Project Title: Laser Desorption Ionization on Porous Silicon
Investigator: Rudzinski, Walter
Department: Chemistry and Biochemistry

Project summary: Surfaces were prepared that feature an oligonucleotide **(**dT20) embedded within a matrix and attached to a gold substrate. After a few preliminary experiments, gold was deemed to be more suitable than porous silicon so the project evolved through the use of a gold substrate. Gel electrophoresis confirmed the binding of the oligonucleotide to gold nanoparticles, while surface plasmon resonance confirmed the attachment of the oligonucleotide complement**(**dA20). Microgravimetric measurements and cyclic voltammetry determined the surface coverage and surface activity respectively. Molecular modeling generated a molecular level image of the self-assembled monolayer. Finally, laser desorption ionization/mass spectrometry using a gold template and gold nanoparticles was used in order to induce ionization of the surface-confined species. The net result was an apparent fragmentation of the oligonucleotide with only fragments of the oligonucleotide attached to gold appearing in the mass spectrum. It appears that part of the role of the matrix in matrix-assisted laser desorption ionization/ mass spectrometry is too attenuate heating effects and prevent fragmentation.