

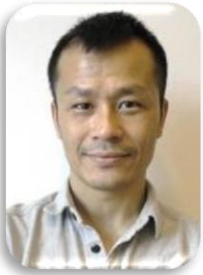
**Project/Master topics
at
Department of Structural Engineering
(2026-2027)**

Our major research topics

- **Modelling of 3D printing using ABAQUS and Machine learning methods**
- **Structural integrity of hydrogen infrastructure**
- **Mechanical stability of molecular structures**
- **Anti-icing technology**

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<https://www.ntnu.edu/nml>

Characteristics of the group

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



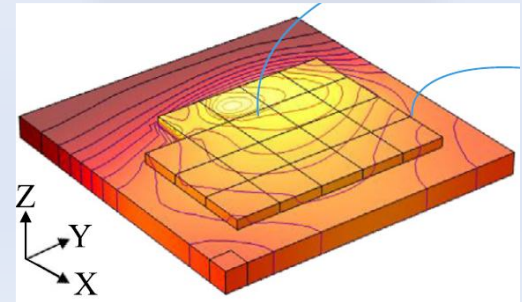
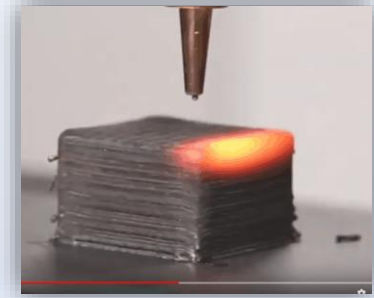
Typical project studies in our group

- **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**

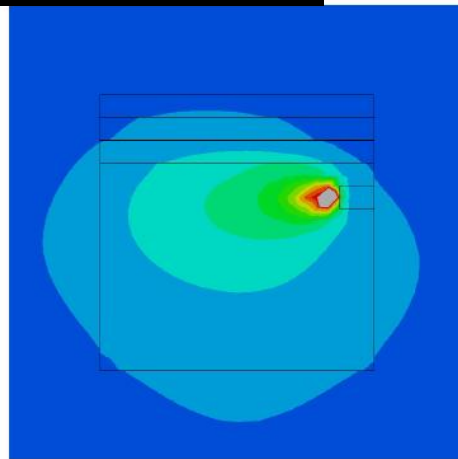
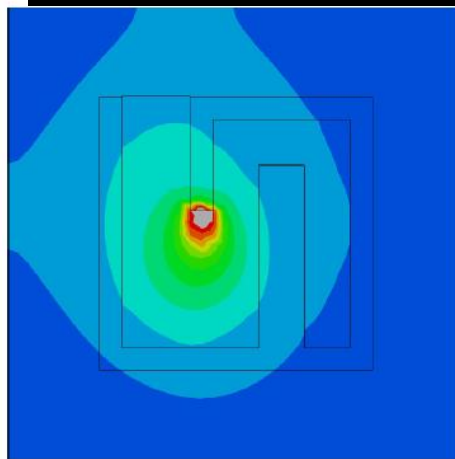
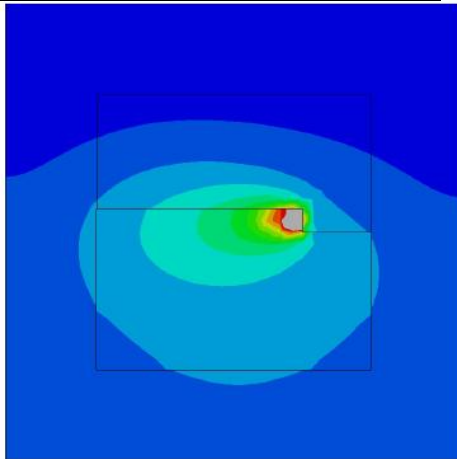
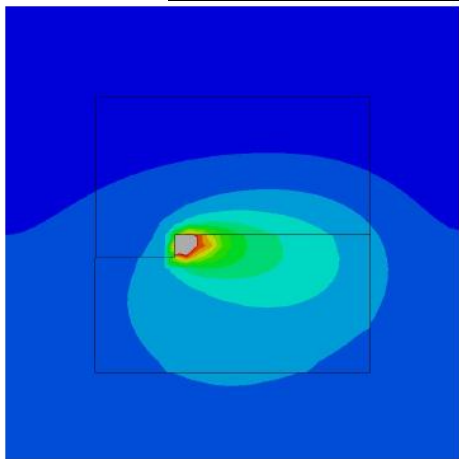
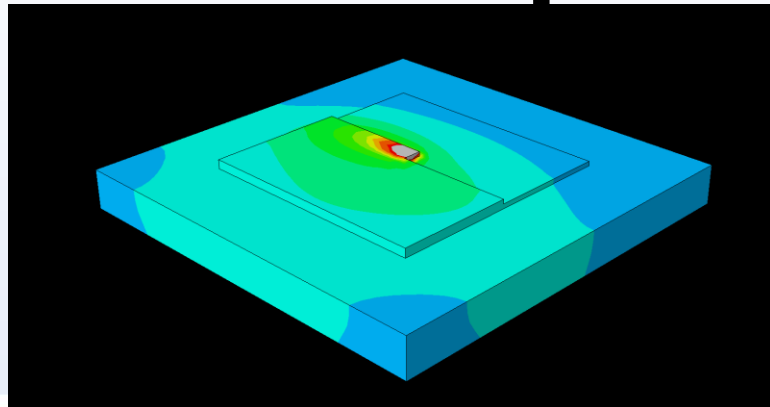
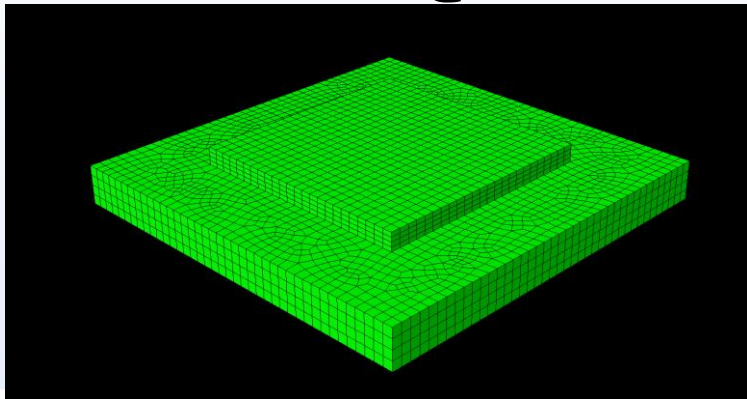
Topic: Modelling of 3D printing using ABAQUS and Machine learning methods

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**

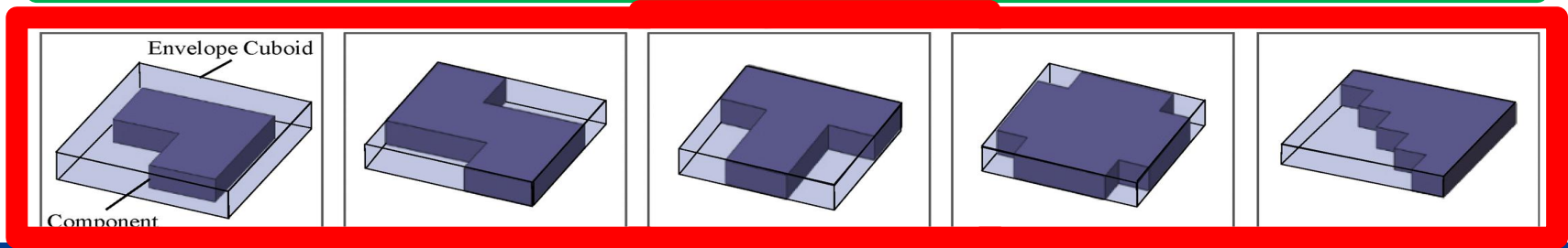
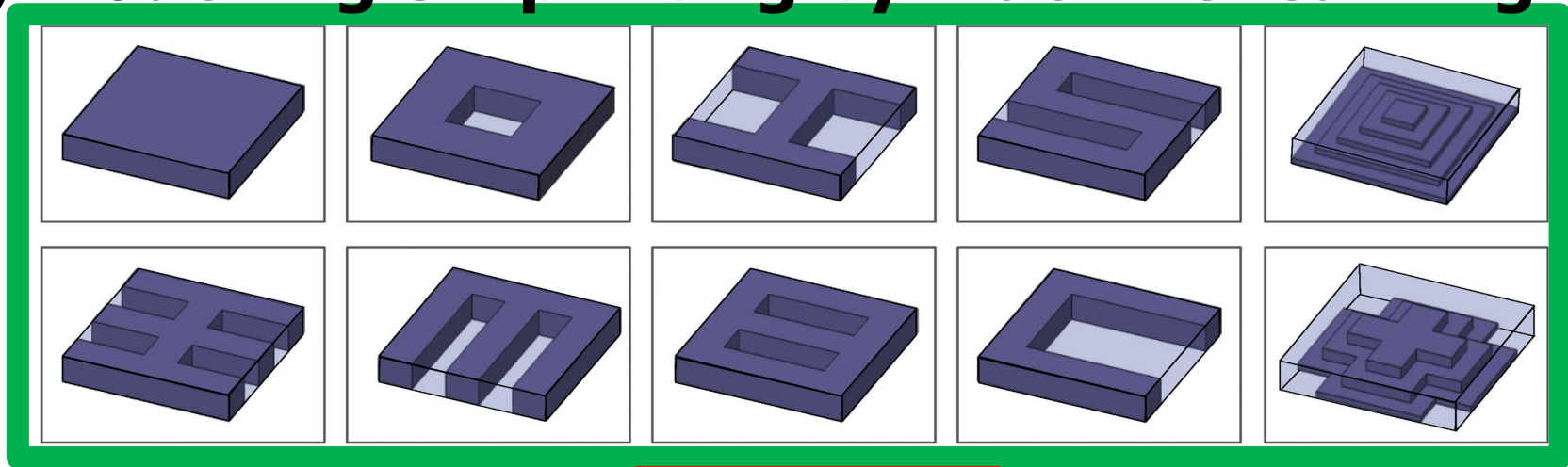


Typical ABAQUS models for 3D printing



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



Journal of Materials Processing
Technology



Volume 302, April 2022, 117472

Towards a generic physics-based machine learning model for geometry invariant thermal history prediction in additive manufacturing

[Kari Lovise Ness](#)^a  , [Arindam Paul](#)^b, [Li Sun](#)^a, [Zhiliang Zhang](#)^a  

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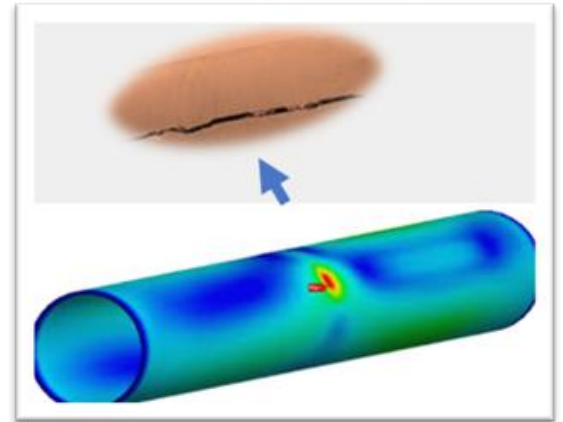
Topic: Structural integrity of hydrogen infrastructure

Summer job at Höegh Evi 2026 → Project/ master at NTNU 2026/2027

<https://hoeghevi.easycruit.com/vacancy/3614611/78115>



Integrity



Structural Integrity of hydrogen infrastructure

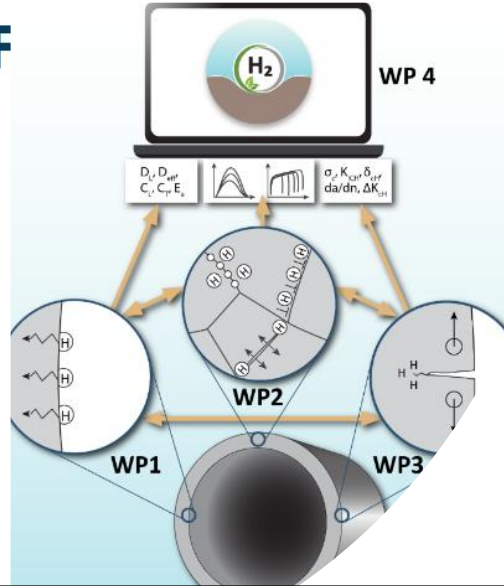


Hydrogen, fuel of the future!

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



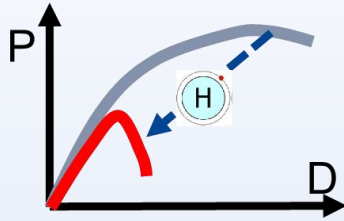
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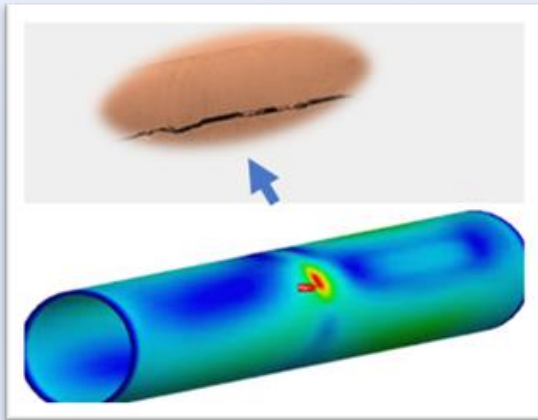
Hydrogen energy
Safe transport

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

Integrity of Hydrogen infrastructures

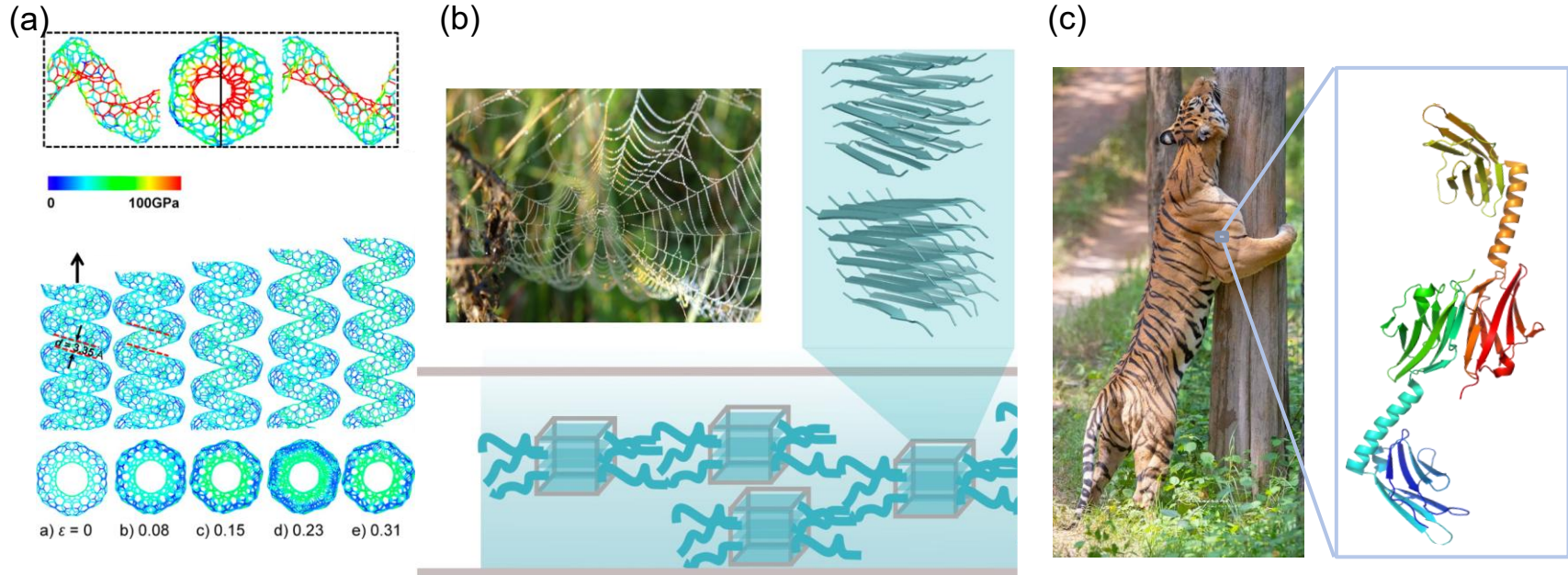


Integrity



- Use ABAQUS to model the material and structural behaviours 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

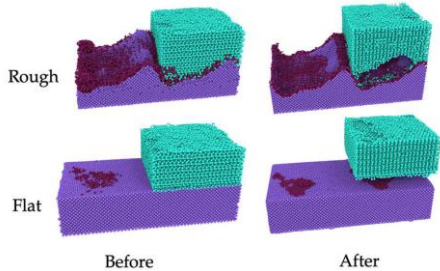
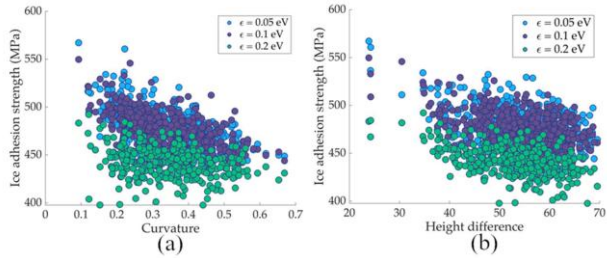
Molecular mechanics: mechanical stability of molecular structures



Machine learning materials science

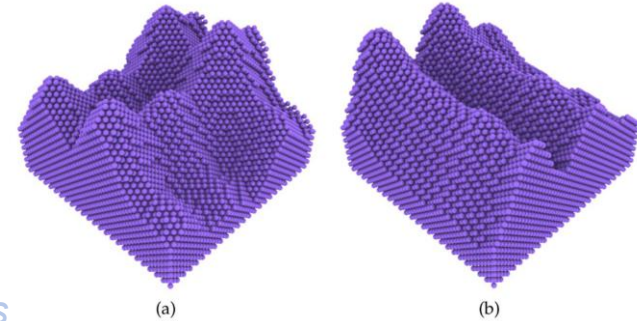
Example: machine learning nanoscale ice adhesion

Data



Predictions

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



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