



Invitation to PhD defense

by Mads Brath Jensen

Title

Co-creative Robotic Design Processes in Architecture

Assessment committee

Professor Dr. Norbert Palz
Universität der Künste Berlin

Associate Professor Dr. Paul Nicholas

Institute of Architecture and Technology, The Royal Danish Academy

Associate Professor PhD Michael Finbarr Mullins

Department of Architecture, Design and Media Technology,
Aalborg University

Supervisor

Professor Hans Jørgen Andersen

Department of Architecture, Design and Media Technology,
Aalborg University

Co-supervisor

Professor MSO Isak Worre Foged

Institute of Architecture and Design, The Royal Danish Academy

Host

Department of Architecture, Design and Media Technology
Aalborg University

Sign up and questions:

If you wish to participate at the defense please sign up via doodle at this link: [\(doodle - defense\)](#).

If you wish to participate in the reception please sign up via doodle at this link: [\(doodle - reception\)](#).

The defense will also be presented via Zoom. If you wish to participate via ZOOM, please sign up on the doodle link for the defense AND send an email to secretary Kristina Wagner Røjen (kwro@create.aau.dk). Kristina will then send you a personal invite to the Zoom session.

Please also contact Kristina with any further questions regarding the defense.

Place

Seminar room: 4.517 + 4.521
Aalborg University
Rendsburggade 14
9000 Aalborg, DK

Online: Zoom

Date

Wednesday, October 6th, 2021

Program

13.00 - 13.05

Welcome by moderator
Marie Frier Hvejsel

13.05 - 13.50

Presentation by
Mads Brath Jensen

13.50 - 14.05

Break

14.05 - 16.00 (latest)

Questions

16.00 - 16.30

Assessment & Announcement
from the assessment committee

16.30

Speeches and reception

Abstract

The PhD thesis examines interactive and collaborative design methods for robotic fabrication in architecture. Through the study of design thinking, computational design exploration, robotic architecture and material systems, the thesis proposes a design framework for co-creative human-material-robot processes in architecture. This integrated design framework seeks to bridge a gap in current processes of digital fabrication, where designers shift from being highly engaged during design processes, to designated passive bystanders during ongoing fabrication processes.

It is believed that robotic fabrication, supported by cyber-physical frameworks for interactive and collaborative processes of human-material-robot making, can support and enhance the creative exploration of design modelling and design making in architecture. To investigate this hypothesis, the thesis asks how interactive and collaborative robotic fabrication can contribute to creative 'co-evolutionary' design process in architecture and how such creative activities will influence cognitive design processes.

Focusing on the methodology of Research-through-Design the work presented in the thesis advocates for design research being performed through experimental work, involving digital models, physical prototypes, and full-scale demonstrators. The project comprises a sequence of five discrete experimental studies that progressively alternates between author-driven and student-driven design processes. This strategy allows for an alternation between subjective and objective registrations of the robot-based design processes and an uncovering of the potential impact and relevance of diverse levels of design experience.

Based on the findings of the thesis, the proposed design methods were found to progressively enhance interaction with the robotic fabrication process. The opportunity to directly interact with a robotic arm and suggest changes during the ongoing fabrication process allowed for initiation of fabrication processes that were not entirely determined, thereby substantiating trial-and-error based design explorations that allow for reflection-in-action to occur.

The thesis also concludes that if decision-making is to be shared between all agents in a co-creative human-robot design framework, the robotic framework must incorporate strategies for machine learning and artificial intelligence.