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Using Forge Toward Human-Robot Collaboration in Architecture

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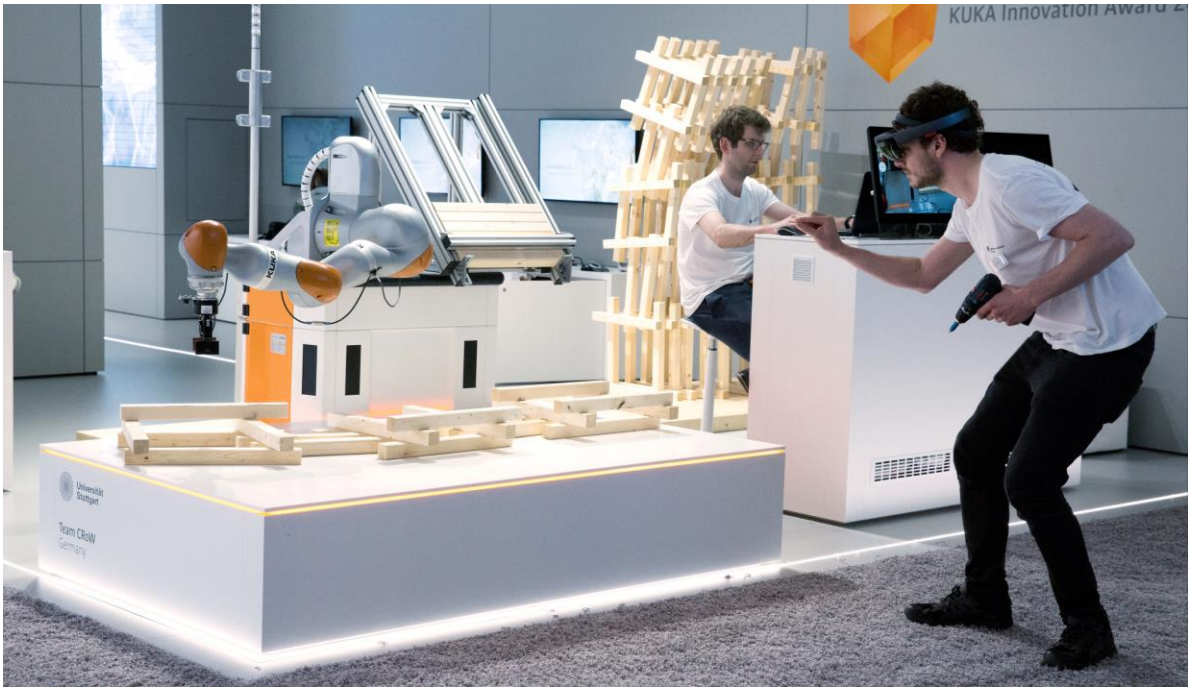

Presented Case Study: Collaborative Robotic Workbench for Human Robot Collaboration, Kuka Innovation Award

Learning Objectives

- Understand the context of current research in human-robot collaboration
- Discover a possible workflow for the generative design of a nonstandard wood system with techniques for cross-platform integration.
- Discover a client-server communication workflow for connecting multiple processes (in this case, connecting a node web server to a ROS server utilizing rosbridge)
- Learn how to use the Forge Viewer API, Node.js, and additional npm packages to develop a web platform for viewing a real-time 3D model of the fabrication process with custom extensions.

Description

This class will present a toolset for enabling and enhancing Human and Robot Collaborative for the building sector. A specific case study, “Collaborative Robotic Workbench”, developed for the Kuka Innovation Award 2018, will illustrate several techniques in generative design, communication protocols, and interfaces for enabling a human and robot collaborative building process. This workbench featured an augmented reality interface for superimposing data and dispatching tasks to the robot, a background computational engine for task distribution and path planning, and an online web platform for process visualization using Forge APIs. The class will provide an overview of the various system components and explain how they facilitated a collaborative construction process - going into particular depth on the communication between a ROS server managing the robotic process and a Forge viewer web client that enables remote monitoring of the construction process in real time.

Speaker

Lauren Vasey is a Research Associate at the ICD where her research focuses on adaptive robotic fabrication. Her projects at ICD include many of the award winning ICD/ ITKE Research Pavilions, as well the HIVE Pavilion, a collaboration with Autodesk exhibited at AU 2015. Her work has been published internationally in Wired, Architectural Design, among others. Recent projects include a workbench for Human Robot Collaboration for the Kuka Innovation Award 2018, and a collaboration with the European Space Agency for feasible fiber based robotic construction methods on the moon. She has previously been the keynote at Advances in Architectural Geometry (AAG) and Paradigm Shift in New Zealand, and currently serves on the Board of Directors of ACADIA, the Association for computer Aided Design in Architecture. Previously, she received a Bachelor of Science in Engineering from Tufts University, cum laude, and a Masters of Architecture from the University of Michigan, with distinction.