

Micro-engineering for seamless electrode-neuron interfaces – and why I think the future lies in modularity

Maria Asplund^{a,b,c}

^a *Department of Microtechnology and Nanoscience, Chalmers University of Technology, Sweden*

^b *Division of Nursing and Medical Technology, Luleå University of Technology, Luleå, Sweden*

maria.asplund@chalmers.se

Bio- and neuro-electronic implantable systems has astonishing potential to address unresolved medical challenges. Electrical recording and stimulation of neurons in the brain and peripheral nerves allow neurorobotics, brain machine interfaces and even restoration of lost senses. However, to unlock its full potential, the longevity challenge must be addressed meaning systems need to be engineered to stay operational for decades. This is a multi-dimensional problem which entails both solutions to keep intimate contact between neurons and implants and solving practical engineering problems such as interconnection, packaging and hermeticity. In my talk I will outline how we have started to address some of these challenges in projects on visual restoration, spinal cord stimulation and high-density brain recordings. Although each new application requires a dedicated solution I am hoping to bring across why I think it's time to consider a modular approach.