# Computational and Applied Mathematics Seminar

## Speaker

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**Thursday, May 17, 2018**
**2pm, HH-3017**

## Finding signals in the noise: post-processing highly oscillatory solutions to convection-diffusion problems.

### Abstract:

Convection diffusion problems are notoriously difficult to solve numerically. Standard finite element and finite difference methods typically yield numerical approximations that appear quantitatively and qualitatively useless: they oscillate wildly, and are extremely inaccurate. A common strategy for dealing with this is to propose specialised methods for computing solutions. An alternative approach is to "post-process" an oscillatory solution in an attempt to to recover some useful approximation. This is much like methods in signal processing are applied to recover information from noisy data.

In this talk we consider a post-processing algorithms devised by Song, Yin and Zhang (Int. J. Numer. Anal. Model, 2007). They realised that an oscillatory FEM solution must yield a good approximation at some points, much like the infamous "stopped clock". The trick is to identify these points. The core part of this talk will be the presentation of a simple, intuitive and more general version of the analysis of Song et al.