

**UNIVERSITY OF TEXAS AT DALLAS - DEPARTMENT OF PHYSICS**  
**PHYSICS COLLOQUIUM**

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

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Wednesday, October 4, 2006; 4:00-5:00 PM  
Kusch Auditorium, FN 2.102

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**Nanocomposite formation for coatings, flexible  
photovoltaics cells and field emission devices**

**Professor Seamus Curran**

*Physics Department, New Mexico State University*

The research initiated at New Mexico State University has focused on developing nanocomposites to build more interesting and novel devices. This has been achieved by combining a wide variety of polymer hosts both conjugated and nonconjugated and then adding different nanofiller materials. The fillers have included nanotubes, fullerenes, quantum dots and organic based dye molecules. This has been done in a controlled manner by using the latest techniques in near field optical microscopy, proximal probe methodologies and understanding the vibrations changes that occur in the formation of these nanocomposites. The results have been the development of nanocomposites with conductivities of 35 s/m at loadings of 0.9 wt% (from multi-walled nanotubes), photovoltaic cells with efficiencies ( $\eta$ ) beyond 5%, and new flexible field emission devices with enhancement factor ( $\beta$ ) of 19,100 at a turn on voltage of below  $1V/\mu\text{m}^2$ .

**About the speaker:** Dr Curran received his Ph.D. in 1995 from Trinity College in Dublin, Ireland. He was awarded several European fellowships and spent two years at Rensselaer's Nanotechnology Center before joining NMSU. Dr Curran's received "New Mexico All Star in Micro and Nanotechnology" award and his results were featured in NSF's "best of the best" research nuggets for 2005-2006. Dr Curran's research interests include spectroscopy and fabrication of nanomaterials and devices on their basis.