

# DSV Seminars

# 2017



UNIVERSITÀ  
DEGLI STUDI DI TRIESTE

DIPARTIMENTO DI  
SCIENZE DELLA VITA

## ***PhD Program in Neural and Cognitive Sciences***

**03 OCTOBER 2017 - 11:15 h**

Emiciclo, Q Building – Via L. Giorgieri, 5

### **Prof. Michele GIUGLIANO**

Department of Biomedical Sciences  
University of Antwerp (Belgium)

*Invited by BRAIN Centre for Neuroscience*

### **“Wide-Field Photostimulation in *in Vitro* Cortical Networks: Consequences for the Emerging Reverberating Responses”**

Cell assemblies manipulation by Optogenetics is pivotal to advance Neuroscience and Neuroengineering. *In vivo*, photostimulation often broadly addresses large population of cells, leading to both “*direct*” and “*reverberating*” spiking collective responses. The latter are consequence of feedback connections and reflect complex dynamical properties, worth an in depth understanding. I will discuss the electrophysiological consequences of wide-field photostimuli delivered in large cortical networks *in vitro*, restricting opsins expression to principal cells. Brief light pulses were then found to evoke robust reverberating responses, oscillating in the physiological gamma frequency range, as *in vivo*. Surprisingly, this rhythm could be also manipulated varying the pulse duration, not intensity. By pharmacology, mathematical modelling, and intracellular recordings, we concluded that gamma oscillations likely emerge as *in vivo* from the excitatory-inhibitory interplay and that, unexpectedly, the light stimuli transiently facilitate excitatory synaptic transmission.

*Pulizzi et al. (2016) Scientific reports 6:24701, doi:10.1038/srep24701*

