

SEMINAR ANNOUNCEMENT

We would like to invite you to attend this seminar hosted by A/Prof. Philipp Kaldi:

Date: 5 September 2014, Friday

Time: 11:00AM – 12:00PM

Venue: Level 3, IMCB Seminar Room 3-46, Proteos, Biopolis

Speaker: Dr. Matteo Barberis, Assistant Professor, University of Amsterdam, Swammerdam Institute for Life Sciences, The Netherlands

Title: At the *right time*, at the *right place*: a Systems Biology approach unravels molecular mechanisms coordinating cell cycle dynamics

The cell cycle is a network of interacting molecules that organize topology and timing of DNA replication and cell division. Cyclin-dependent kinases (Cdks) mediate a faithful timing of these events by binding to pools of cyclins in waves of expression. This coordination is such that waves of cyclin/Cdk activity occur sequentially throughout cell cycle progression. However, how the *precise* timing of cyclin waves is managed, is not understood. In this talk I will present our latest, mostly unpublished findings addressing the molecular basis of mitotic (Clb) cyclin oscillations in budding yeast, with the focus on regulatory motifs that may generate timely waves. By integrating computational modelling with detailed experimental investigations, a transcriptional regulation synchronizing Clb waves is unravelled, with a feed-forward mediated by a cyclin/Cdk inhibitor (Cki) acting as a timer of their oscillations. Ckis modulate timely DNA replication dynamics, which failure leads to alteration of centrosome number and cellular ploidy. Here I will also present the strategy of our systems biology consortium to address how spatiotemporal regulation of Ckis may temporally coordinate DNA replication initiation. Summarizing, a multidisciplinary approach integrating experimental analyses into appropriate computational frameworks can provide a powerful tool to pinpoint regulatory modules to fine tune the *precise* cell cycle timing, highlighting design principles in cell division.

Biography:

Matteo Barberis is assistant professor of Synthetic Systems Biology at the University of Amsterdam and adjunct researcher at the Systems Biology Institute in Tokyo since 2013. He received his PhD in Industrial Biotechnology from the University of Milano-Bicocca in 2006. After postdocs at the Max Planck Institute for Molecular Genetics and the Humboldt University in Berlin, he joined the Swammerdam Institute for Life Sciences, a multidisciplinary research institute with a systems biology approach to the life sciences. His research integrates experimental and computational approaches for understanding molecular switches driving temporal cell cycle dynamics. His interest expands to identify design principles underlying cellular organization through multi-scale modeling, with a particular emphasis on the interface between cell cycle and cell physiology. He is coordinator of the International Society of Systems Biology, associate editor of *Frontiers in Systems Biology* and member of international review boards for systems biology and systems medicine grant applications.

ALL ARE WELCOME (No registration required)