



IFIP WG7.5 Working Conference on
RELIABILITY AND OPTIMIZATION OF
STRUCTURAL SYSTEMS

PROGRAM

COLLEGE OF ENGINEERING
AMERICAN UNIVERSITY OF ARMENIA



YEREVAN, ARMENIA

June 24-27, 2012

Introduction

It is a pleasure to welcome you to Yerevan, Armenia, on the occasion of the 16th working conference and scientific meeting of the IFIP Working Group 7.5 on Reliability and Optimization of Structural Systems. WG 7.5 is one of the working groups under Technical Committee 7 on System Modeling and Optimization of the International Federation for Information Processing. This is the sixteenth in a series of working conferences that begun in 1987 at Aalborg University, Denmark, under the leadership of Professor Palle Thoft-Christensen. Subsequent conferences have been held in London, UK (1988), Berkeley, California, USA (1990), Munich, Germany (1991), Takamatsu, Japan (1993), Assisi, Italy (1994), Boulder, Colorado, USA (1996), Krakow, Poland (1998), Ann Arbor, Michigan, USA (2000), Osaka, Japan (2002), Banff, Canada (2003), Aalborg, Denmark (2005), Kobe, Japan (2006), Toluca, Mexico (2008), and Munich, Germany (2010).

The purpose of the Working Group 7.5 is to promote modern structural system reliability and optimization theories and methods, to stimulate research, development and application of structural system reliability and optimization, to further the dissemination and exchange of information on reliability and optimization of structural systems, and to encourage education in structural system reliability and optimization.

Attendance at IFIP 7.5 Working Conferences is by invitation. Individuals who are not members of the Working Group IFIP WG7.5 may be invited upon recommendation of one of the group members, approved by the Scientific Committee.

Organization of the Conference

The present conference is sponsored by the College of Engineering of the American University of Armenia and co-sponsored by the University of California, Berkeley, California, USA. The following committees have served the Conference:

IFIP WG7.5 Leadership

M. Faber, Denmark, Chair

D. Straub, Germany, Vice Chair

Scientific Committee

H-S. Ang, USA

H. Furuta, Japan

J.O. Royset, USA

C. Bucher, Austria

A. Naess, Norway

J. Song, USA

L. Esteva, Mexico

A. Nowak, USA

J.D. Sørensen, Denmark

M. Faber, Denmark

R. Melchers, Australia

D. Straub, Germany

D. Frangopol, USA

M. Panday, Canada

B. Sudret, France

Organizing Committee

Armen Der Kiureghian, Chair, Interim Provost, AUA, and Taisei Professor of Civil Engineering, UC Berkeley

Aram Hajian, Dean, College of Engineering, AUA

Suren Khachatryan, Assistant Professor, Computer and Information Science, AUA

Sargis Zeytunyan, Lecturer, Industrial Engineering and Systems Management, AUA

Rubina Danilova, Conference Secretary

Conference Location and Facilities

The opening session of the conference on Monday morning will be held in Manoogian Hall located on the first floor (above the ground floor) of Paramaz Avedisian Building (PAB) of AUA. All remaining sessions will be held in Room 208E located on the second floor of PAB. Coffee breaks will be held in the hallway outside Room 208E. There, you will also find the Conference Secretariat desk, where you can seek information or help as needed. For speaker preparation, please use room 207E. Lunches will be held in Akian Gallery, which is located on the fourth floor of PAB (West Wing). You can find the ArtBridge Café on the first floor of PAB and the ArtBridge bookstore in the mezzanine (half way up the stairs from the ground floor). Unfortunately the university library and cafeteria are undergoing major renovations and are closed until late summer.

WiFi service is provided in both PAB and the Main Building of the University. The required login information is:

Account name: ifipguest

Password: ifip2012

Use of the WiFi requires a setup of your computer. Please see the conference secretariat for help.

Presentation Time

This is a working conference. As such, it is desirable to have plenty of time for discussion. For this reason, each presentation will be limited to 15 minutes with 3-5 additional minutes for Q&A and discussion about the specific paper. Additional time is allocated at the end of each session for broader discussion about all presentations in the session. Session co-chairs are asked to strictly follow these time limits.

Brief History of AUA

On December 7, 1988 an earthquake measuring 6.9 on the Richter scale rolled through the former Soviet Republic of Armenia, killing 25,000 people and leaving another 500,000 homeless. The human tragedy and economic devastation shocked the world and opened the Republic to unprecedented international humanitarian and technical assistance. Many Western specialists in the field of earthquake engineering visited Armenia and interacted with their Armenian counterparts. It was during one such meeting in 1989 that the idea of an American-style technical university in Armenia was proposed by Yuri Sarkissian, then rector of the Yerevan Polytechnic Institute, to Armen Der Kiureghian, Professor of Civil Engineering at the University of California, Berkeley. Der Kiureghian pursued this idea and sought collaboration from his American-Armenian colleagues Mihran Agbabian of the University of Southern California and Stepan Karamardian of the University of California at Riverside. The team then approached the Armenian government and several organizations seeking support for the development of an American university in Armenia.

The American University of Armenia became a reality thanks to the steadfast support of the Armenian and United States governments and two major institutions in the United States: the Armenian General Benevolent Union (AGBU) and the University of California (UC). On the fourth floor of PAB, on the Founders Wall, you will find pictures of the Armenian and American individuals who played decisive roles in founding of the University.

AUA opened its doors as a university on September 21, 1991, the very same day that Armenia declared its independence from the Soviet Union. Today, AUA provides master's degree programs in Business and Management, Industrial Engineering & Systems Management, Computer & Information Science, Political Science

& International Affairs, Public Health, Law, and Teaching English as a Foreign Language. Parallel to its academic programs, AUA has established the Center for Business Research and Development, the Engineering Research Center, the Turpanjian Center for Policy Analysis, the Acopian Center for the Environment, the Center for Health Services Research, the Legal Resource Center, and the Center for Research in Applied Linguistics. AUA will be starting undergraduate programs in Computational Sciences, Business, and English & Communications in Fall 2013. All instruction in AUA is in English.

The American University of Armenia is accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges (WASC), 985 Atlantic Avenue, N100, Alameda, CA 94501, which is one of six agencies recognized by the US Department of Education for the accreditation of higher education. Furthermore, AUA has a special affiliation agreement with the University of California, approved by its Regents.

Conference Program

All sessions are held in Paramaz Avedisian Building (PAB)

Sunday June 24

17:30-20:30 **Registration and Reception** (Akian Gallery)
Musical renditions, *Lilit Pipoyan*

Monday June 25

9:00-9:20 **Opening Session** (Manoogian Hall)
Armen Der Kiureghian, Conference Chair
Bruce Boghosian, President, AUA
Aram Hajian, Dean, College of Engineering, AUA
Michael H. Faber, Chair, IFIP WG7.5

9:20-10:30 **Session MA1** (Maoogian Hall)
Reliability-Based Optimal Design I
M. Faber and M. Maes, Co-Chairs

Reliability-based design optimization with uncertain cost: Criteria and methods, *T. Haukaas*

Sequential selection of an optimal operating window, *M. Maes and A. Naess*

Life-cycle cost based optimal design of fluid viscous dampers, *A.A. Teflanidis and I. Gidaris*

10:30-11:00 **Coffee Break** (2nd Floor Hallway)

11:00-12:30 **Session MA2** (Room 208E)
Reliability Analysis Methods I
K. Breitung and J. Song, Co-Chairs

Efficient system reliability analysis by finite element structural models, *B. Gaspar, A. Naess, B. J. Leira, C. Guedes Soares*

slangTNG - Scriptable software for stochastic structural analysis, *C. Bucher*

- Reliability analysis of structures using a meta-heuristic method, *K. Nakatsu, H. Furuta, K. Takahashi, K. Ishibashi and K. Ando*
- Designing for wind actions based on time-domain analysis: Achieving reliability with limited simulations, *D. Straub, I. Papaioannou and A. Michalski*
- 12:30-14:00 **Lunch** (Akian Gallery)
- 14:00-15:30 **Session MP3** (Room 208E)
Probabilistic Models and Analysis
M. Pozzi and C.M. Mok, Co-Chairs
- Reliability analysis for adhesive bonded composite stepped lap joints loaded in fatigue, *A. Kimiaeifara, J.D. Sørensen, E. Lunda and O.T. Thomsena*
- Multi-dimensional risk interdependence analysis for buildings and building users, *G. Ginda and M. Maślak*
- Truck Load Modeling for Reliability Based Calibration, *G. Fu*
- Probabilistic evaluation of COF for steel frames considering system reliability, *Y-G. Zhao and M. Sharfuddin*
- 15:30-16:00 **Coffee Break** (2nd Floor Hallway)
- 16:00-17:30 **Session MP4** (Room 208E)
Stochastic Systems I
A. Naess and W. Smeby, Co-Chairs
- Stochastic behavior from deterministic dynamical systems, *B. Boghosian*
- Short-term instability in stochastic systems, *M.F. Dimentberg, C. Bucher, A. Hera and A. Naess*
- Tolling contracts, *H. Kechejian, V.K. Ohanyan*
- 21:00-23:00 **Concert**
Armenian Navy Band, *Arto Tunçboyacıyan et al.*
Avant-garde Folk Music Club
3A Pushkin Street (see map in your folder)

Tuesday June 26

- 9:00-10:30 **Session TA5** (Room 208E)
Reliability of Wind Turbines I
J.D. Sørensen and K. Nishijima, Co-Chairs
- Structural reliability methods for assessment of wind power converter systems, **E.E. Kostandyan and J.D. Sørensen**
- Probabilistic seismic demand models and fragility estimates for wind turbine support structures, **M. Mardfekri and P. Gardoni**
- Reduction of the random variables of the turbulent wind field, **M.T. Sichani and S.R.K. Nielsen**
- Some observations on the subset simulation related to the wind turbine mechanics, **M.T. Sichani, S.R.K. Nielsen and P. Thoft-Christensen**
- 10:30-11:00 **Coffee Break** (2nd Floor Hallway)
- 11:00-12:30 **Session TA6** (Room 208E)
Reliability Analysis Methods II
C. Bucher and Y-G. Zhao, Co-Chairs
- Adaptive importance sampling using nonparametric density function, **N. Kurtz and J. Song**
- Enhancing meta-model-based importance sampling by subset simulation, **B. Sudret, V. Dubourg and J.-M. Bourinet**
- Assessment of MCMC algorithms for subset simulation, **I. Papaioannou, K. Zwirgmaier and D. Straub**
- Identification and reliability of reinforced concrete structural systems for model updating purposes, **S. Sessa, F. Marmo and N. Valoroso**
- 12:30-14:00 **Lunch** (Akian Gallery)
- 14:00-15:30 **Session TP7** (Room 208E)
Infrastructure Systems
D. Straub and P. Gardoni, Co-Chairs
- Bayesian Network with Gaussian variables for post-earthquake emergency management, **M. Pozzi, A. Der Kiureghian, Y. Yue and D. Zonta**

Probabilistic modeling of networked systems in the context of risk assessment, **J. Qin and M.H. Faber**

Evaluation of seismic vulnerability of bridges under differential support motions using fragility curves,

K. Konakli

Bridge management system of a large number of bridges using genetic algorithms, **K. Nakatsu, H. Furuta, K. Takahashi, K. Ishibashi and T. Umekage**

15:30-16:00 **Coffee Break** (2nd Floor Hallway)

16:00-17:30 **Session TP8** (Room 208E)

Reliability-Based Optimal Design II

T. Haukaas and A. Teflanidis, Co-Chairs

Sensitivity analysis methods for reliability problems, **K. Breitung**

Pre-posterior decision optimizations by least squares Monte Carlo method, **K. Nishijima and A. Anders**

Enhancing the extended least squares Monte Carlo method for real-time decision optimizations, **A. Anders and K. Nishijima**

Hydrologic and hydrogeologic applications of stochastic optimization, **C-M. Mok, N. Wanakule and G. Matanga**

18:30-22:30 **Conference Banquet**

Ashtaraki Dzor (Ashtarak Gorge) Restaurant

This is an outdoor restaurant near a river. Please bring a jacket as it can be cool at night. The bus will take you from AUA to your hotel and then at 18:30 will leave for Ashtarak.

Wednesday June 27

9:00-10:15 **Session WA9** (Room 208E)

Reliability of Wind Turbines I

S.R.K. Nielsen and I. Papaioannou, Co-Chairs

Fatigue reliability and calibration of safety factors for offshore wind turbines, **S. Márquez Domínguez and**

J.D. Sørensen

Maintenance optimization for offshore wind turbines using POMDP, **J.J. Nielsen, J.D. Sørensen**

System reliability effects in wind turbine blades, **N. Dimitrov, P. Friis-Hansen and C. Berggreen**

10:15-10:45 **Coffee Break** (2nd Floor Hallway)

10:45-12:00 **Session WA10** (Room 208E)

Stochastic Systems II

B. Sudret and M.F. Dimentberg, Co-Chairs

An alternative linear response surface for stochastic dynamic analysis, **U. Alibrandi**

FORM in high dimensions for stochastic dynamic analysis, **S. Koduru and A. Der Kiureghian**

Simulation of stochastic processes in time domain using *sinc* basis, functions **M. Broccardo and A. Der Kiureghian**

12:00-12:45 **IFIP WG7.5 General Meeting** (Room 208E)

12:45-13:45 **Lunch, including registered spouses** (Akian Gallery)

13:45-19:00 **Visit to Tsitsernakaberd (Genocide Memorial and Museum), Garni Temple and Geghart Monastery**

Bus will leave from AUA right after lunch. Bring a hat for protection from the sun.

Spouses' Program

Sunday June 24

17:30-20:30 **Registration and Reception** (Akian Gallery)
Musical renditions, *Lilit Pipoyan*

Monday June 25

10:00-17:00 Excursion to Ashtarak region: **Mughni Church, Saghmosavank, Alphabet Square, Karmravor, Amberd**
Lunch in Ashtarak
Bus will depart Ani Plaza Hotel at 10:00

21:00-23:00 **Concert**
Armenian Navy Band, *Arto Tunçboyacıyan et al.*
Avant-garde Folk Music Club
3A Pushkin Street (see map in your folder)

Tuesday June 26

10:00-16:00 **Tour of Matenadaran, Parajanov Muesum, Brandy Factory**
Lunch at Charents 28 Restaurant
Bus will leave Ani Plaza Hotel at 10:00

18:30-22:30 **Conference Banquet**
Ashtaraki Dzor (Ashtarak Gorge) Restaurant
This is an outdoor restaurant near a river. Please bring a jacket as it can be cool at night. The bus will take you from AUA to your hotel and then at 18:30 will leave for Ashtarak.

Wednesday June 27

10:00-13:00 Free time for shopping

13:00-14:00 **Lunch** (Akian Gallery)

14:00-19:00 **Visit to Tsitsernakaberd (Genocide Memorial and Museum), Garni Temple and Geghart Monastery**
Bus will leave from AUA right after lunch. Bring a hat for protection from the sun.

