# Biology Seminar

12:30 - 1:30 pm
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BGS 0165

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## Selective coupling of circadian clocks across the brain as a model for behaviour regulation

Circadian rhythms are behavioural and physiological changes in response to daily changes in environment, like day/night or temperature cycles. The circadian clock underlies the regulation of circadian rhythms, and is composed of an activator complex responsible for expression of ~15% of the transcriptome, including two genes that encode components of the repressor complex. This transcriptional negative feedback loop therefore oscillates with an ~24-hour period. Using *Drosophila melanogaster*, we determined that mutations in circadian genes that disrupt behaviour are non-functional in some neurons, but remain functional in others. As such, these mutations lead to differences in period and phase of clock transcription oscillations, uncoupling transcription programs in different regions of the brain. The central hypothesis of our lab is that behavioural disorders are caused not by mutations in behaviour genes *per se,* but rather the relative changes in transcription regulation that lead to transcriptional uncoupling between brain regions. Here, we will present the latest data in how circadian clocks are selectively coupled in the *Drosophila* brain, how external pressures such as stress may influence transcriptional coupling, and propose a working model that describes how behavioural disorders emerge.