Invention Summary: In the past few decades, significant developments in the design of multifunctional nanomaterials-based systems have been made particularly for early cancer detection and targeted therapy. Current state of the art technologies in this field include quantum dots, magnetic nanoparticles and gold colloids. A new era of methodology is just on the horizon with the recently realized use of Raman in bio-applications with the versatility of the imaging technique.

Researchers at Rutgers have advanced a new class of biocompatible tags based on dimeric assemblies of spherical gold nanoparticles for specific tumor targeting and surface enhanced Raman scattering (SERS)-based detection. The synthetic modality allows controlled nanoparticle dimerization via a dithiolated SERS reporter. The creation of a narrow internanoparticle gap upon dimerization results in brighter signals, longer retained activity, and lower cytotoxicity compared to monomers. All these properties make these tags potential breakthrough candidates for tumor phenotype detection and support imaging approaches that are faster and less cytotoxic than the currently available ones.

Market Applications:
• Tumor targeting and SERS-based detection

Advantages:
• Brighter signals,
• Longer retained activity,
• Lower cytotoxicity


Research Focus: Dr. Fabris’ research focuses on the Synthesis and Characterization of Plasmonic nanoparticles and their use as tags for surface enhanced Raman scattering (SERS)-based cell detection and in those applications that require near field enhancement effects (e.g. plasmonic organic photovoltaics). Her lab also focuses on the study of nanoparticle Assembly in solution, both Experimentally and Computationally. Finally, they are interested in unraveling the fundamental phenomena at the basis of Ligand Exchange in plasmonic nanospheres and nanorods in solution.