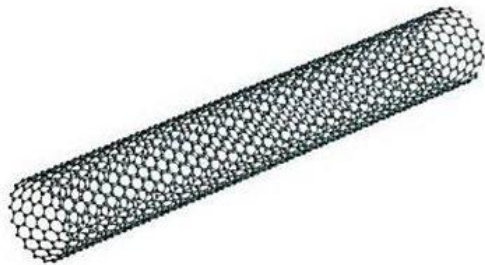




GEORGIA TECH RESEARCH INSTITUTE  
NANOTECHNOLOGY LAB 

# Nanotechnology Undergraduate Education (NUE) – NSF Additional Information

## Introduction to Nanotechnology Undergraduate Education (NUE) - NSF



**David W. Stollberg, Ph.D., P.E.**

**EOSL**

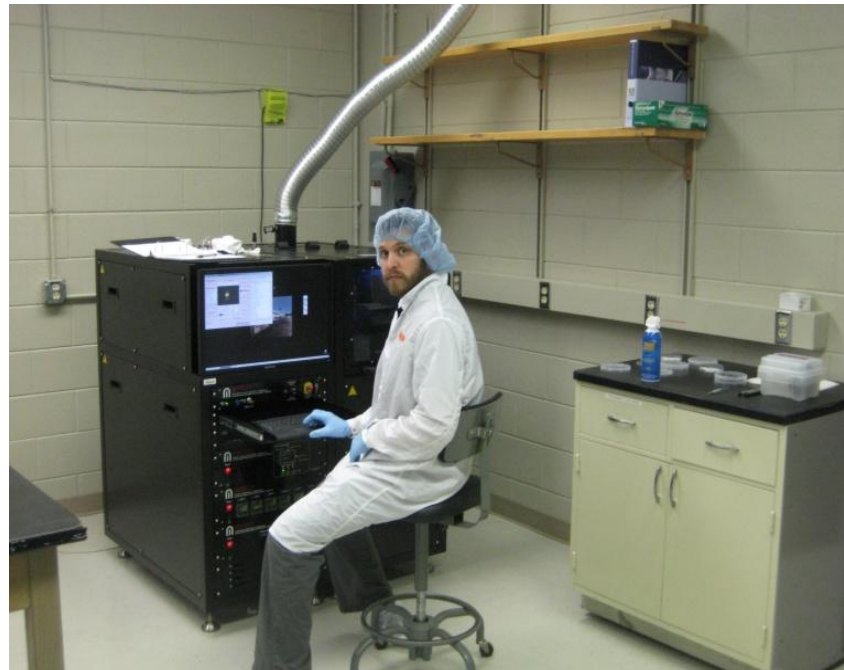
**5 Jun 2011**

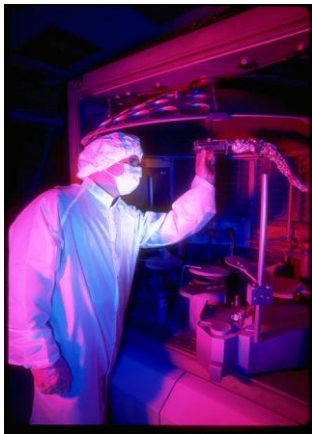


- CNTs have been produced in-house via Chemical Vapor Deposition (CVD) since 2003.
  - Catalyzed pyrolytic decomposition of hydro-carbon gasses
    - Ethylene ( $C_2H_4$ )
    - Methane ( $CH_4$ )
    - Acetylene ( $C_2H_2$ )



- But even better for making CNTs is the “Black Magic”
  - via DURIP funding from ONR in 2010
  - PECVD + TECVD





**Ion Beam Assisted Deposition**



**EvoVac**  
**2 e-beams ea. w. 4 pockets**  
**+ DC sputterer**  
**+ RF sputterer**  
**+ 4 Thermal Evaps**



**Pegasus DRIE**  
**(Bosch Process for Si)**



**SUSS MJB4**

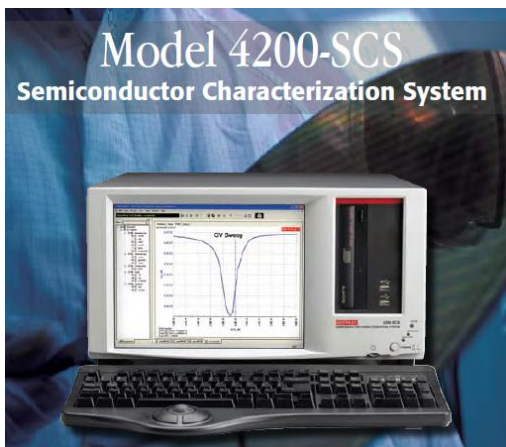
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STS ICP III-V



Hitachi S-4700



Solartron Impedance Spectroscopy