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Baton Rouge, Louisiana 70803-4001

WEEKLY CALENDAR

April 8-12, 2013

DEPARTMENTAL COLLOQUIUM

"Bringing Nuclei into Focus: Applying Neural Networks to Distorted Tracking Data Images"

3:30 PM April 11, 2013
109 Nicholson Hall

Meredith Howard

Rutgers University and Oak Ridge National Laboratory

Host: Jeffrey Clayton

• Refreshments served at 3:10 PM in 232 (Library) Nicholson Hall •

Neural networks have applications in just about every field, from identifying handwritten alphanumeric characters to discriminating signal over background in particle physics experiments. Digging through the literature to find useful information on neural networks is a dizzying venture, both for the breadth of potential applications and for the general excitement level surrounding this charming mathematical tool. Fortunately, despite the fact that neural networks are not fully understood by the average physicist, neural network codes are readily available in standard physics analysis packages such as ROOT and PAW, and are relatively easy to use.

Micro-channel plate detectors (MCP) are commonly used to determine the positions of atomic nuclei in beams. This is done by combining the signals from the four corners of the MCP to reconstruct the particle position in a two-dimensional plane. In a recent experiment, electronics for one of the corner signals failed for several hours. Recovering 2D position sub-mm resolution while missing one corner is a non-trivial problem, but is easily solved with neural networks. Discussion will cover the limitations and advantages of neural networks, a detailed comparison of using neural networks versus other methods, and a beginner's guide for applying neural networks to other problems.

NSF PetaApps Workshop

"Taming the scale explosion in ab initio nuclear theory"

7-9 April 2013, Room 353

Hosts: Jerry Draayer/Tomas Dytrych/Kristina Launey

The workshop will discuss challenges to nuclear physics and computer science, with the goal to reliably predict -- by harnessing the computational power of NSF's leadership-class computer facilities -- the structure of exotic nuclei needed for astrophysical, medical, and energy applications.

PUBLICATIONS:

1. "Two oscillators in a common heat bath," **R. F. O'Connell**, Phys. Scr. T151 (2012) 014045 (2pp).
2. "Quantum carpets: a tool to observe decoherence," P. Kazemi, S. Chaturvedi, I. Marzoli, **R. F. O'Connell**, and W. P. Schleich, New Journal of Physics 15 (2013) 013052.