SynCTI SEMINAR SERIES

NUS Synthetic Biology for Clinical and Technological Innovation (NUS SynCTI)
Member of Singapore Consortium for Synthetic Biology (Sinergy)

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Bio-inspired Electronic Skins

Electronic sensor skins are active area of research for many groups globally due to its potential to enable dramatic changes in how we interact with the digital environment. For example, 'robots' can don on sensor active skins to shake human hands with comfortable pressure, measure our health biometrics and possibly aid in wound healing. In my talk, I will discuss the development of electronic sensor skins with some historical context, followed by showcasing of several force sensitive electronic skin technologies with high sensitivity, stretchability and bio-mimetic self-healing abilities[1-5]. More recently, we demonstrated a power-efficient artificial mechano-receptor system inspired by biological mechano-receptors[5]. We further used a channelrhodopsin with fast kinetics and large photocurrents as an optical interface to neuronal systems for next generation opto-tactile prosthetic interfaces.

1. L. Y. Chen*, **B. C-K Tee***, et al. Continuous wireless pressure monitoring and mapping with ultra-small passive sensors for health monitoring and critical care. Nature Communications 5, 1–10 (2014). (*equal contribution)
2. **B. C.-K. Tee**, et al. An electrically and mechanically self-healing composite with pressure- and flexion-sensitive properties for electronic skin applications. Nature Nanotechnology 7, 1–8 (2012).
3. S. C. B., Mannsfeld, **B. C-K Tee** et al. Highly sensitive flexible pressure sensors with microstructured rubber dielectric layers. Nature Materials 9, 859–864 (2010).
4. Skin-Like Sensors of Pressure and Strain Enabled by Transparent, Elastic Films of Carbon Nanotubes, D.J. Lipomi*, M. Vosgueritchian*, **B. C-K. Tee*** et al., Nature Nanotechnology, 1–6, (2011).
5. A skin-inspired organic digital mechanoreceptor, **B. C-K. Tee** et al., Science, 350, 313–316, (2015).

Dr. Benjamin C.K. Tee is appointed President's Assistant Professor in Materials Science and Engineering Department at the National University of Singapore. He obtained his PhD at Stanford University, and was a Singapore-Stanford Biodesign Global Innovation Postdoctoral Fellow in 2014. He has developed and patented several award-winning electronic skin sensor technologies. He is an MIT TR35 Innovator (Global) in 2015 and Singapore National Research Foundation (NRF) Fellow. His research group aims to develop technologies at the intersection of materials science, mechanics, electronics and biology, with a focus on sensitive electronic skins that has tremendous potential to advance global healthcare technologies in an increasingly Artificial Intelligence (AI) era.

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