The MARCO FENA Center is proud to present its student-hosted tutorial series featuring

HIGH PERFORMANCE ORGANIC MEMORY: FROM ORGANIC TO BIOMOLECULE BASED NANOELECTRONICS

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FENA THEME 4
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THURSDAY, NOVEMBER 30TH - 12:00PM
BOELTER PENTHOUSE - 8500 BOELTER HALL
LUNCH SERVED AT 11:30AM

Semiconductor industry will soon be facing scaling difficulties as the device size becomes smaller. The development of future information technology is highly dependent on the availability of large capacity memory at a low cost. Memory devices incorporating advanced organic, nanostructured or biomolecular materials seem to provide the perfect solution to these problems. We will present the principles of the operation of these organic memory devices and recent efforts that have been made to demonstrate the feasibilty of these hybrid nanostructured materials.

- A hybrid polymer nanocomposite material, consisting of polyaniline nanofiber attached with metal nanoparticles, was used as a memory element. Electrical bistable and charge trapping behavior of the nanoparticles in memory devices were elucidated and the memory mechanism was attributed to the charge transfer between conjugated polymer and metal nanoparticles.
- The ability of fine-tuning the characteristics of donor-accepter system at the molecular level makes it versatile for high density array and lithographically compatible memory devices. These devices have great potential for applications in low cost, flexible, and large area flash type memory chips.
- We demonstrated the first bio-inorganic memory device based on tobacco mosaic virus conjugated with metallic nanoparticles/quantum dots. The nanostructured biomolecular/inorganic interface results in interesting memory effect.

These electrically bistable organic hybrid systems can be used in digital memory devices and the results provide an alternative route for the search in next generation electronic devices.

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