Modeling and Simulation the Electrical and Thermal Behavior of Carbon Nanotube Networks

- **Motivation** – There does not exist a physics-based model to couple the electrical and thermal conductivity of a macro-scale network of neat single-walled carbon nanotubes (CNT), with an emphasis given to applications with large current loads.

- **Objective** – Form a fundamental link between the stochastic nature of the nanostructure and the bulk response of the network, and how this coupling affects the damage mechanisms under large current loading.

- **Results** – Demonstrated success in: (1) Full 3-D network, (2) Coupled thermal and electrical effects, (3) Steady-state and transient responses for a variety of nanostructure configurations, and (4) Provided the first reasonable explanation for the premature observed failure mechanism.