



ΕΘΝΙΚΟ ΜΕΤΣΟΒΙΟ ΠΟΛΥΤΕΧΝΕΙΟ  
ΣΧΟΛΗ ΗΛΕΚΤΡΟΛΟΓΩΝ ΜΗΧΑΝΙΚΩΝ ΚΑΙ ΜΗΧΑΝΙΚΩΝ ΥΠΟΛΟΓΙΣΤΩΝ  
ΤΟΜΕΑΣ ΣΗΜΑΤΩΝ, ΕΛΕΓΧΟΥ ΚΑΙ ΡΟΜΠΟΤΙΚΗΣ

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Ο Τομέας Σημάτων, Ελέγχου και Ρομποτικής  
Της Σχολής Ηλεκτρολόγων Μηχανικών και Μηχανικών Υπολογιστών του ΕΜΠ  
σας προσκαλεί να παρευρεθείτε στην διάλεξη\* του

***Prof. Richard G. Baraniuk***

*Dept. of Electrical and Computer Engineering, Rice University, USA*

με θέμα:

**"A Probabilistic Theory of Deep Learning"**

Η διάλεξη θα γίνει την **Πέμπτη, 23 Νοεμβρίου 2017, ώρα 11:30**

Στο **Αμφιθέατρο Πολυμέσων (Κεντρική Βιβλιοθήκη Ε.Μ.Π.)**

### **Abstract**

A grand challenge in machine learning is the development of computational algorithms that match or outperform humans in perceptual inference tasks that are complicated by nuisance variation. For instance, visual object recognition involves the unknown object position, orientation, and scale in object recognition while speech recognition involves the unknown voice pronunciation, pitch, and speed. Recently, a new breed of deep learning algorithms have emerged for high-nuisance inference tasks that routinely yield pattern recognition systems with near- or super-human capabilities. However, a coherent framework for understanding, analyzing, and synthesizing deep learning architectures has remained elusive. We make some progress in this direction by developing a new probabilistic framework for deep learning based on the Deep Rendering Model (DRM): a generative probabilistic model that explicitly captures latent nuisance variation. By relaxing the DRM's generative model to a discriminative one, we recover the inference computations in not only deep convolutional neural networks but also random decision forests, providing insights into their successes and shortcomings, a principled route to their improvement, and new avenues for exploration. (2016 NIPS paper: <https://goo.gl/kNcXG1>)

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## **Βιογραφικό Σημείωμα :**

Richard G. Baraniuk is the Victor E. Cameron Professor of Electrical and Computer Engineering at Rice University. His research interests lie in new theory, algorithms, and hardware for sensing, signal processing, and machine learning. He is a Fellow of the American Academy of Arts and Sciences, US National Academy of Inventors, American Association for the Advancement of Science, and IEEE. He has received the US DOD Vannevar Bush Faculty Fellow Award (National Security Science and Engineering Faculty Fellow), the IEEE Signal Processing Society Technical Achievement Award, and the IEEE James H. Mulligan, Jr. Education Medal.