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Workshop supports girls in becoming engineers

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#### **Resources:**

**New York State Center for Engineering Design and Industrial Innovation,**

[www.nyscedii.buffalo.edu](http://www.nyscedii.buffalo.edu) [1]

**Moog Inc.,** [www.moog.com](http://www.moog.com) [2]

The middle of a recession seems like a strange time to hype training and education programs for positions that show weakened demand. On the contrary, it's the perfect time. Take engineering as an example. Today the engineering profession isn't looking very sharp. Unemployment figures are high, and the number of open positions small. But two factors are inescapable: recessions don't last forever, and engineers aren't trained overnight. If colleges or universities wait to promote engineering majors until companies demand new engineering graduates, they've waited too long and may be left behind as forward-looking organizations that anticipate the demand take the lead in supplying the next generation of engineers.



[3] One of those organizations planning ahead is the State University of New York at Buffalo and the New York State Center for Engineering Design and Industrial Innovation (NYSCEDII). The Center began a decade ago with state support. It provides basic research, education, and training using state-of-the-art techniques and expertise in immersive and high-end visualization, rapid virtual prototyping, and CAD and 3D modeling for real-time interactive design and analysis simulations.

The Center's goals revolve around industrial outreach, academic research, and education and workforce development. It's in the area of workforce development that the center has taken a unique approach, promoting the engineering profession via summer workshops to those still in high school. What makes the Cyber Engineering Workshop unique is that it targets young women, not men.

Ken English, workshop coordinator and NYSCEDII deputy director, explains, "We're always talking about attracting more women to this field. So the workshop is an opportunity for the university to reach out and recruit more women engineers." The state-of-the-art facilities at UB is complemented by social interactions between girls attending the workshop, many of whom felt at times that they were the only female interested in engineering.

One such girl was Nichaela Bald, who took the workshop in 2007. Nichaela always had an interest in math, science, and technology. Her dream from the time she was small was to

work for the Walt Disney Co. As she grew older, her interest in technology grew as well. The idea of becoming an engineer at Disney soon became her goal. But she also found there were road blocks in her path.

“I remember a counseling meeting in high school to select my classes. The guidance counselor refused to let me take any technology classes. I could take the math and science, but no technology,” she relates. “There are always some people who go, ‘Oh, you’re a girl going into engineering? How does that work?’ But once you show people you’re serious and it’s really something you want to do, people will support you.” In fact, she says she learned about the Center’s summer workshops from four different teachers.

During the two-week summer program, Nichaela and the other girls used a six-degree-of-freedom (6DOF) motion base donated by Moog Inc., in East Aurora, N.Y., to simulate a roller coaster. The motion base is identical to those used in flight-training simulators and ride simulators around the world.

As this was the first time many of the girls had ever seen a motion base, there was some intro work to go over. “First we got to see the motion base in action. Then we got to ride a roller-coaster simulation to see how it feels. The hands-on project was to determine how the simulator would move over a small section of simulated track created for the workshop,” says Nichaela.

The girls were working with high levels of motion cueing. But there wasn’t time to get too deep into the dynamics of motion sensing. Ken explains, “Once they designed their track geometry, we gave them advice on typical motions to use. For example, here you’re going forward, so you’ll want to use a surge motion fore and aft. Now you’re going downhill, so you’ll need an element of upward, an element of heave, and an element of pitch.”

The girls would work out the type, amount, and trigger point for each simulated movement and then program the motion base. They would then try out the ride, to see how well the design they created worked for their track.

“It was funny to hear the girls say, ‘Oh, this works great,’ or ‘This doesn’t work well at all!’” comments Nichaela. “It was just a really cool experience working on it and then determining what did and didn’t work. The program showed us the math and science, but we also had fun. It showed us what engineering is all about. That it wasn’t people sitting at a desk solving equations all day.”

Nichaela is now a sophomore attending the University at Buffalo taking junior level courses. She was just accepted for an internship to the Disney College program in Orlando, Fla., where she’ll be working on the attractions, networking with Disney staff, and taking classes about aspects of engineering in the park taught by Disney Imagineers.

Photo caption and credit: *Nichaela Bald (left), Undergraduate Assistant, and Dr. Kevin Hulme, Senior Research Assistant, from the State University of New York at Buffalo, pose beside the Moog 6DOF motion simulator used during the Cyber Engineering Workshop for Young Women. -- Image courtesy of Moog Inc.*

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[1] <http://www.nyscedii.buffalo.edu>

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