

	<b>Speaker</b>	Lim Lee Wei
	<b>Talk Title</b>	Prefrontal cortex stimulation: From antidepressant to memory enhancement
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### 1. Tentative Abstract

The use of stimulation electrodes implanted in the brain to control severely disabling psychiatric and neurological conditions is an exciting and fast-emerging area of clinical neuroscience. For patients who remain severely depressed despite trial-and-error combinations of medication and psychotherapy, a novel strategy has been introduced recently, using electrical stimulation to modulate the neurocircuitry of depression. Our research demonstrated that electrical stimulation targeting specifically the medial prefrontal cortex, most effectively treats symptoms of depressive-like behaviors, as compared to several other stimulated brain regions (cingulate cortex, nucleus accumbens core and shell parts, lateral habenula, ventral tegmental area). This study identifies stimulation of a specific cortical region as evoking powerful antidepressant effects in experimental models. Further, our studies have shown that it could also be used to enhance the growth of brain cells in the hippocampus, which mitigates the harmful effects of dementia-related conditions and improve the learning and memory functions. These findings suggested that deep brain stimulation has the potential to be developed into a therapy to treat patients suffering from dementia as well as treatment-resistant depression.

## 2. Brief Biography

Dr Lim Lee Wei is currently an Assistant Professor at the Department of Physiology, the University of Hong Kong. At the same time, he is also holding adjunct faculty positions at the Sunway University, Malaysia, and the Maastricht University, the Netherlands. He conducted his PhD study in neuroscience at the Maastricht University, and subsequently spent several years of research fellowship in Maastricht University, Oxford University, and Nanyang Technological University. He has extensive experience in the field of neuromodulation research using deep brain stimulation for neuropsychiatric diseases. His recent findings in the *eLife* and *Translational Psychiatry* papers have garnered more than 150 international media coverage including the UK Daily Mail, The Straits Times, Economic Times, TODAY, Channel News Asia, FinanzNachrichten, Xin Hua News, etc.

## 3. List of Representative Publications

1. AW Liu, N Jain, A Vyas, LW Lim. (2015) Ventromedial prefrontal cortex stimulation enhances memory and hippocampal neurogenesis in the middle-aged rats. *eLife* 4:e04803.
2. LW Lim, J Prickaerts, G Huguet, E Kadar, H Hartung, T Sharp, Y Temel. (2015) Electrical stimulation alleviates depressive-like behaviors of rats: Investigation of brain targets and potential mechanisms. *Transl. Psychiatry*. 5:e535.
3. S Hescham, LW Lim, A Jahanshahi, A Blokland, Y Temel. (2013) Deep brain stimulation in dementia related-disorders? *Neurosci Biobehav Rev.* 37:2666–2675.
4. S Hesham, LW Lim, A Jahanshahi, HWM Steinbusch, A Blokland, Y Temel. (2013) Deep brain stimulation of the forniceal area enhances memory functions in experimental dementia: The role of stimulation parameters. *Brain Stimul.* 6(1):72-7.