Dr. Georgy Filonenko,
Delft University of Technology
Department of Materials Science and Engineering
Functional Polymers and Sensors group

Title: **Imaging polymer mechanics through chemical sensing**

Abstract: Polymer devices often feature complex topology, especially so for 3D printed materials. In addition to topology, additive manufacturing incurs large thermal gradients and residual stresses in 3D printed plastic parts. In our group we study this mechanical and dynamical complexity using chemical sensing tools. Small molecules embedded in polymers can perceive mechanical stresses and variations in dynamics of surrounding materials. These chemical sensors, termed mechanophores, can describe damage, crack propagation, phase transitions and stress heterogeneity in polymeric solids and liquids. This sensory performance stems from the way mechanophores were designed and in this lecture we will cover the operational basics of molecular sensors, our group have developed over the last few years, cover the connection between chemistry and physics and discuss the utility of mechanochemical imaging for resolving complexity in materials.