

April 2020

## VR tech in collegiate classrooms leading the future

With virtual reality and rendering technology, Kirby Building Systems is using leading edge technology and the ability to turn a 3D BIM model into an immersive, real world experience for its customers. Virtual Reality provides a better sense of scale than on-screen and paper models, and thanks to advanced 3D rendering programs, you can see exactly what a building is going to look like before it's even built.

Now, thanks to Hannah Blum, Ph.D., Assistant Professor and Alain H. Peyrot Fellow in the Department of Civil and Environmental Engineering at the University of Wisconsin-Madison, this VR technology is making its way into the classroom in steel structure courses for first year graduate students at the university and can also be employed in undergraduate steel classes.

Through Metal Building Manufacturers Association (MBMA), Dr. Blum was connected with Nucor Buildings Group to provide a SketchUp 3D rendering of a building to use along with VR in the classroom setting. The 3D rendering is planned to be used by Dr. Blum's students in virtual field trips where students can move around the space and explore the framing of a building in a realistic scale.



**Student Chris Kotrotsos, left, wears a VR headset in one of Dr. Hannah Blum's, right, steel structure courses.**



**Student Mek Sudhiwana is able to move around a building through a VR headset as if he were standing there in real life.**

“In a traditional field trip for this class, students would go to a job site, a head engineer would take the students around and point out elements, columns, beams, etc. and explain how they were designed and their function,” explained Blum. “Field trips have a lot of benefits, but sometimes it's hard to get out there at the right time. We want to bring these field trips into the classroom.”

Dr. Blum is working on recording 360-degree photos and videos to be put into VR headsets. These photos and videos will have added voice-overs, clips, and photos that would allow for elements to be identified and clicked on for photos or added explanation — a field trip tour right in the classroom.

“The students can move around the space as you would if you were standing there in real life,” said Dr. Blum. “For safety, the students are seated so as not to walk into each other. They have controllers to walk around or fly so they can see the roof.”

Dr. Blum has received educational innovation grants from both the College of Engineering and the Provost’s office at the University of Wisconsin-Madison in order to help finance the creation of more of this content and to purchase more headsets to build a VR lab. She’s hoping to continue to expose students to this technology, so when they get to the end of their education, the technology is familiar.

“Some of this 3D technology is being used in the workplace,” said Dr. Blum. “Learning this technology in the classroom allows students to familiarize themselves with it before they head out to internships or full-time jobs. This is beneficial for our students and future engineers.”

Dr. Blum is also working on a related project with the American Institute of Steel Construction to create a video game for learning about 2D plan drawings. The game would place the students in a 3D structure virtually, as they simultaneously look at the matching 2D drawings. The goal of the game is to match certain building elements on the designated plan with the ultimate goal of learning how to read 2D drawings.

“There are many elements that can be added into the VR teaching module. This can include an animation showing load path through a building,” said Blum. “We are looking into how we can take 3D photos from site visits and put them into the 3D model. Students could click on an icon in the model and the related photo would pop up to show what it looks like in real life.”



**As a benefit to future engineers, students are learning this technology in the classroom in order to familiarize themselves with it before they enter their full-time jobs.**

In addition to VR, Dr. Blum is also looking into what can be done with Artificial Reality (AR). “This would be with glasses where the artificial world is projected onto the real world,” explained Dr. Blum. “Students would have a hologram projected in front of them in the glasses. They would be involved in both worlds. For example, on a job site visit, they could look at a structure, but have drawing plans projected onto the real structure. Or they could look at a completed structure where you can only see walls, but the hologram would show where the columns are located. These are great applications for the construction industry in the future.”