

# OSTC COLLOQUIUM SEMINAR

*“Ultrafast Optical Signal Processing using Space-time Duality”*

**James Van Howe**



**Associate Professor  
Department of Physics and Astronomy,  
Augustana College**

**Tuesday, March 29, 2016 1:30 p.m.  
Iowa Advanced Technology Center (IATL)  
Conference Room, 104**

**Abstract:**

Space-time duality in ultrafast optics refers to the analogy between narrowband dispersion and paraxial diffraction. Essentially one can transfer the mathematical machinery and experimental knowledge of diffractive optical systems and components such as lenses, prisms, gratings, and holograms to develop temporal counterparts: time-lenses, time-prisms, temporal-gratings, and time-holograms. Recently, these temporal analogs of spatial optical systems have been extremely useful for designing photonic devices such as delay lines, pulse-compressors, analog-to-digital converters, repetition rate multipliers and dividers, signal regenerators, noise-suppressors, amplifiers, and even temporal cloaks. In this presentation I will review my own work using time-lenses, time-prisms, and the temporal Talbot effect for developing photonic instrumentation as well as review other current trends in optical signal processing using space-time duality.