

## **“Perineuronal net turnover and gamma oscillations reactivate brain plasticity”**

by

**Dr Henry HC Lee**  
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**Date: 5 Dec 2016**

**Time: 11:00am to 12:30pm**

**Venue: Meeting Room 3 (1B-G04), G/F, Block 1, To Yuen Building**

### **Abstract**

During early postnatal development, different brain regions exhibit transient critical periods (CP) of heightened plasticity. Beyond such CP, learning capacity is reduced and regenerative potential greatly limited. Finding ways to reopen CP would be beneficial for enhancing life-long learning performance or promoting recovery from neurotrauma. Previous studies have identified particular extracellular matrix structures -- perineuronal nets (PNNs) -- as a ‘brake’ on plasticity which inhibit regeneration as well. Here, I present novel evidence indicating that PNNs are dynamic structures, and that their turnover plays an active role in plasticity control and injury response. I further describe how PNN turnover might be regulated by neuronal activity such as gamma oscillations. Finally, I will discuss novel strategies for visualizing PNN turnover, and how to harness this knowledge of PNN to enhance learning and recovery.

### **About the Speaker**

Dr Henry HC Lee received a BSc in Biochemistry (First Class Honors) and a MPhil in Biology under the mentorship of Professor Karl Tsim at the Hong Kong University of Science and Technology, before moving to University of Pennsylvania and received a PhD in neuroscience working with Professor Stephen Moss. Henry’s research with Professor Moss on phosphorylation of potassium chloride co-transporter KCC2 was recognized with a pre-doctoral fellowship from the American Epilepsy Society in 2007 and a post-doctoral fellowship from the American Heart Association in 2009. In 2010, Henry was awarded a Croucher post-doctoral fellowship to join Professor Takao Hensch’s laboratories at Harvard University and Boston Children’s Hospital, studying how inhibitory neuronal circuits regulate brain plasticity and respond to injury via their extracellular structures perineuronal nets (PNNs). Henry has published his research in leading scientific journals including Cell, Cell Reports, Nature Neuroscience, PNAS, Cerebral Cortex, Journal of Neuroscience, Journal of Biological Chemistry, and Molecular and Cellular Neuroscience. Besides doing his research, Henry also enjoys advocating science outreach to the public, as a Science Communication Fellow at the Discovery Museums, Massachusetts.

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**All are welcome**