

RECENT WORKING EXPERIENCE

- **Ph.D. candidate at AMOLF, ARCNL** Amsterdam, Netherlands
Advisors: Johannes T.B. Overvelde, Martin van Hecke, Bart Weber Oct 2021 – present
Focus: metamaterials, nonlinear mechanics, instabilities (experimental, numerical)
 - Design, fabrication, demonstrations of 'countersnapping' structures
 - Development of a catalog of nonlinear building blocks and designs methods
 - Development of the 'flexel formulation' for robust and fast simulations of highly nonlinear structures; implementation into a publicly available and installable Python library [[library link](#)]
 - Design and fabrication of various instability-based architected structures, guided by simulations: *snapping lattices, LCE-actuated snapping devices, pneumatic countersnapping systems, locomotion based on sequential hysteresis*
 - Mentoring Master's students and setting up internship projects
 - Talks at international conferences: *2024 SES* (Hangzhou, China), *2024 Multifunctional Materials and Structures GRS* (Ventura, USA), *Creative Differences Workshop - 2023 Design Biennial* (London, UK), *2023 APS March Meeting* (Las Vegas, USA)
- **Software-hardware test engineer at ASM International** Almere, Netherlands
Tasks: software testing, software-hardware integration testing Jan 2021 – Oct 2021
- **Research intern at Any-Shape** Flemalle, Belgium
Master's thesis: Quality assessment of highly productive selective laser melting processes Feb 2019 – Jun 2019
 - Fabrication of test samples in 316L and AlSi10Mg using selective laser melting
 - Experimental identification of instabilities (keyhole, Rayleigh-Plateau) that affect part quality

PUBLICATIONS

- **Ducarme P.**, Weber B., van Hecke M., Overvelde J.T.B., Exotic mechanical properties enabled by countersnapping instabilities, PNAS, 2025. [[open-access link](#)] [[promo movie link](#)]
- **Ducarme P.**, Weber B., van Hecke M., Overvelde J.T.B., Simulating mechanical systems from entities with arbitrarily complex deformation paths, about to be submitted. [[github link](#)]
- Stinissen K., **Ducarme P.**, Gorissen B., Overvelde J.T.B., Functionalities enabled by pneumatic countersnapping instabilities, in preparation.
- Kurt E., **Ducarme P.**, Picella S., Overvelde J.T.B., Heat-induced instabilities in silicone-LCE composite structures for locomotion, in preparation.
- **Ducarme P.**, Koppen S., Overvelde J.T.B., Computation of deformation paths for stimuli-driven nonlinear reconfigurable structures, in preparation.

SCIENTIFIC OUTREACH & AWARDS

- Featured on *Veritasium* (18M+ subscribers), discussed and showcased research on countersnapping instabilities. 9M+ views. [[video link](#)]
- Created short movie showing countersnapping structures in action. 300k+ views. [[video link](#)]
- Designed a hand-actuated soft gripper featured at the *Nemo Science Museum*. [[exhibition link](#)]
- Best poster award at *2024 GRC Multifunctional Materials and Structures*.

PREVIOUS EDUCATION

- **Master of Science in mechanical engineering, University of Liege** Liege, Belgium
Honors: magna cum laude. Focus: advanced solid mechanics, structural optimization Sep 2017 – Feb 2020
- **Erasmus mundus exchange program, University of Ottawa** Ottawa, Canada
As part of M.Sc. studies. Focus: reinforcement learning, mechatronics Aug 2018 – Jan 2019
- **Bachelor of Science in engineering, University of Liege** Liege, Belgium
Honors: cum laude. Focus: physics, quantum mechanics, mechanical engineering Sep 2014 – Jun 2017