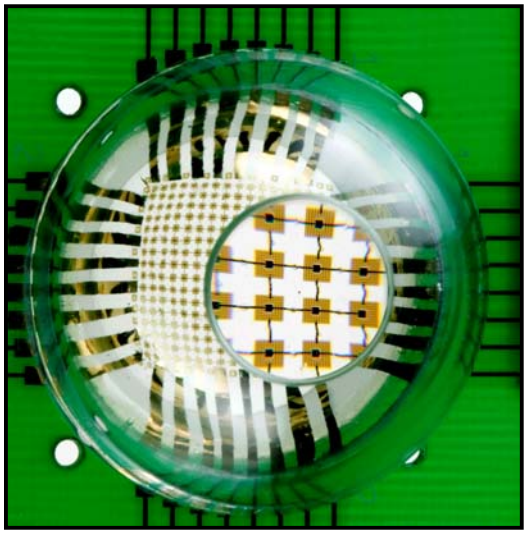
NANOHOUR

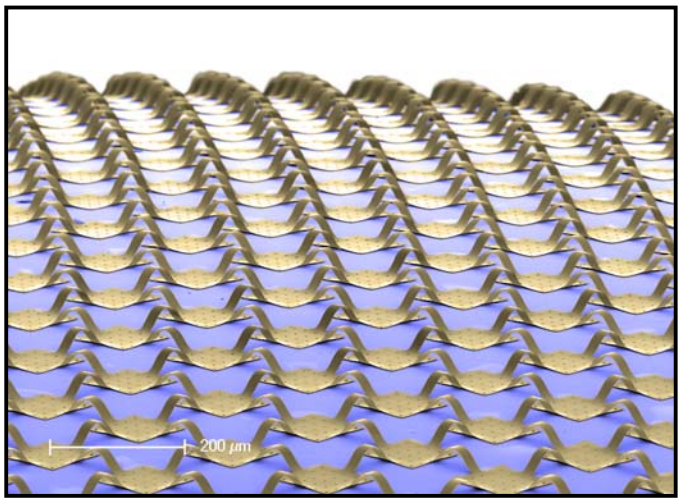
Wednesday, November 5, 2008
3:00 pm - Beckman Institute - Room 3269

A Hemispherical Electronic Eye Camera Based on Compressible Silicon Optoelectronics

Heung Cho Ko – Department of Materials Science and Engineering



Over the last several decades, tremendous advances in optoelectronic devices such as display devices and digital cameras have led to transformative impacts and enrichment of human life. In this presentation, I will discuss unusual strategies for creating and implementing monocrystalline silicon nanomaterials in flexible, compressible/stretchable, and curvilinear optoelectronic devices. As an example of the sort of system that can be achieved, I will present results on the first camera that exploits designs based on the human eye, to provide a wide angle field of view and low aberrations with simple imaging optics. The key element in this system is a hemispherical focal plane array that serves as an 'artificial retina'. This curved geometry is impossible to achieve using established, wafer-based optoelectronics technologies, due to the intrinsically planar nature of the patterning, deposition, etching, doping, and materials growth methods that exist for fabricating such systems. Our approach exploits silicon nanomaterials in stretchable configurations to accomplish an elastic geometry transformation from the planar layouts in which the devices are fabricated to the hemispherical ones needed for electronic eye cameras. I will summarize the basic materials science and mechanics of these approaches, as well as the performance and imaging characteristics of the resulting devices.



Coffee, tea and cookies will be served.

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