

# Product optimization Machine Design @LiU

Johan Ölvander, PhD, professor in Engineering Design  
Division of Machine Design  
Department of Management and Engineering

# Product optimization @ Machine design

- **Research activities since 2000**
  - 10+ projects, in total 20 MSEK
  - 5 dissertations, 3 on going PhD projects focusing on MDO aspects
  - 2 active PhD courses
  - **Research areas**
    - Multi-objective opt., multi-disciplinary opt., robust opt., surrogate modelling, non-gradient based algorithms, real world applications, dynamic systems, product development
  - **Research applications**
    - Aeronautics, industrial robotics, automotive, fluid power
  - **Publications**
    - 20+ journal publications, 40+ conference publications
- **Educational activities**
  - Design optimization, 6 ECTS, 60+ stud/year, in total 600+ students
  - Product modelling, 6 ECTS, 120+ students/year, in total 1000+ students
  - Collaborative MDO, 6 ECTS, 30 students/year, in total 60 students
  - MSc Thesis: 6-10 students per year, in total 50+ students



# Structural and Topology Optimization Solid Mechanics @LiU

Anders Klarbring, Carl-Johan Thore, Bo Torstenfelt

# Structural and Topology Optimization

At the division of Solid Mechanics at Linköping University researchers develop Finite Element based Structural Optimization tools that find optimal structures based on geometrical and material modifications.

## Current active research directions:

- Topology Optimization (TO) in combination with 3D-printing.
- Biological growth as optimization processes.
- Robustness of optimal structures to small changes of design, loads and boundary conditions concerns into TO methods.

## Examples of ongoing projects:

- Dynamical systems approach to optimization in biological growth and structural design. Financed by the Swedish Research Council (VR).
- Cut Finite elements, geometry, and optimal design Financed by the Swedish Foundation for Strategic Research (SSF). This project involves researchers from the universities in Umeå, Linköping and Jönköping.

## Book in Structural Optimization:

- P W Christensen and A Klarbring, An Introduction to Structural optimization, Springer, 2009.

And many journal publications....

