

The 650<sup>th</sup>

# MANA Seminar



**Resistive switching and complex behavior in cluster-assembled nanostructured gold films**

**Chair: Dr. Kazuya Terabe (MANA PI)**

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Networks based on nanoscale resistive switching (RS) junctions are considered promising elements for the fabrication of neuromorphic computing architectures in view of applications based on the processing of cognitive and distributed data intensive tasks in a way similar to synapses networks. In particular assemblies of metallic nanoparticles, produced in the gas phase when poised near the electrical percolation threshold exhibit complex resistive switching behavior. In this talk I will present a novel resistive switching system based on nanostructured metallic films with thickness well beyond the electrical percolation threshold fabricated by supersonic cluster beam deposition of bare gold clusters. Cluster-assembled gold films show non-ohmic behavior and different reversible RS regimes. High resolution TEM analysis of the cluster-assembled films shows that the elemental building blocks are crystalline and extremely rich of defects which are not eliminated during the film growth. The network-specific properties of nanostructured gold films are characterized in terms of network firing correlation and network frequency analysis showing significant spatio-temporal correlations. These observations suggest that cluster-assembled metallic films represent a novel class of *complex* nanoscale systems.

**Venue: Auditorium, 1F, WPI-MANA Bldg., Namiki-site**

**Date: May 7<sup>th</sup>, Tuesday    Time: 14:00 – 15:00**

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