

## 20.317

### Augmented Design

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#### Instructor

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#### Students

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#### Course Description

Augmented Reality has crossed a significant threshold in its development with the recent introduction of hardware and programming kits such as the HoloLens and ARCore/ARKit respectively. It is now more accessible to end-users who may wish to adopt this technology for their specific domain purposes. The moment is ripe for architects, who comprise one such group of end-users, to explore the potentials of AR and critically evaluate where it can be used to enhance established workflows.

If AR does indeed have the potential to disrupt how architecture is currently conceived, represented and materialized, then it would be critical to expose students to such technology. This elective course will furnish students with conceptual and technical knowledge enabling them to explore how AR can be utilized at various stages of the design to production process. Furthermore, it will build upon topics introduced earlier in the core syllabus relating to computation and fabrication.

In the first half of the course, students had to analyse their current studio design workflow and propose ways of enhancing routine processes using AR. They were later required to perform a live demonstration of the augmented process using their custom apps on mobile phones and tablets. In the second half, students were challenged to not only design a lattice structure based on a modular system, but more importantly, develop an interactive AR app to capture assembly instructions as an alternative to conventional construction documents. Thereafter, another student group would utilise the app to assemble the structure accordingly.

#### Learning Objectives

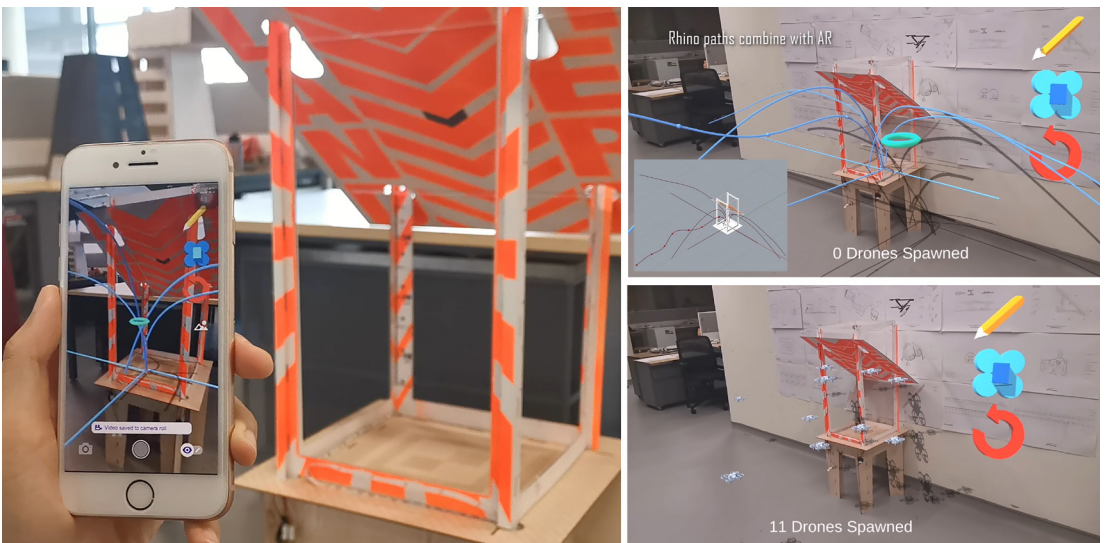
By the end of this course, students will be able to:

- Gain the technical ability to apply AR technology to the architecture design process and create new workflows
- Creatively explore possibilities in terms of design representation and materialization
- Understand the relation of AR technology with respect to advances in computation and fabrication
- Uncover new areas for research into the use of AR for future design processes

#### Measurable Outcomes

- Develop and implement an AR app for mobile devices for design representation purposes
- Utilize AR device to construct a geometrically complex and evocative design artifact
- Deliver an oral and visual presentation together with a written report, suitable for a professional audience

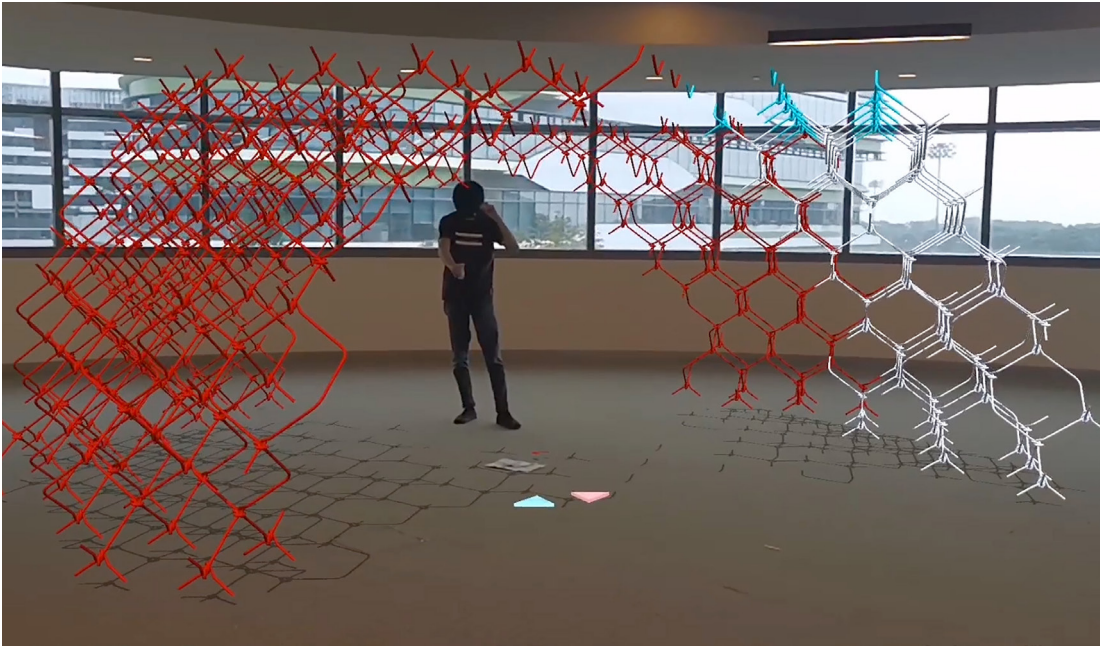
Student defines a surface by recording spatial positions using a tablet, while another student sees the generated woven structure concurrently, allowing them to evaluate the design on site immediately.



Students demonstrate an AR app showing the flightpaths of a swarm of virtually generated drones. This app was developed in relation to a studio investigating the design of droneports.



Students used the AR apps they developed to display holograms of the structures in incremental states on the HoloLens, then assembled physical modules to match the virtual reference.



Student team A designed a non-orthogonal lattice structure ( virtual version above), while team B constructed it using the AR app given to them by that team (completed structure below).