



PRESS RELEASE

GLOBAL WASTE RESEARCH INSTITUTE

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Cal Poly's Global Waste Research Institute Awarded National Science Foundation Grant To Expand Engineering Research Capability

Grant used to acquire optical interferometry system for advanced research of material surfaces for consumer, commercial and aerospace applications

San Luis Obispo, June 22, 2011 — The Global Waste Research Institute (GWRI) of Cal Poly, San Luis Obispo, announced today that it had been awarded a \$372,000 grant from the National Science Foundation (NSF) to acquire an Optical Interferometry System to help research and analyze material surface characteristics for a variety of civil engineering, bio-medical, manufacturing, micro-electromechanical, and aerospace engineering applications.

Part of the grant will allow GWRI to acquire a Bruker Nano Inc. OM-NPFLEX 3D Metrology System and associated accessories for Cal Poly's College of Engineering. The interferometer employs coherence scanning interferometry to produce 3-D surface maps for investigation of surface topographies for a wide variety of natural or engineered, inorganic or organic materials. Surface characterization conducted using the interferometer will enable novel investigations of civil engineering systems, including interface shear behavior of layered systems; soil-structure interaction; and discrete inclusions in composite systems.

The interferometer will allow significant advancements to be made in numerical modeling of particulate-continuum interfaces — bonding and distribution of inclusions in solid matrices with the availability of surface texture data. Particular example applications in waste and byproduct management areas will include quantification of surface characteristics of textured geomembranes used in containment systems and characterization of inclusions made of recycled materials such as tire chips, fly ash, glass, and plastics. Additional engineering and manufacturing applications of the interferometer include detection and prevention of surface defects in rocket nozzles for space missions; evaluation of sub-scale aerodynamic performance problems for wind turbines; fabrication 3-D surface mapping of silicon diaphragms and piezoresistive sensors; quantification of surface roughness for in-vivo degradation of metallic bio-

medical materials, and surface texture analysis of paper-based packaging materials for printability.

“We are very pleased to have received the NSF grant. The acquisition of the interferometer will provide extensive research capabilities at Cal Poly, creating opportunities for interdisciplinary collaborations for advancing surface topography analysis and the engineering performance of materials,” said GWRI’s Director Dr. Nazli Yesiller. “We’ll be able to greatly improve our understanding of the mechanics and micromechanics associated with applications in civil engineering and other technical fields, which will lead to potentially transformative advances in interface and fiber inclusion analysis, and pre-, in-, and post-service analysis of materials **that** will be integrated into learning modules for use throughout the curriculum at Cal Poly.”

The effort for the acquisition of the interferometer was led by Dr. Nazli Yesiller, Dr. Jim Hanson and Dr. Garrett Hall from Civil and Environmental Engineering. An interdisciplinary group of faculty including Dr. Patrick Lemieux, (Mechanical Engineering), Dr. Richard Savage, (Materials Engineering), Dr. Trevor Harding, (Materials Engineering), and Dr. Jay Singh, (Industrial Technology) also contributed to the effort.

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About the Global Waste Research Institute

The Global Waste Research Institute (GWRI), located in San Luis Obispo, California, is a collaborative effort between Cal Poly and industry to promote the development of sustainable waste and byproduct management technologies and advance current practices in resource management.

The San Luis Obispo based institute, located on Cal Poly's campus and headed by Director Dr. Nazli Yesiller, engages faculty and students in projects that investigate all aspects of wastes and byproducts from initial generation to final disposal. The Institute provides training for students, professional community, regulators, and the general public in sustainable waste and byproduct management domestically and abroad, and contributes to the overall educational focus and 'learn-by-doing' mission of Cal Poly. Additionally, the Institute actively promotes international partnerships that help mature and developing countries 'transform waste into opportunities'.

GWRI has set up a specific set of fellowship giving opportunities to support research activities in line with the Grand Challenges for Engineering designated by the National Academy of Engineering.

To learn more about GWRI — please visit www.gwri.calpoly.edu or call Dr. Nazli Yesiller at (805) 756-2932.