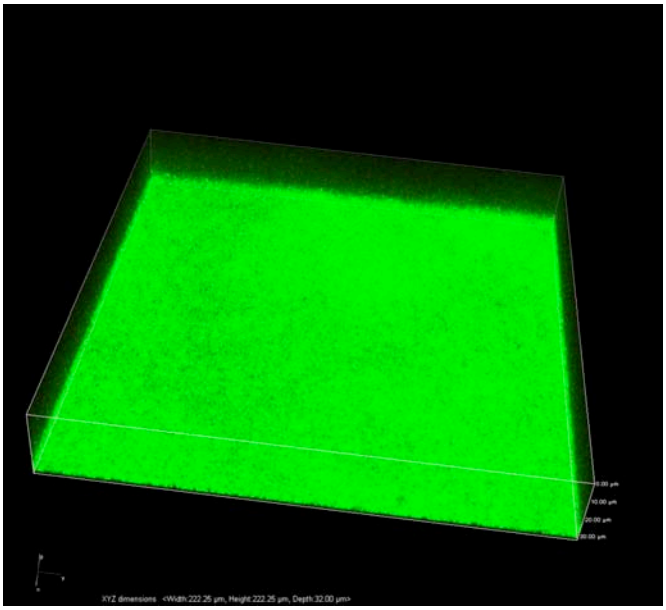
Nanoelectronics Undergraduate Research Fellowship (NURF)
2010 Project Summary

Student name: Chinedu Madukoma
Faculty mentor name: Dr. Marya Lieberman
Project title: **Guiding Bacterial Attachment with Magnetite Nanoparticles**

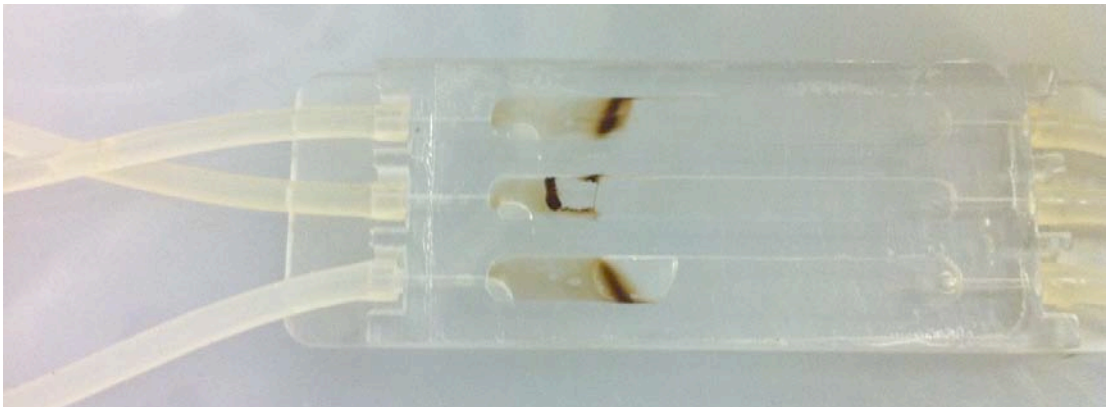
Please write two paragraphs summarizing your NURF research. In the first paragraph, describe the problem / problem area. In the second paragraph, describe your activities and results. Please include one or two research images, with caption(s).

My group was faced with the challenge of binding bacteria, *Pseudomonas Chlororaphis* and magnetite nano particles (Fe_3O_4) with the quest to monitor biofilm formation and control the direction, location of the biofilm using flowcell.

RESULTS:
Our activities during this research work entailed three areas, bacteria, magnetite nano particles and fabrication of glass slide magnet. We were able to transform the bacteria with Green Florescent Protein (GFP) which allowed the bacteria to fluoresce in the presence of UV light. We synthesized the magnetite nano particles and showed that the bacteria were able to bind to the magnetite with the presence of APTES. The APTES-silica-magnetite nanoparticles (SMNPs) had a mean diameter near 20 nanometers. We equally found out that SMNPs were not toxic to *P. chlororaphis* bacteria and readily bound to bacterial surfaces allowing them to be guided by a magnetic field.



A “lawn” of bacteria with GFP in the chromosome



Flowcell, showing attraction of magnetite by external magnet

My group from IvyTech Community College, South Bend, Indiana presented our poster title **Guiding Bacterial Attachment with Magnetite Nanoparticles** during the MIND poster session on 08/10/2010.