Project/Master topics
at
Department of Structural Engineering
(2025-2026)

Characteristics of the group

- Interdisciplinary
- International
- Industry relevance
- Weekly webinars
- **Modelling & Lab**
- **Local properties**
- **Macroscopic performance**

Typical <u>project studies</u> in our group

- **7.5 study points**
- **A guided literature study** to learn about the topic (1/3-1/2)
- Guided preliminary **modelling** or **lab work** (1/3)
- **Summarize the understanding**, analyze and formulate the preliminary results (1/3)
- **Plan for the master study**
- **Weekly supervising meetings**
- **Interaction with PhD students and post docs**

# **Project Topics**: **Modelling of 3D printing**

- **3D printing** in principal works for any material, any shape, any quantity and in any fields, without the need for specialized tooling.

- **Challenges:** No control of printed properties

- **Needs:**
  - Modelling of thermal fields
  - Modelling of mechanical properties

- **1-2 students**
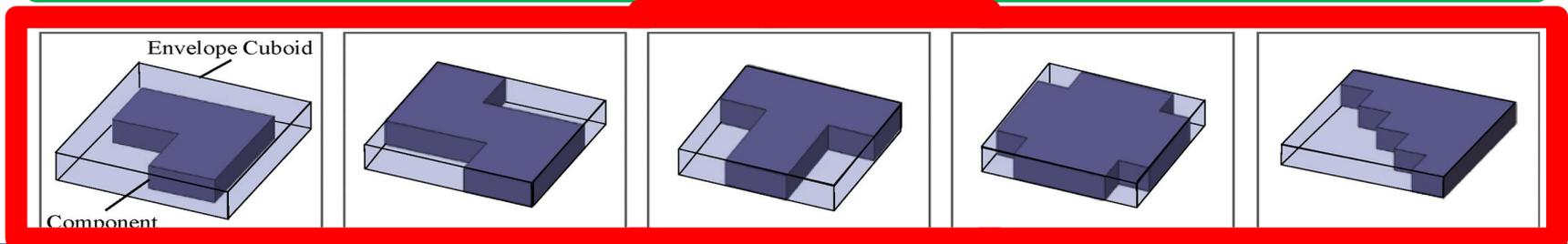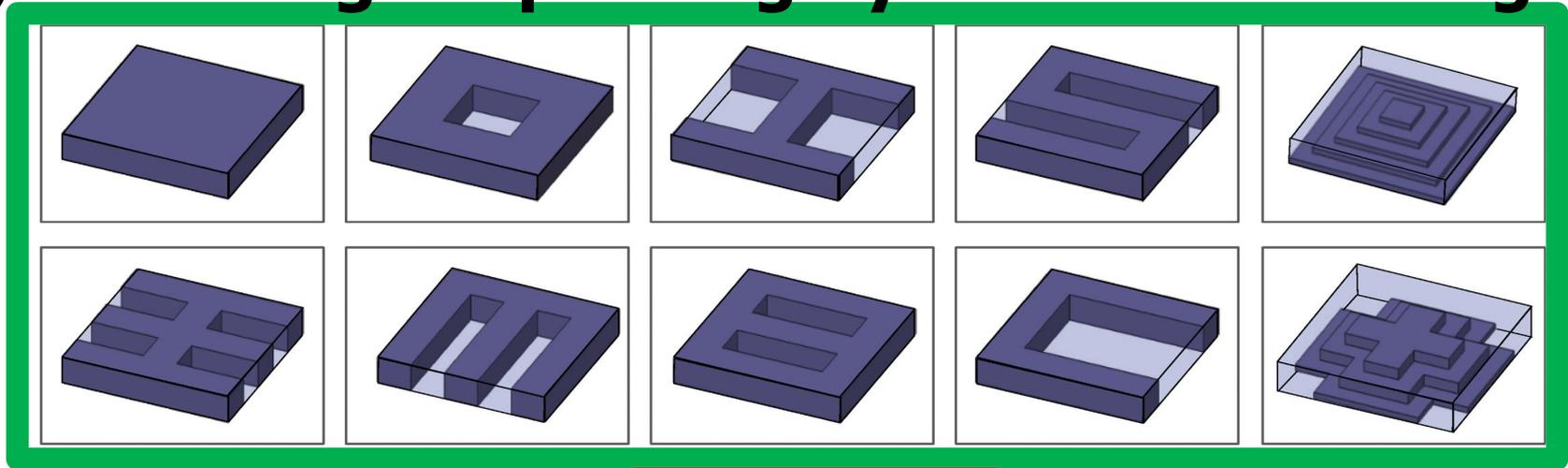
- Working with **PhDs and SINTEF**
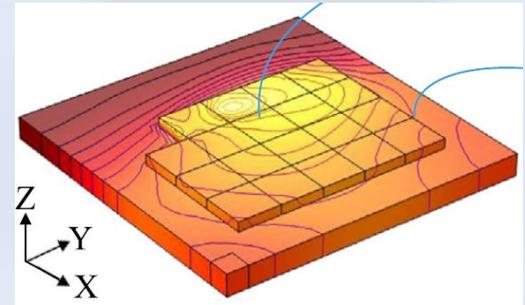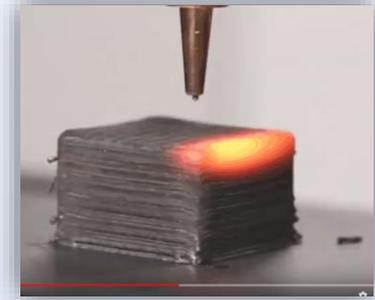
Topic:

Modelling of 3D printing using

ABAQUS and Machine learning methods

Typical ABAQUS models for 3D printing
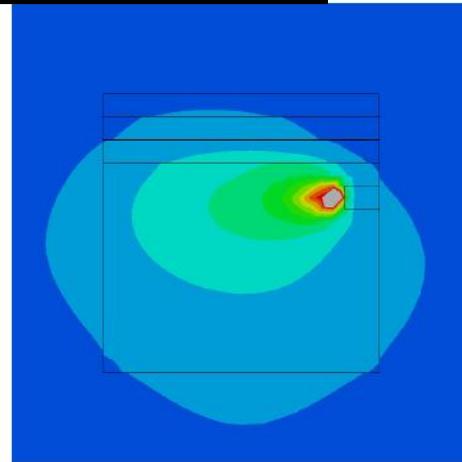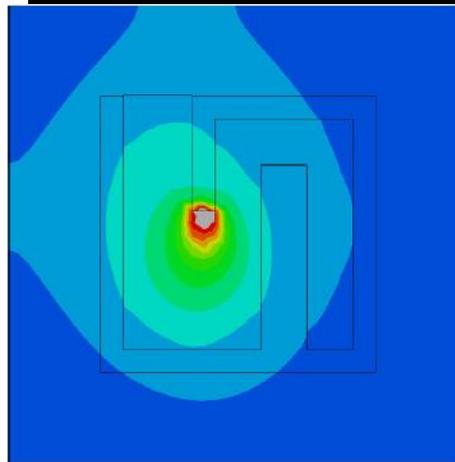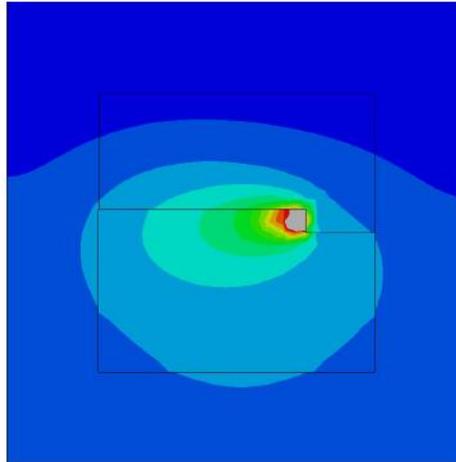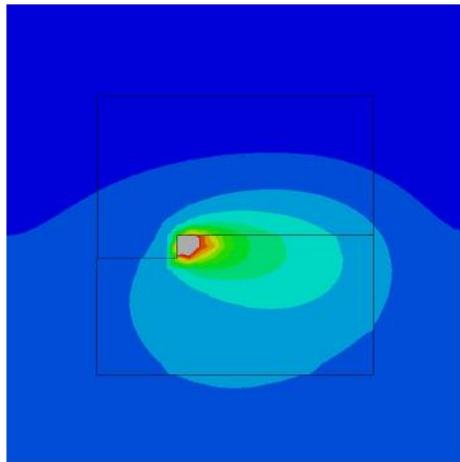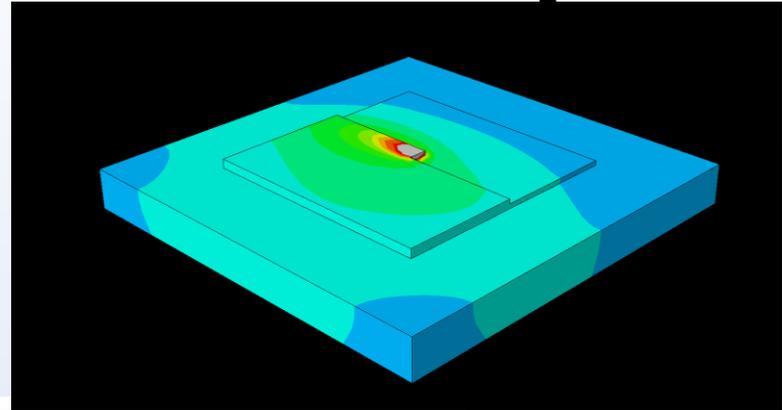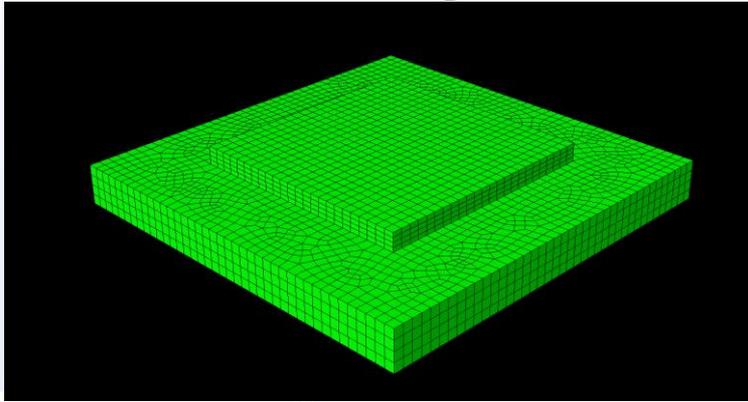
Master topic alternatives:
1) Continue modelling 3D printing with Abaqus
2) Modelling 3D printing by machine learning

Master student's work published at international journal

https://doi.org/10.1016/j.jmatprotec.2021.117472

Topic:
Integrity of hydrogen infrastructure

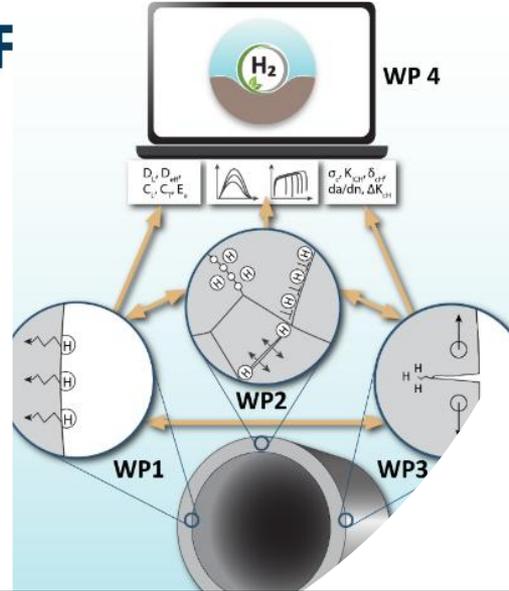# Integrity of hydrogen infrastructure

Hydrogen, fuel of the future!

Safe Pipelines for Hydrogen Transport II – a large scale project financed by the Research Council of Norway and many industrial partners
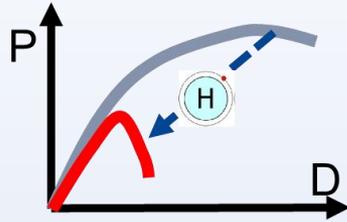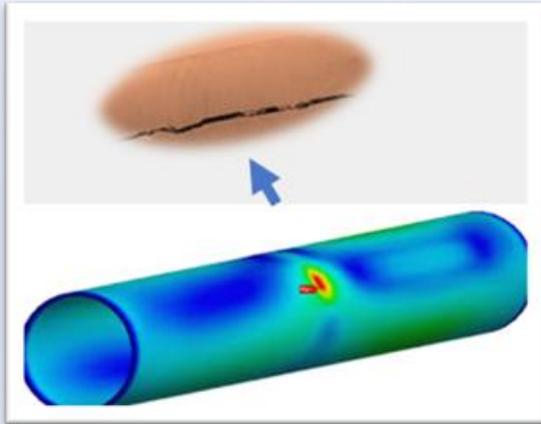

Hydrogen energy
Safe transport

Research question: Is it safe to use the existing gas pipelines to transport H2 from Norway to market?

Cracking of Hydrogen infrastructures

Integrity

- Use ABAQUS to model the material and structural behvaiours when exposed to hydrogen

- Model **how the material degrades** and its consequence to the safety

- **Leading competence in this field**

- **Working in a large team**
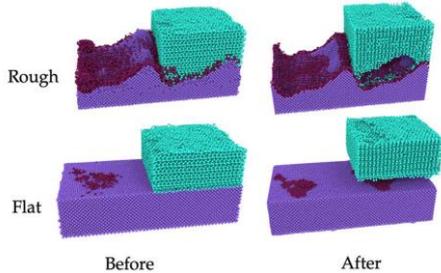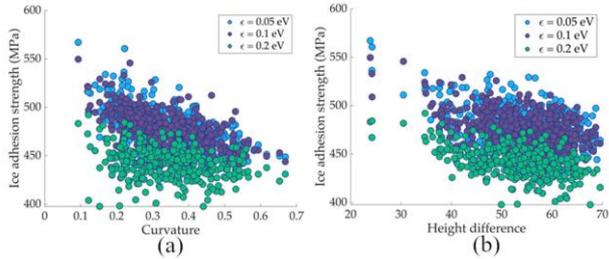
- Gain valuable experience in coming hydrogen technology

Master Thesis topics:

Molecular mechanics: mechanical stability of molecular structures

Master Thesis topics:
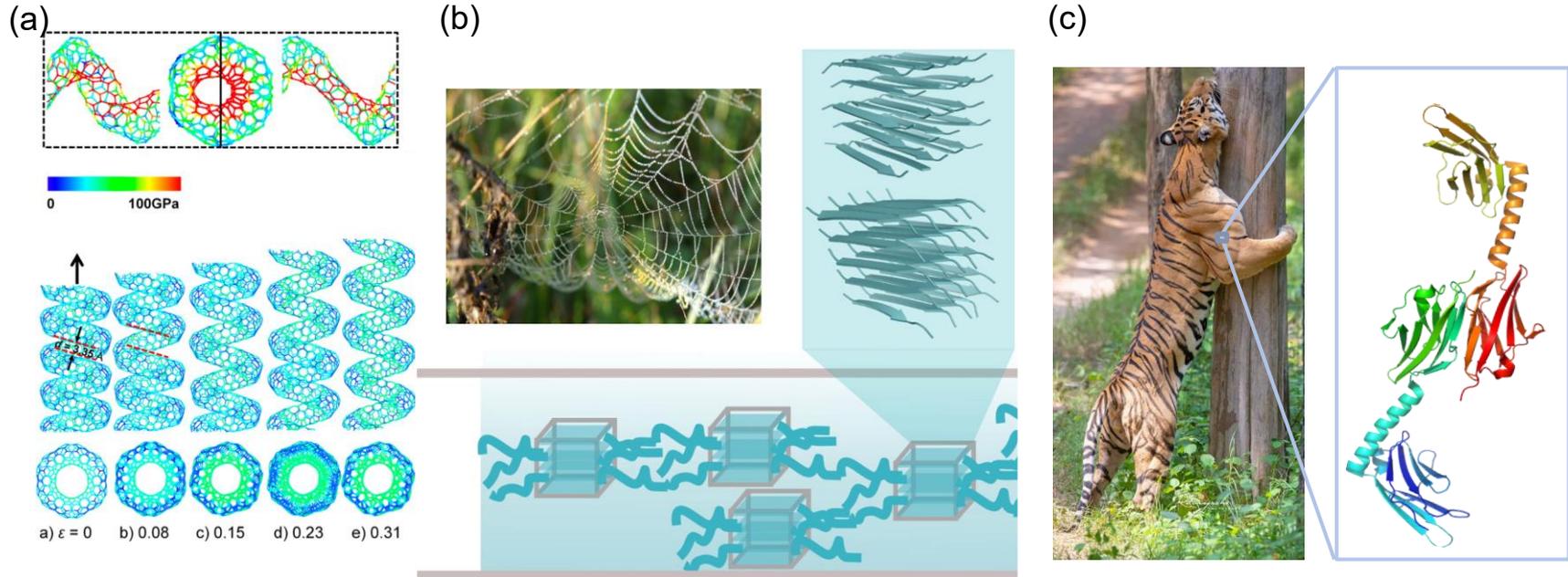
Machine learning materials science

Example: machine learning nanoscale ice adhesion

Data

Machine learning algorithms (Matlab, Python, R, Octave)

Predictions

Surface topologies with highest (a) and lowest (b) ice adhesion

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