

## HiWi

# Integrating Connection and Manufacturing Constraints in Generative Design and Topology Optimization for Industrial Applications

Keywords: Topology Optimization, Machine Learning, Computational Mechanics

### Background:

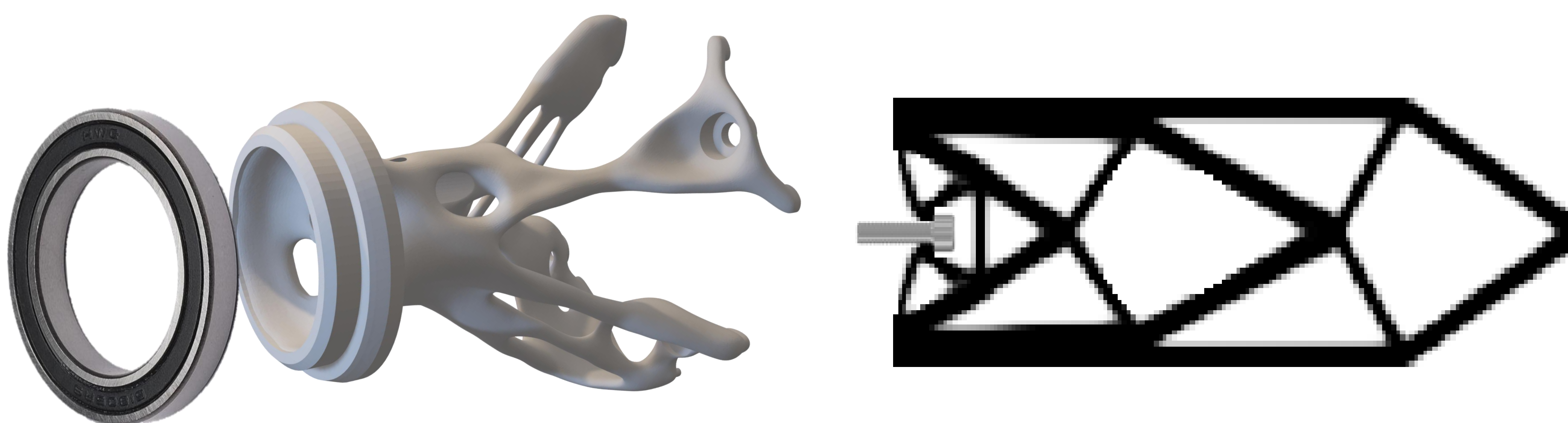
Highly optimized lightweight components are typically subject to many requirements on their performance and restrictions imposed by manufacturing and assembly. Often, requirements and restrictions are not available as explicit constraints and cannot be included in tools that automatically generate design proposals. Also, there are no methods available for optimal load path design of mechanical connections.

The new research project FORAnGen brings together multiple universities and industry partners. In collaboration with *Audi*, *Stöger Automation*, and *ZF Friedrichshafen*, this project aims to make generative design more applicable in industrial context.

### Description:

Possible work packages (depending on interest and background):

- Improve topology optimization codes.
- Research on connection and manufacturing requirements in the (topology) optimization process.
- Post-processing and printing of prototypes.
- Collaboration with industry partners.



*Figures: Topology optimization considering bearings and a screw connection.*

### Required skills:

We are looking for a highly motivated person who is keen to work on industry problems (up to 20h/week):

- Finished bachelor in Mechanical Engineering, or similar
- Interest in topology optimization, additive manufacturing, computational mechanics
- Basic knowledge of Python
- Independent and reliable work

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