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Processing and Characterization of New Materials at Pomona College with External Collaborations

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My research program focuses on the evolution of novel lithographic, growth, and characterization processes for use with thin films for microelectronics and photovoltaic technologies. We have established facilities at Pomona College for wet chemistry, spin coating, thermal evaporation, micro-contact printing, ultra violet ozone cleaning, oxygen plasma cleaning, Au/Pd sputter coating, critical point drying, optical microscopy, optical lithography, ellipsometry, spectral reflectance, electrical conductivity, current-voltage characterization, atomic force microscopy, scanning tunneling microscopy, electron microscopy, electron beam lithography, and energy dispersive x-ray spectroscopy. Active collaborations with researchers at Cornell University and at Risø National Laboratory for Sustainable Energy (in Denmark) keep the research program vibrant and relevant. Since 2001, I have been an active member of the Cornell Center for Nanoscale Systems. Recent research and publications have focused on carbon nanotubes, graphene sheets, and organic photovoltaics. Pomona College students have played significant roles in all these projects, as well as in the development of our facilities. Connections to a wide range of researchers are invaluable not only for scientific discussions, but provide many opportunities for summer REU internships for my research students. This provides valuable training, access to facilities, and seeds future collaborations. Collaborations at Cornell span 15 years including two sabbatical years and regular summer visits to work at sites such as the Cornell Nanofabrication Facility, the Cornell Center for Materials Research, and the Cornell Center for Nanoscale Systems.