

*Department of Mathematics,  
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# Math 295 - Mathematics Colloquium

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## Graph-based semi-supervised learning

**Abstract:**

Semi-supervised classification refers to learning a function that assigns classes to input data using two sets of observations, one where the input and the associated class is recorded and another where only the inputs are observed. This is a very canonical problem in machine learning with strong links to different approaches in Statistics and Mathematics, e.g. probit regression, spectral clustering or the Ginzburg-Landau classifier. In several applications quantifying the uncertainty associated with classification is as important as the classification itself. In semi-supervised learning uncertainty quantification can be used to improve classification by active-learning, which amounts to manually classifying the subjects for which classification is most uncertain, and then relearning the classification function; this is also known as human-in-the-loop. In the talk I present a recent framework that connects the different approaches to classification and comes automatically with uncertainty quantification. It is based on Gaussian process classification where the covariance operator of the Gaussian process is constructed using information from the graph Laplacian. The plan of the talk is to provide an accessible overview of the key ideas in this paradigm.

Host: Dimitris Politis

**Thursday, February 28, 2019**

**1:00 PM**

**AP&M 6402**

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