

# UNIVERSITY OF TEXAS AT DALLAS - DEPARTMENT OF PHYSICS

## PHYSICS COLLOQUIUM

<http://www.utdallas.edu/physics/lectures/info/>

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Wednesday, March 14, 2007; 4:00-5:00 PM  
Kusch Auditorium, FN 2.102

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### MOVING THINGS BY THOUGHT: NANOTOOLS FOR EFFICIENT NEUROINTERFACING

**Professor Mario I. Romero-Ortega**

*UT Southwestern Medical Center and Texas Scottish Rite Hospital for Children*

In recent years, the discipline of brain-machine interfacing has demonstrated that robotic prosthetic hands can be controlled by thought, and that future versions will be able to provide sensory feed-back to the amputee. Current neural interfaces rely on conventional electrode technology involving the implantation of relative invasive wired electrodes, complex electronics and power storage devices. Conversely, the emerging discipline of nanotechnology has developed the tools to fabricate, characterize or manipulate novel nanomaterials with almost atomic precision. Carbon nanotubes in particular are positioned to enable the fabrication of potent neuronal interfaces as they bear extremely high thermal and electrical conductivity, precise tunable optical emissions and superior mechanical stiffness. Such unique characteristics also make nanocarbon an optimal tool for a plethora of biomedical applications including the fabrication of potent neuronal interfaces. I will elaborate on the use of carbon nanotube sheets and yarns as viable substrates for neural growth and their potential contribution to revolutionize the way we will move things by thought.

**About the speaker:** Dr. Mario Romero-Ortega is the Director of the Division of Regenerative Neurobiology at the Seay Research Center at Texas Scottish Rite Hospital for Children, and Assistant Professor of Plastic Surgery, Neurology, and Biomedical Engineering at the University of Texas Southwestern Medical Center, in Dallas. He received his doctorate degree in Neuroscience in 1997 at Tulane University in New Orleans, LA. His recent research has helped define the molecular mechanisms that guide development of nerve circuits in the spinal cord, shedding light into the possible genetic cause of a rare human condition known as congenital mirror movement disorder. His research also focused on methods to direct nerve regeneration in the peripheral nervous system, as well as in the spinal cord. He is currently working towards the developing a fully functional bi-directional, sensory/motor peripheral neuro-electrical interfaces to control robotic prosthesis. Dr. Romero is past associate member of the Christopher Reeve Paralysis Foundation Research Consortium on Spinal Cord Injury, and is member of the International Association of Nanotechnology, the Tissue Engineering Society International, and the Society for Neuroscience.