Structural Reliability, Risk Assessment and Decision-Making: Past, Present, Future

A TUM Institute of Advanced Study workshop

Funded by the TüV Süd Foundation

Hosted by the Engineering Risk Analysis Group at TUM

October 1-2, 2012

TU München, Arcisstr. 21, Room 1713

Objective: To bring together a diverse group of researchers and practitioners – senior, mid-career, junior and doctoral students – to discuss topics of interest in the closely related fields of structural reliability, risk assessment, and decision making; to provide a deeper understanding of the history of the field; to review recent research accomplishments and their use in practice; to identify major challenges ahead; and to enjoy an intellectual discourse on the underpinning concepts of probability and statistics.

WORKSHOP PROGRAM

Monday October 1

9:00-9:30   **Introduction &**
                   Dedication to the memory of Prof. Rüdiger Rackwitz
                   D. Straub, A. Der Kiureghian, K. Breitung

9:30-11:00   **Bayesian Methods in Risk and Decision**
                   Moderator: Junho Song
                   Optimal policy search for instrumented structures
                   Matteo Pozzi (Carnegie Mellon)
                   Bayesian updating of engineering models: Formalizing the learning process
                   Daniel Straub (TUM)
                   Deteriorating concrete – learning models from inspection
                   Johannes Fischer (TUM)

11:00-11:30   Coffee break

11:30-13:00   **Stochastic Processes and Random Fields**
                   Moderator: Giulio Cottone
                   Optimal discretization of multivariate random fields
                   Iason Papaioannou (TUM)
                   Assessment of methods for the numerical solution of the Fredholm
                   integral eigenvalue problem in the Karhunen-Loeve expansion
                   Wolfgang Betz (TUM)
                   Stochastic modeling and simulation of near-fault ground motions
                   Mayssa Dabaghi (UC Berkeley)

13:00-14:30   Lunch

14:30-16:00   **Structural Reliability**
                   Moderator: Christian Bucher
                   Estimation of tail probabilities using asymptotic sampling
                   Christian Bucher (TU Wien)
                   SORM without eigenvalue analysis
                   Karl Breitung (TUM)
                   Cross-entropy-based adaptive importance sampling method using Gaussian
                   mixture
                   Junho Song (Univ. of Illinois, Urbana-Champaign)

16:00-16:30   Coffee break

16:30-17:30	**Risk and Reliability in Practice**
	Moderator: Iason Papaioannou
	Risk-based adaptation of engineered structures to climate change
	Luca Garré (DNV, Oslo)
	Probabilistic rainfall estimation and prediction
	Chin Man Mok (AMEC & TUM)
19:30 -	Dinner at Ratskeller München

Tuesday October 2

9:00-10:30	**Bayesian Method in Risk and Decision II**
	Moderator: Matteo Pozzi
	Structural reliability analyses supported by system identification: challenges faced by current methodologies
	James A. Goulet (EPF Lausanne)
	Modeling uncertainties in the tunnel construction process using dynamic Bayesian networks
	Olga Spackova (TUM)
	Compression algorithm for Bayesian network modeling of binary systems
	Iris Tien (UC Berkeley)
10:30-11:00	Coffee break
11:00-12:30	**Stochastic Dynamics**
	Moderator: Luca Garré
	The plane of moments: definition, properties, applications and open questions
	Giulio Cottone (TUM)
	Hasofer-Lind versus TELM: An analogy and beyond
	Armen Der Kiureghian (UC Berkeley)
	TELM from teenage to mature life: What it can and cannot achieve?
	Marco Broccardo (UC Berkeley)
12:30-14:00	Lunch
14:00-16:00	**Discussion Forum**
	Moderators: Armen Der Kiureghian & Daniel Straub
16:00-16:30	Award ceremony