

EE 298-12
Solid State Technology and Devices Seminar

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Functional Nanofibers for Wearable Electronics and Solar Cells

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Abstract

Natural systems, like muscular and nervous systems, are comprised of three-dimensional, complex assemblies of various functional fibers. This talk presents applications of nature-inspired synthetic nanofibers in wearable electronics, solar cells and sensors. The continuous, low cost deposition of electrospun nanofibers with a variety of compositional and morphological properties allows high level of scalability for roll-to-roll manufacturing on a variety of substrates. Highly conductive and transparent meshes of conductive nanofibers are presented as candidates for replacement of rigid and brittle indium tin oxide (ITO) and fabrication of solar cells and displays on flexible plastic and fabric substrates. Highly sensitive nanofiber based deformation sensors are presented with gauge factors in excess of 50 for design and implementation of wearable health monitoring systems and tactile systems. The nanofibrous sensing textiles are used for monitoring of musculoskeletal movements, pulse and breathing patterns, and neurological disorder such as Parkinson's tremors.

Bio

Peyman Servati was born in Tehran, Iran, in 1976, and received his PhD in flexible transistors and electronics from the University of Waterloo, Canada in 2004. He is an Associate Professor with the Department of Electrical and Computer Engineering of the University of British Columbia (UBC), Vancouver, Canada, where he leads Flexible Electronics and Energy Laboratory (FEEL). His research interests include electronic textile, flexible solar cells and batteries, nanofibers, and wearable electronics for health monitoring. He was a research associate at the University of Cambridge, UK (2005-2006), working on synthesis and printing of nanowires and nanotubes, and was involved in spin-off of Ignis Innovation Inc. (2004-2005), a leader in novel active matrix organic light-emitting diode (AMOLED) displays. He was the winner of 2005 Doctoral Prize from the Natural Sciences and Engineering Research Council (NSERC) of Canada, 2006 Canada-UK Millennium Research Award and Bronze Medal in the XXV International Physics Olympiad, China, 1994.