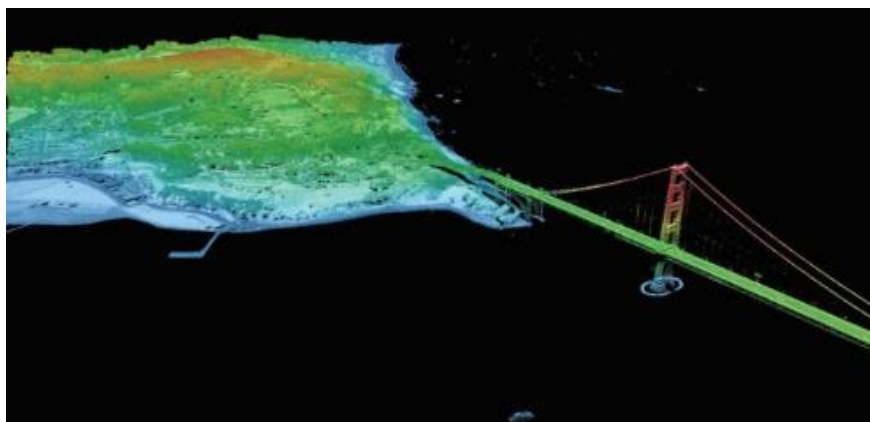


## *Graduate Math and Physics Seminar*

Deep learning in LiDAR and how mathematical ideas can help us  
in machine learning

**Francis Patricia Medina, Ph.D.**  
*Worcester Polytechnic Institute*

**Abstract:** We present a machine learning framework for the classification of LiDAR 3D point clouds (data collected using an optical remote sensing technique that uses laser light to densely sample the surface of the earth). The goal is to be able to distinguish elementary classes such as water, man-made structures, and vegetation. We'll start by talking about the Kolmogorov's representation theorem (1957) to motivate the definition of neural networks. Dimension reduction (in particular, PCA and auto-encoders), intrinsic dimension estimation, and the product coefficients from the product formula representation of measures of dyadic sets will also be discussed. The general purpose of this talk is to show how the aforementioned mathematical ideas improve (or have the potential to improve) any machine learning model through various examples involving LiDAR data.



*When:* Tuesday, March 5, 2019, 6:00 – 6:50 pm

*Where:* CSUCI, Bell Tower 1688

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