

*Department of Mathematics*  
*University of Notre Dame*

**TOPOLOGY SEMINAR**

**Guest Speaker: Jens Kjaer**  
**University of Notre Dame**

**Date:** Tuesday, September 11, 2018

**Time:** 2:30 PM

**Location:** 258 Hurley Hall



**Lecture Title:**

**Unstable  $\nu_1$ -periodic Homotopy Groups through Goodwillie Calculus**

**Abstract**

It is a classical result that the rational homotopy groups,  $\pi_*(X) \otimes \mathbb{Q}$ , as a Lie-algebra can be computed in terms of indecomposable elements of the rational cochains on  $X$ .

The closest we can get to a similar statement for general homotopy groups is the Goodwillie spectral sequence, which computes the homotopy group of a space from its "spectral Lie algebra". Unfortunately both input and differentials are hard to get at.

We therefore simplify the homotopy groups by taking the unstable  $\nu_h$ -periodic homotopy groups,  $\nu_h^{-1}\pi_*( )$  (note  $h = 0$  recovers rational homotopy groups). For  $h = 1$  we are able to compute the  $K$ -theory based  $\nu_1$ -periodic Goodwillie spectral sequence in terms of derived indecomposables. This allows us to compute  $\nu_1^{-1}\pi_*SU(d)$  in a very different way from the original computation by Davis.

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