Where nanoengineering meets magnetism

Magnets are omnipresent in our world – vital technologies such as energy conversion and automotive industry rely strongly on permanent magnets. However, magnetism is a complex phenomenon that waited for the rise of the theory of relativity and quantum mechanics to be better understood, and there is still much left to explain. Conventional research on making magnets stronger, cheaper, and more sustainable has reached its limits, but developing technologies require better magnets and we need new approaches to achieve this. This is where nanoengineering comes to play – can we tune the structure of magnets at the nanoscopic, or even atomic level in order to make them better? The answer is yes, and in this lecture we will talk about how we can combine theory and experiments, i.e. micromagnetic simulations and magnetic imaging, in order to make progress where nanoengineering meets magnetism – in the area of nanomagnetism.