Growing up in a changing world: insights from insects into the mechanisms through which environmental conditions modify development to affect rates of organ growth and patterning.

By Christen Mirth

Lecturer, School of Biological Sciences, Monash University, Australia

Changes in environmental conditions affect a wide range of developmental processes generating an impressive array of phenotypic variation. For example, in developing animals changing the nutritional environment generates variation in body and organ size without compromising organ function. While developmental processes like organ growth are generally thought to be sensitive to environmental conditions, others processes like patterning - the process that generates distinct cell identities - remain robust to environmental change. This is particularly surprising given that the same hormones that regulate organ growth also regulate their pattern. We are interested in the mechanisms that allow organs to show plasticity in growth while maintaining robust patterning. To do this, we use the fruit fly, Drosophila melanogaster, as a genetic system to uncover how environmental cues regulate larval physiology to control the growth and patterning of the developing wing. This work provides a framework for understanding how hormones coordinate animal development in the face of changing environmental conditions.

About the speaker
I was awarded my PhD in 2002 from University of Cambridge (UK) and conducted my post-doctoral training at the University of Washington, USA (2003-2008), and Janelia Research Campus, USA (2008-2010). In 2010, I took up an appointment as a Group Leader at the Instituto Gulbenkian de Ciência (Portugal). In November 2015, I was recruited to the School of Biological Sciences at Monash University and in 2017, was awarded an ARC Future Fellowship. Work in my lab aims to uncover the molecular mechanisms through which diet and nutrition modify animal development to affect traits, like body size and shape, and how evolution acts on these mechanisms to generate phenotypic diversity.