



Applied and Computational Mathematics Seminar

Title: Can maths explain your love of music?

Speaker: Aine Byrne (University College Dublin)

Date: Mon 10th February 2020 at 1:00PM

Location: Seminar Room SCN 1.25

Abstract: When listening to music, we typically lock onto and move to a beat. There are many studies on beat perception and generation, yet the neural mechanisms remain poorly understood. Beat perception presents a special case of timing processing, relying on fast perception and learning of repetitive time intervals from 100 to 2000 ms. In this talk I'll present a simple neural circuit model that can adapt its behaviour to synchronise to an external rhythm and postulate that this beat generator (BG) circuit can be used to understand how humans synchronise to periodic stimuli, as in music. Analysis of the model demonstrates that accurate rhythmic time keeping can be achieved over a range of frequencies relevant to music, in a manner that is robust to changes in parameters and to the presence of noise. Additionally, the model makes generalisable predictions about the existence of asymmetries in the synchronisation process. For example, if the stimulus frequency changes (music speeds up/slow down), it is easier to resynchronise to the new frequency if it is faster than the original frequency.

<https://maths.ucd.ie/ACMSeminars/1920/byrne.html>