

# PHOTONICS CENTER DISTINGUISHED SEMINAR SERIES

Dr. Scott Diddams, National Institute of Standards and Technology (NIST)

## *Optical Frequency Combs: From Lab-scale to Chip-scale*

September 7, 2017

10-11 a.m.

Room 901

Photonics Center

8 Saint Mary's Street

Refreshments will be served!

In the past decade, we have witnessed significant advances associated with the frequency stabilization of the comb present in the output of a mode-locked femtosecond laser. While proving itself to be fantastically successful in its role as the “gears” of optical atomic clocks, the optical frequency comb has further evolved into a valuable tool for a wide range of applications, including ultraviolet and infrared spectroscopy, frequency synthesis, optical and microwave waveform generation, astronomical spectrograph calibration, and attosecond pulse generation, to name a few. In this talk, Dr. Diddams will trace his progress on a few of these applications, and highlight the frequency comb advances that have made them possible. In addition, he will attempt to offer a perspective on the challenges and opportunities for frequency combs that might lie ahead. Along these lines, he will describe a new class of parametric frequency combs that are based on monolithic microresonators. Such microcomb devices are compatible with semiconductor processing and can be further integrated with other photonic and electronic components on a silicon chip. In the future, this technology will bring the precision, flexibility, and measurement power of frequency combs to a wide range of new and emerging applications beyond the confines of the metrology laboratory.

Scott Diddams is a Fellow of the National Institute of Standards and Technology (NIST), where he carries out experimental research in the fields of precision spectroscopy and metrology, nonlinear optics, microwave photonics and ultrafast lasers. He received a Ph.D. from the University of New Mexico in 1996. From 1996 through 2000, he completed his postdoctoral work at JILA, NIST and the University of Colorado. Since 2000, Diddams has been a research physicist at NIST and is the leader of the Optical Frequency Measurements group. He is a Fellow of the Optical Society of America and the American Physical Society, as well as a Professor Adjoint at the University of Colorado.



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