Abstract Submitted
for the OSS19 Meeting of
The American Physical Society

**Size, Shape and Aspect Ratio Effect on the LSPR Sensitivity of Hollow-Gold Nanoshells** MASOUD SHABANINEZHAD NAVROOD, GUDA RAMAKRISHNA, Western Michigan University — The changing refractive index of the surrounding medium of the plasmonic nanoparticles due to binding biomolecules is routinely used in localized surface plasmon resonance (LSPR) based biosensors. In this work, the influence of the shape, size, shell thickness and aspect ratio on the plasmon sensitivity, defined as change in LSPR peak wavelength per unit refractive index, of the hollow-gold nanoshells is studied using theoretical modeling. Different shapes of hollow Au nanoshells are studied that include: sphere, disk, triangular prism, rod, ellipsoid, and rectangular block. We used multi-layered Mie theory and discrete dipole approximation (DDA) to determine the LSPR peak position and LSPR sensitivity of the spherical and non-spherical nanoparticles, respectively. The rectangular block and rod-shaped Au nanoshells have shown maximum LSPR sensitivity when compared to other shaped Au nanoshells. In addition, increased sensitivity was observed for higher aspect ratio as well as for smaller shell thicknesses. The results are rationalized based on the inner and outer surface plasmonic coupling.

Masoud Shabaninezhad Navrood
Western Michigan University

Date submitted: 18 Mar 2019 Electronic form version 1.4