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# STATISTICS SEMINAR

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UW-Department of Statistics

[www.stat.wisc.edu](http://www.stat.wisc.edu)



**Abstract:** The brain has about  $10^{14}$  synapses and we only live for about  $10^9$  seconds. Even just considering binary synapses, a learning algorithm would still require  $10^5$  bits of information per second to learn all the connections in the brain. This motivates the idea that humans must do a lot of unsupervised learning since the perceptual input (including proprioception) is the only place we can get  $10^5$  dimensions of constraint per second.» Geoffrey Hinton.

In this lecture we'll explore three common network architectures (denoising & variational autoencoders and generative adversarial nets) that learn to capture the structure and properties of high dimensional data without supervision, which is usually very expensive to get. Using them as generative models, we can compare interpolation in the latent and input spaces, paying attention to when we end up outside the data manifold. Finally, we'll see what the research directions are in order to get better and more robust models.

## TITLE:

**Unsupervised Deep Learning:  
Autoencoders and Generative Adversarial Nets**

## Speaker:

**Alfredo Canziani**  
Post-Doctoral Deep Learning Research Scientist at NYU

## Time & Place:

Wednesday,  
September 11, 2019  
**4:00 pm**, Room 140 Bardeen

Cookies & Coffee @  
**3:30**, Rm 1210 MSC

