



**BIOINFORMATICS 2015 FALL SEMINAR SERIES**

Hosted by: Department of Computer and Information Sciences,  
Department of Electrical and Computer Engineering &  
Center for Bioinformatics and Computational Biology  
<http://bioinformatics.udel.edu/Seminars/Current>

**MONDAY, October 12, 2015**  
**3:30pm**  
**DBI Room 102**

# **Stochasticity and the Mechanism of Precision in the Vertebrate Segmentation Clock**

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**ABSTRACT:** Oscillations are prevalent in biological systems. The vertebrate segmentation clock governs the rhythmic segmental patterning of the vertebral column during embryonic development. The period of the segmentation clock dictates the number and sizes of vertebrae. Stochastic gene expression imposes a great challenge to precise embryonic development. To investigate this issue, we counted single RNA transcripts and determined, for the first time, the amplitude and variability of clock gene expression in an intact tissue. In contrast to previously published computational models, our results unraveled low amplitudes and high variability in oscillatory gene expression, and suggested the presence of sharp transcriptional bursts. We further showed that the magnitude of transcriptional bursts is reduced when Notch cell-to-cell signaling is disrupted.