Short Course

3-5 pm
February 16, 19, 20, & 21, 2018

Watt Family Innovation Center
Room 307

Instructor:
Roland Platz

Controlling Uncertainty via Smart System Technology

Structural design processes are in general split into the following basic stages: (i) having an idea, (ii) defining specifications based on expected loading, (iii) deriving concepts for adequate structural integrity, (iv) choosing and optimizing the concepts, (v) selecting final design, (vi) fabricating, testing and, eventually, initiating serial production. In every stage in this process, uncertainty originates from various sources that may lead to failure in later utilization. The sources of such uncertainty are lack of information, tolerances, limited resources and human deficiency. Consequently, uncertainty differs throughout the design process and needs to be quantified and evaluated differently for each design stage. Knowing the type, dimension, significance, relevance of uncertainty is critical, especially in early design stage when assessing the reliability of systems. If uncertainty is ignored in early design, it will propagate and cumulate through the following stages of the development processes.

Active and semi-active or “smart systems” technologies in structures may account for such uncertainties. Smart structures may react to critical loading with tailored properties and adaptation, mostly through external energy that is fed into the structure. Examples are active vibration control, stability control, load distribution control or crack growth control. Even though smart structures help addressing uncertainty, their processes are uncertain as well. Main challenges are adequate coupling of design specifications with smart materials together with the use of sensors, actuators, interfaces, electronics and signal processing for control capability.

Intended Audience and Scope

This class is suitable for faculty, graduate and undergraduate students who are interested in (i) means to control uncertainty by smart structure technologies, and (ii) state-of-the art and newly developed probabilistic and non-probabilistic methods to quantify and to evaluate data and model uncertainty to assess, eventually, the reliability in structural dynamical systems. Participants should have a basic background and interest in structural dynamics.

To register for the short course:
email your name and department to resilience@g.clemson.edu
or follow the link to https://goo.gl/forms/NCzKCnXmoKBmHO8O2
To reserve a time to meet with the speaker:
contact Paige Thomsen, resilience@clemson.edu

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