DANDRITE
Danish Research Institute of Translational Neuroscience
Nordic EMBL Partnership for Molecular Medicine

AARHUS UNIVERSITY

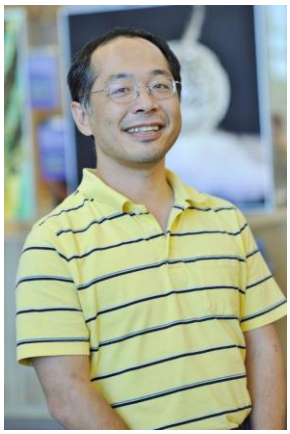
Virtual DANDRITE Lecture

Wednesday 18 May 2022

15.00 – 16.00 (CET)

Online via Zoom

Please find Zoom link via the Outlook calendar invitation. If you have not received this, please write an e-mail to Astrid Munk, asmu@dandrite.au.dk



Ryohei Yasuda

Dr. and Scientific Director of the Max Planck Florida Institute

Neuronal signal transduction in synaptic plasticity

Activity-dependent changes in synaptic strength and structure are believed to be the cellular basis of learning and memory. A cascade of biochemical reactions in dendritic spines, tiny postsynaptic compartments emanating from the dendritic surface, underlies diverse forms of synaptic plasticity. The reaction in dendritic spines is mediated via signaling networks consisting of hundreds of species of proteins. Aiming to elucidate the operation principles of such signaling networks, we have developed several new techniques to measure the spatiotemporal properties of the signaling components. First, based on o2-photon fluorescence lifetime imaging and highly sensitive biosensors, we have developed methods to image signaling activity in single dendritic spines. Second, based on CRISPR/Cas9-mediated gene-editing, we have developed a technique to fuse fluorescent tags to endogenous proteins in single cells in vivo. Third, we have established a molecular tool to manipulate protein activity with light. These new tools have allowed us to probe detailed mechanisms linking signaling activity in dendritic spines with synaptic, circuit, and behavioral plasticity.