

CIVE 7400 Graduate Seminar Series

**The Local Approach to Change Detection, Diagnosis,
and Model Validation:
Application to Vibration Mechanics**



Dr. Laurent Mevel

**Institute National de Recherche en Informatique et en Automatique
Campus de Beaulieu 35042 RENNES Cédex, France**

Tuesday, January 25

1:45 pm to 2:45 pm

335 Shillman Hall, Northeastern University

ABSTRACT: In this tutorial, it is argued that uncertainty in identification and detection are closely related problems. We also explain how the connectivity noted in the theory provides guidance for the development of practical detection algorithms. The whole argument relies on a statistical approach particularized to the analysis of small deviations. The local approach consists in assuming that the nominal and the true models differ by a small factor that depends on the number of available samples. Grounded on this premise it is possible to systematically design criteria and test statistics for model validation, change detection, and diagnosis. In this tutorial seminar we report our experience in using these techniques in the area of vibrations monitoring in structural and mechanical engineering, where they have proven very useful and effective.

BIOGRAPHY: Dr. Laurent Mevel is with INRIA (French National Institute for Research in Computer Science and Automatic Control), Rennes, France, where he is currently “Chargé de Recherches.” He graduated from University of Rennes in 1997, where he received a Ph.D. in Applied Mathematics in the field of statistical inference for hidden Markov models. Now he is working on identification and detection of partially hidden stochastic systems. His interests include: structural health monitoring and detection for vibration mechanics, modelling and rejection of environmental effects, model validation and uncertainty estimations and model reduction of large systems.

(Reception will follow)