

**FALL 2014 CHEMISTRY COLLOQUIA CO-SPONSORED BY NCMN**



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**3:15 Reception  
3:30 Seminar  
112 Hamilton Hall**

**“Designer Gold Nanostars for Imaging  
and Therapeutics”**

Nanotechnology offers new strategies for minimally invasive and localized approaches to diagnose and treat cancer. Recently, nanoparticles have been explored in a range of applications, including drug delivery vehicles, imaging probes, and therapeutic agents. In particular, gold nanostar particles are advantageous as probes of biological and molecular interactions because they are anisotropic in shape, electron-dense, and facile carriers of bio-functional ligands. Therefore, such probes can provide snapshot information of particle-cell interactions via electron microscopy as well as real-time tracking of intracellular interactions by optical methods. This talk will describe how gold nanostars can be used as probes to resolve how oligonucleotide drugs interact with the cancer cell nucleus. Aptamer drugs grafted to the surface of gold nanostars can bind to a cell-surface marker and shuttling protein for transport near the nucleus and result in severe, local changes in nuclear phenotype. Interestingly, we found that changes in the shape of the nucleus could be correlated with biological activity of treated cancer cells. Prospects for this construct as a general approach to deliver drugs to a wide variety of carcinomas will be described. We will also discuss the effects that nanomaterial shape has on therapeutic and imaging applications.

