



University of Cyprus  
Department of Biological  
Sciences

# *Postgraduate Seminars*

*Seminar Series 2020 - 2021*

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### **“Like mother like daughter: maintenance and inheritance of transcriptional memory”**

**Wednesday, 30 September 2020, at 17:00**

**This seminar will be hosted via Zoom.**

**Click [here](#) to find the seminar registration link and join our seminar.**

***This seminar is open to the public***

Certain genes can remember previous transcriptional states and upon re-exposure to the same stimulus adjust their second response, a phenomenon referred to as transcriptional memory. Accordingly, transcriptional memory of gene expression enables adaptation to repeated signals in a broad range of organisms. However, the regulation and heritability of transcriptional memory through cell divisions remains poorly understood. We have put together a diverse group of researchers to address this question and we specifically combined microfluidics with single-cell live-imaging to monitor *Saccharomyces cerevisiae* galactokinase 1 (GAL1) expression over multiple generations. By applying pedigree-analysis we dissected and quantified maintenance and inheritance of transcriptional memory in individual cells through multiple divisions. We then systematically screened the yeast deletion collection for loss- and gain-of-memory knockouts to identify memory regulators and found novel loss-of-memory mutants that strikingly affect memory inheritance into progeny. Importantly, we also unveiled that mutants of the Elongator complex lead to a newly identified gain-of-memory phenotype which is mediated through decreased nucleosome occupancy at the GAL1 promoter. This work uncovers principles of maintenance and inheritance of gene expression states and sets a cornerstone for future investigations on the inheritance of phenotypes within lineages of cells.