



# Genetics, Bioinformatics, & Systems Biology Colloquium

*presents*

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UC San Diego



 **THURSDAY**  
**OCT 12TH**

 **12PM**

 **LEICHTAG AUDITORIUM**

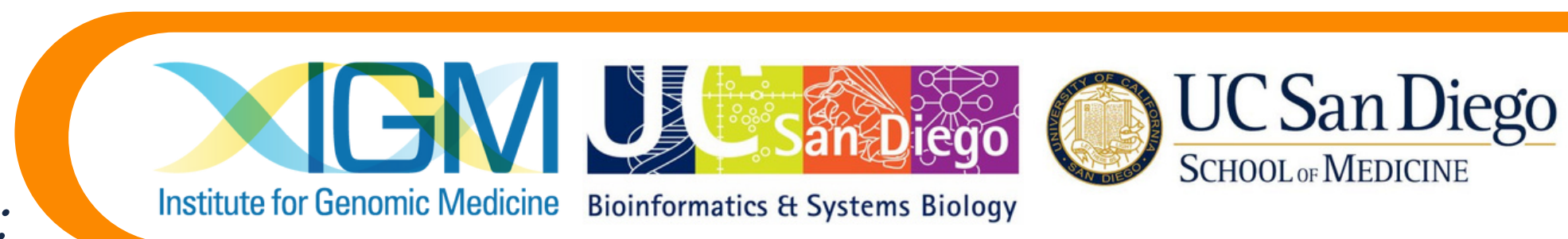
 **ZOOM**



## ENGINEERING LONGEVITY – COMPUTATIONALLY-GUIDED REPROGRAMMING OF CELL AGING

In this talk, I will present our recent work that combined high-throughput dynamic measurement technologies with math-based theoretical frameworks to interrogate how intracellular molecular networks govern aging processes. Specifically, we investigated single-cell aging dynamics throughout the replicative lifespans of *S. cerevisiae*, and found that isogenic cells diverge towards two aging paths, with distinct phenotypic changes and death forms (Jin et al., 2019; Li et al., 2020). We developed a nonlinear dynamic model of the underlying molecular network of aging, which quantitatively simulated divergent aging trajectories and guided the engineering of a synthetic gene oscillator to substantially extend the lifespan (Zhou et al., 2023). Our results establish a causal connection between gene network architecture and cellular longevity and set the stage for the rational design of synthetic gene networks that can effectively slow aging in more complex organisms.

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