

# Computational Fabrication and Assembly for In Situ Manufacturing

## BIOGRAPHY



Martin Nisser is an Assistant Professor of Aeronautics and Astronautics at the University of Washington, where his research interests are in computational fabrication and assembly. He completed his PhD at MIT in the Computer Science and Artificial Intelligence Laboratory. Previously, he completed his masters and undergraduate degrees at MIT, ETH Zurich, and The University of Edinburgh, and held intern or staff appointments at the Boston Dynamics A.I. Institute, Tesla Motors, Harvard University and the European Space Agency. He is a Sweden-America fellow, a Bernard Gold fellow, and has appeared in media including CNN, BBC News, The NBC Daily Show and The Washington Post.

## ABSTRACT

The space environment is remote and unpredictable, and the ability to manufacture in situ offers unique opportunities to address new challenges as they arise. However, the challenges faced in space are often mirrored on Earth. In hospitals, disaster zones, low resource environments and laboratories, the ability to manufacture customized artefacts at points of need can significantly enhance our ability to respond rapidly to unforeseen events. In this talk, I will introduce digital fabrication platforms with codeveloped software and hardware that draw on tools from robotics and human-computer interaction to automate manufacturing of customized artefacts at the point of need. Highlighting three research themes across fabrication machines, programmable materials, and modular assembly, the talk will cover a digital fabrication platform for producing functional robots, a method for programming magnetic material to selectively assemble, and a modular robotic platform for in-space assembly previously deployed in microgravity.