Julia Poska
Organization materials

**Boilerplate:**

Holo Reality Lab has worked to capture and display the three-dimensional world virtually since 2018, as part of the University of Iowa Department of Electrical & Computer Engineering. The lab contributes innovation in 3D video communication to the scientific field and develops real-world applications utilizing 3D data in several areas.

Backgrounder
Holo Reality Lab

Holo Reality Lab works to capture and display the three-dimensional world virtually.

A team of student research assistants led by Dr. Tyler Bell focuses on innovation in all steps of the process. This includes capturing, storing, analyzing and transmitting data in order to construct digital representations of 3D objects and spaces.

The resulting 3D images and videos provide highly accurate visuals from all angles, able to be displayed on any screen or with virtual reality equipment, like that used in VR video gaming. The lab collaborates with interdisciplinary teams to develop real-world applications for the technology, in areas including telemedicine, forensics and mobile communication.

Holo Reality Lab formed in August of 2018, when Bell joined the University of Iowa Department of Electrical & Computer Engineering as an assistant professor. Previously, he had completed his PhD at Purdue University.

The lab employs both graduate and undergraduate research assistants, each assigned to an individual or group project. Funding comes from the department, as well as a grant from the Department of Veterans Affairs Center for Prevention and Treatment of Visual Loss.

Dr. Bell occasionally gives educational presentations and demonstrations within the state of Iowa. The lab also collaborated with the UI 3D Club to create an interactive Augmented Reality Sandbox for the Science Center of Iowa in Des Moines. The exhibit projects multicolored light onto the sand and adjusts it in real time to illustrate the sand's changing topography as visitors alter elevation in different areas through play.

Since its formation, the lab has published two journal articles, one a cover feature for *Applied Optics*. A conference paper by PhD candidate Matt Finley won the best student paper award at the 2020 3D Measurement and Data Processing conference at IS&T's International Symposium on Electronic Imaging.

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## About Us


Our team works to capture and display the three-dimensional world virtually. We innovate along every step of the process, from capturing to storing to transmitting 3D images. Our work culminates in highly accurate 3D video displays viewable at any angle on any screen, including in augmented and virtual reality platforms.

The sort of high-quality 3D images and videos we develop have potential for use in a wide range of fields, from gaming to medicine, arts to security. We aim to both entertain and help real people through applications of our work, allowing them be virtually present where they cannot be physically. For example, we are:

- Developing a virtual representation of a 3D space that will train the visually impaired to use echolocation for navigation-based tasks by simulating the echoes of clicking noses.
- Augmenting video chat through 3D face scanning, allowing users to adjust the angle at which their partners in conversation appear on their own mobile screens.

Our laid-back team has a lot of fun playing with new technology, learning a lot and contributing valuable knowledge to our field. Students interested in becoming research assistants (or anyone else curious to learn more) can inquire by email to tyler-bell@uiowa.edu.

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