinion. Gordon, can you tell us a little more about yourself?

Gordon Lipsy

I am Gordon Lipsy, a 30-year veteran of supervising Science Olympiad events in Delaware, and currently the State Director for Delaware Science Olympiad and a National Event Supervisor for Circuit Lab. I attended the University of Minnesota on a Navy ROTC scholarship over 50 years ago and received a B.S. degree in Electrical Engineering, which was followed by a 5-year assignment doing engineering work in the naval nuclear program that prepared me for a career supporting the commercial nuclear power industry. I am now retired. I joined the IEEE which Burt just discussed, as a student member in college and ascended to the rank of Senior Life Member, where dues are waived.

All three of my adult children still fondly recall the fun memories and teamwork and collaboration skills they acquired in Science Olympiad, and continue to use those skills in their careers.

Circuits is about electricity, which is the movement of electrons from one atom to another by certain forces. That may sound simple enough, but the resulting impacts on our daily lives are tremendous and continue to change at a brisk rate due to all of the electrical engineers around the world looking for better and faster, cheaper, lighter, and more profitable uses for electricity.

New careers for electrical engineers can be found in renewable energy development, medical diagnostic and control devices, internet expansion, drones, cell phone technology, electric cars, data streaming and cloud storage, computer chip optimization and many many more. I listed these specific career areas because they did not even exist when I entered the workforce.

In your studies of circuits you will encounter the interaction of moving electrons within a magnetic field and the wondrous result which follows a right-hand rule. As a member of the Physics Rules Committee for Science Olympiad, we try to incorporate such rules into our events in order to open up the world of careers founded on such basic principles. You will also learn about electrical safety which is always the highest priority to those working with electricity. There are lots of free written video resources from which to learn about electricity, and the marketplace has a great many kits for hands-on learning about circuits and various electrical devices. That is where the fun really comes to life.

In Delaware, our local IEEE branch provides Circuit Lab workshops to mentor the competing students using a presentation and a custom box of electrical parts for each team to build and test circuits. During the workshops, with IEEE engineers in



attendance to assist the students and discuss career experiences. Other IEEE branches are involved around the country to provide the similar support and mentoring.

One lab activity we do involves a AA battery, a neodymium magnet, and a construction screw, and a piece of wire. And what we do is we take the magnet and center the screw on one side and then hang that magnet screw assembly from the nose of the battery, and then take the wire and run a current from the top of the battery down to the side of the magnet. And as you can see (oh there was a spark!) that causes a tremendous amount of spinning of that assembly and that is based on that right-hand rule I mentioned earlier.

So with that said, I hope you have a lot of fun with our program, and good luck in you learning of the wonders of electricity.

Dr. Alan Chalker

Thanks Gordon, that was a great quick hands-on demo of some of the wonders of electricity. Finally, I'd like you all to meet Julie Newman, another former Science Olympiad competitor who is now a literal rocket scientist. Julie, what impact has Science Olympiad had on your career?

Julie Newman

I'm an engineer today because of Science Olympiad. In middle school and high school, I competed in almost every building event. I built dozens of devices and contraptions - rockets, airplanes, robots, trebuchets, scramblers, electric vehicles, mission possibles, wooden bridges and many many more. I spent countless weekends in my garage, in machine shops, and especially in my high school's gym, building, testing, and improving my projects.

Science Olympiad taught me that preparation is what determines performance. The more you put in, the more you get out. I had a lot of fun and success competing - Science Olympiad was my main extracurricular in school and it ended up being the primary focus of my college applications. Grades and test scores are fine and all, but real hands-on project experience and excitement about problem solving is what made me stand out.

I chose to attend Caltech, where I studied Electrical Engineering. The four years to graduation were challenging, but it was my experience in Science Olympiad that helped me persevere and be confident that I could solve whatever was thrown at me. Today, I am an Electronics Engineer at the NASA jet propulsion laboratory and I love my job.

Currently, I'm designing the radar instrument for the Europa Clipper Mission. My hardware will be used to measure and map the icy surface of Jupiter's moon Europa and help in the search for alien life. I have to optimize the design to meet the requirements of the space environment and mission objectives, much in the same way as my Science Olympiad projects had to be built to achieve the tasks set out in the rules for the event. I have to rigorously test my electronics in order to guarantee that they will work in space after launch, much like when I'd practice in my garage with my robots to ensure that they would run flawlessly on the day of competition.

I've been volunteering with Science Olympiad for 10 years now. Every year what gives me the most joy is walking around the building events and seeing girls competing just like I did when I was their age. When I was younger, I figured I would become a scientist. After all, the event is called Science Olympiad. But what I didn't know then was that when I was building those rockets and robots and contraptions, I was actually on the road to becoming an engineer. Being an engineer is very different from being a scientist, and yet no one really used the word engineering with me when I was growing up and I think it's something that every competitor in Science Olympiad, especially the girls need to understand and learn about engineering is one of the most rewarding and fulfilling career choices out there.

As an engineer, I get to be creative every day while working with some of the world's most interesting men and women,



and while working on some of the universe's most interesting problems. I really cannot recommend it highly enough. If you don't know what major to choose in college, choose engineering - you'll love it and your future self will thank you. Who knows, maybe Science Olympiad will lead you to being an engineer at NASA one day too.

Dr. Alan Chalker

Thanks Julie. I'm sure a lot of the viewers are now seeing themselves working for NASA in the future too. As you've heard over the past few minutes, Science Olympiad isn't just about the competition and the medals and the trophies, but rather the skills and knowledge you're exposed to that can help set you up for a lifetime of learning. I sincerely hope you enjoyed learning more about circuits this month and perhaps as a result of that, decades in the future some of you will be featured in a video like this one about the impact of Science Olympiad on your life.