



**University of Twente, Enschede  
Friday, 17 April 2020**

## **Plenary Lecture – Physica Prize 2020**

Speaker: Martin van Hecke (UL & AMOLF)

Title: Designer Matter

### **Abstract:**

#### Designer Matter

Mechanical metamaterials are structured forms of matter that exhibit properties and functionalities that surpass those of their constituent materials. So far, most designs comprise periodic architectures, leading to materials that perform a single, spatially homogeneous task. However, by exploiting their near limitless structural complexity, we may enter the realm of machine-like materials. Such forms of designer matter can deal with spatially patterned functionalities such as shape morphing, can perform tasks in sequence, and may ultimately be able to process information and learn. After a brief introduction explaining the principles of mechanical metamaterials, I will discuss examples of such advanced mechanical metamaterials, including shape changers, self-folding materials, non-commuting metamaterials and materials that count.