

# THE MS2DISCOVERY INTERDISCIPLINARY RESEARCH INSTITUTE

WATERLOO | CANADA

## “Honeybees, Varroa destructor, the Acute Bee Paralysis Virus, Neonics: A Differential Equations Perspective”

**Hermann Eberl** | University of Guelph

The Western honeybee (*Apis mellifera*) is in trouble: For years, beekeepers in North America and Europe have reported drastic numbers of incidents of colony failure. In Canada and other regions with colder climates these manifest themselves primarily as overwintering losses. The exact reasons are not understood yet, but several potential culprits have been suggested. The consensus seems to be emerging that colony failure is mostly a multi-factorial phenomenon whereby the effects of several stressors, each of which might be tolerable, amplify each other when they interact. To explore this, we develop a mathematical model for honeybee colonies infested with the ectoparasitic mite *Varroa destructor*, which is a vector for several known viral honeybee diseases. Among those, we focus on the Acute Bee Paralysis Virus (ABPV) that has been frequently implicated in Colony Collapse Disorder. We also include exposure of foraging honeybees to neonicotinoids in the field. This results in a system of 4-5 ordinary differential equations with periodic coefficients which we study with a blend of analytical and numerical techniques. This is joint work with Vardayani Ratti (Dartmouth College) and Peter G Kevan FRSC (School of Environmental Science, U Guelph).



Hermann Eberl is a Professor in the Department of Mathematics and Statistics at the University of Guelph, and the Director of the Biophysics Interdepartmental Graduate Program. His primary research area is the application of differential equations and scientific computing methods in microbiology and bioengineering, in particular biofilms. Mathematical apiculture has become a second strand in his research program in recent years.

Contact at the MS2Discovery Research Institute: Manuele Santoprete (Host of the speaker, Multidisciplinary Talk, Tecton 2)

Refreshments will be provided

**December 5, 2018**

4pm | Location: LH2066 (Lazardis Hall)

The MS2Discovery Seminar Series: [www.ms2discovery.wlu.ca/seminar](http://www.ms2discovery.wlu.ca/seminar)  
Wilfrid Laurier University, 75 University Avenue West, Waterloo

This event is hosted by the MS2Discovery Interdisciplinary Research Institute  
<http://www.ms2discovery.wlu.ca> | Waterloo

