

The Department of Mechanical Engineering/College of Engineering and Applied Sciences
Stony Brook University

Mechanical Engineering Seminar



Masoud Ghandehari

Associate Professor
Department of Civil and Environmental Engineering
New York University Polytechnic Institute

Lecture Title: In-situ Chemical Analysis for Infrastructure Health Management

Wednesday, June 17th, 2009, 11:00 AM, Room 173 Light Engineering

Abstract

Long term in-situ measurement enables the assessment of Infrastructure durability with higher level of reliability. For example, degradation processes in materials are often catalyzed by chemical reactions; and early detection of such chemical processes, in advance of the corresponding physical damage, is an effective means of enhancing infrastructure safety and serviceability.

The potential for integration of molecular probes and functional polymers as tools for in-situ analysis of the internal environment of infrastructure materials will be presented. In the proposed sensing methodology, the recognition of target specie is carried out either by sensor molecules, or achieved by analysis of the inherent optical properties of the analyte. Signal transduction may take place either by optical waveguides or by full field imaging of optical activities.

Summary of work on detection of agents of degradation, as well as identification of products of materials dissolution will be discussed. Emphasizing system robustness and long-term sensor durability, practical applications include monitoring of transport processes and reaction chemistries of civil and utilities infrastructure materials, as well as the tracking of contamination in the subsurface environment.

Biography

Masoud Ghandehari is Associate Professor of Civil and Environmental Engineering at NYU Polytechnic Institute, where he coordinates research activities at the *optical diagnostics laboratory*. He studied at Columbia University as an undergraduate student, worked as a consultant in New York City and then obtained his MS and PhD degrees from McGill University and Northwestern University, respectively. The focus of his research is on health monitoring of civil, environmental and utilities infrastructure.

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