

Final Program of the 16th International Probabilistic Workshop



12-14 September 2018, Vienna, Austria

www.probabilistic.boku.ac.at



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Welcome

From 12 to 14 September 2018 BOKU University hosts the 16th edition of the International Probabilistic Workshop (IPW2018) in the city of Vienna, Austria.

We will follow the IPW tradition of organizing a multi-disciplinary forum for the exchange of knowledge and expertise, in probabilistic methods, uncertainty quantification, safety and risk management, enabling constructive and fruitful discussions. The event is aimed at specialised developments in both theory and practice with respect to probabilistic methods for engineering purposes. Industry and academia are invited to contribute and to join in the discussions on developments and needs in the field

Originally, the series started as the 1st and 2nd Dresdner Probabilistic Symposium in 2003 and 2004, which were launched to present research and applications mainly dealt with at Dresdner University of Technology. Since then, the series has grown to an internationally recognised conference dealing with research and applications of probabilistic techniques, mainly in the field of structural engineering.

After Dresden in 2003 and 2004, the International Probabilistic Workshop was organized in Vienna (2005), Berlin (2006), Ghent (2007), Darmstadt (2008), Delft (2009), Szczecin (2010), Braunschweig (2011), Stuttgart (2012), Brno (2013), Weimar (2014), Liverpool (2015), Ghent (2016) and Dresden (2017).

The program of the 16th edition of the International Probabilistic Workshop includes 43 presentations (of which 4 are keynote lectures and 8 are poster presentations) representing contributions from 15 countries. The papers are divided in the following topics:

- Safety of Structures
- Probabilistic modelling and soft computing techniques
- Probabilistic aspects of fastening systems
- Probability and multi-criteria optimization techniques
- Material properties
- Natural Hazards
- Inspection of Structures

We look forward to welcoming you in Vienna!

The conference chairs

Alfred Strauss, University of Natural Resources and Life Sciences Vienna, Austria

Konrad Bergmeister, University of Natural Resources and Life Sciences Vienna, Austria

Dirk Proske, Zürich, Switzerland

Committees

Organizing Committee

Assoc. Prof. Alfred Strauss

Prof. Konrad Bergmeister

DI Eftychia Apostolidi

Mrs. Evelin Kamper

Scientific Committee

Prof. Konrad Bergmeister, Vienna, Austria

Assoc. Prof. Alfred Strauss, Vienna, Austria

Dr. Dirk Proske, Zürich, Switzerland

Prof. Michael Beer, Hannover, Germany

Prof. Christian Bucher, TU Vienna, Austria

Dr. Maximilian Huber, Vienna, Austria

Prof. Joan Ramon Casas, Barcelona, Spain

Prof. Robby Caspeele, Ghent, Belgium

Prof. Bruce Ellingwood, Georgia Tech,
College of Engineering, Atlanta, USA

Prof. Michael Faber Nielsen, Aalborg,
Denmark

Prof. Dan. M. Frangopol, Lehigh, USA

Prof. Tom Lahmer, Weimar, Germany

Prof. Jose Antonio Campos e Matos,
Guimarães, Portugal

Prof. Raphael Steenberg, Delft, The
Netherlands

Prof. Daniel Straub, München, Germany

Prof. Luc Taerwe, Ghent, Belgium

Prof. Dragomir Novak, Brno, Czech
Republic

Prof. David Lehky, Brno, Czech Republic

Prof. Panagiotis Spyridis, Dortmund,
Germany

Prof. Peter Mark, Bochum, Germany

Dr. Roman Wan-Wendner, Vienna, Austria

Prof. Pieter van Gelder, Delft, The
Netherlands

Dr. Edoardo Patelli, Liverpool, UK

Dr. Radomir Pukl, Prague, Czech Republic

Dr. Vladimir Cervenka, Prague, Czech
Republic

Prof. Daniil Yurchenko, Edinburgh,
Scotland, UK

Conference Venue

University of Natural Resources and Life Sciences Vienna, BOKU

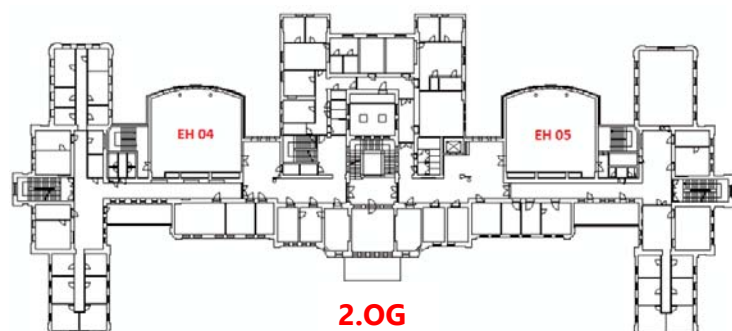
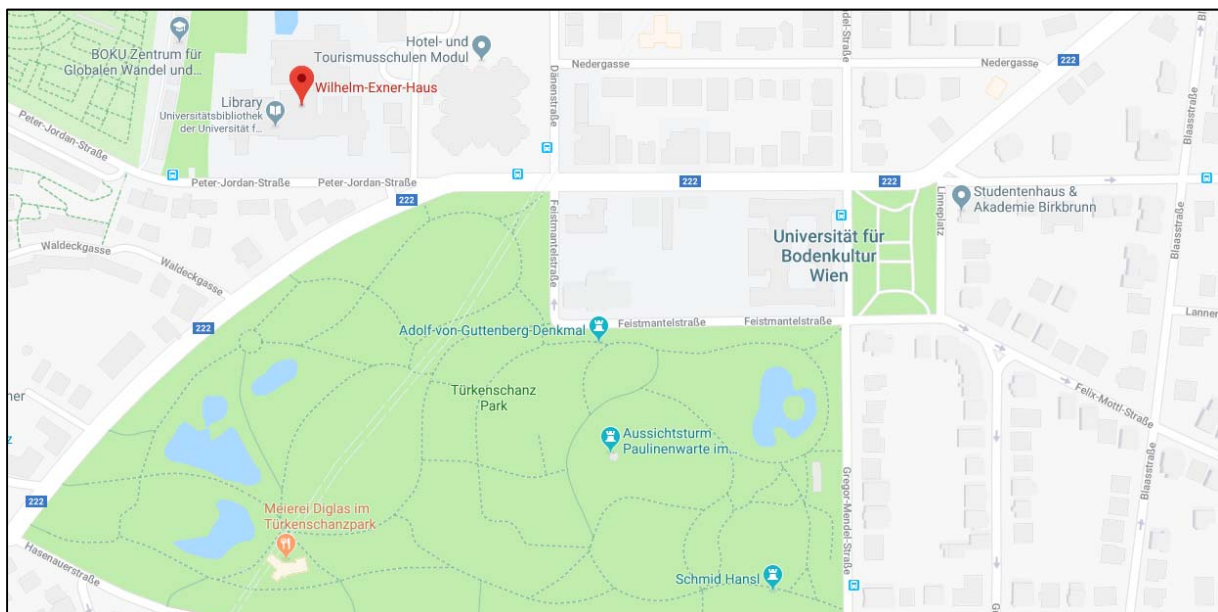
Wilhelm Exner Haus

Lecture Room EH 04 and EH05 (2nd Floor)

Peter Jordan Strasse 82

1190 Vienna

BOKU – University of Natural Resources and Life Sciences is a unique Austrian research and teaching organisation with strong focus on renewable resources, living space and quality of life as well as food chain and health issues. BOKU innovatively combines fundamental and applied expertise in the fields of natural sciences, engineering and planning sciences, and social and economic sciences to enhance the knowledge basis for sustainable management of our natural resources. More information about University of Natural Resources and Life Sciences can be found on <http://www.boku.ac.at/en/>.



The City of Vienna

Vienna is Austria's primary city, with a population of about 1.8 million and it is cultural, economic, and political centre. It is the 7th-largest city by population within city limits in the European Union. Until the beginning of the 20th century, it was the largest German-speaking city in the world, and before the splitting of the Austro-Hungarian Empire in World War I, the city had 2 million inhabitants. Today, it has the second largest number of German speakers after Berlin. Vienna is host to many major international organizations, including the United Nations and OPEC. The city is located in the eastern part of Austria and is close to the borders of the Czech Republic, Slovakia, and Hungary. These regions work together in a European Centrope border region. Along with nearby Bratislava, Vienna forms a metropolitan region with 3 million inhabitants. In 2001, the city centre was designated a UNESCO World Heritage Site. In July 2017 it was moved to the list of World Heritage in Danger.

In Vienna, the Metropolis of Music, you can strike the right note at first-rate concerts and enjoy an unrivalled selection of music - from opera to musical. More famous composers have lived here than in any other city - in Vienna, music is literally in the air: Waltzes and operettas have their home here, and so do musicals "made in Vienna", which have conquered international audiences. In the capital of coffeehouse culture, you can enjoy a golden Mélange and Apfelstrudel in one of the famous Vienna coffeehouses, second home to artists and thinkers such as Arthur Schnitzler, Gustav Klimt, Adolf Loos and even Leon Trotsky. Note that the Mercer Survey once again ranked Vienna (together with Vancouver) first for quality of life in 2010.



General Information

Registration desk opening hours:

Wednesday 12 September:	11:30 – 18:00
Thursday 13 September:	08:30 – 17:45
Friday 14 September:	08:30 – 10:30

Catering

Coffee breaks will be provided next to the conference room.

Lunch will be served at the Meierei Diglas im Türkenschanzpark.

Certificate of attendance

In case you need a certificate of attendance, please inform the registration desk and we will send it to you by email.

Proceedings

All the registered participants will receive a hardcopy of the Special Issue of Beton und Stahlbetonbau by Ernst & Sohn.

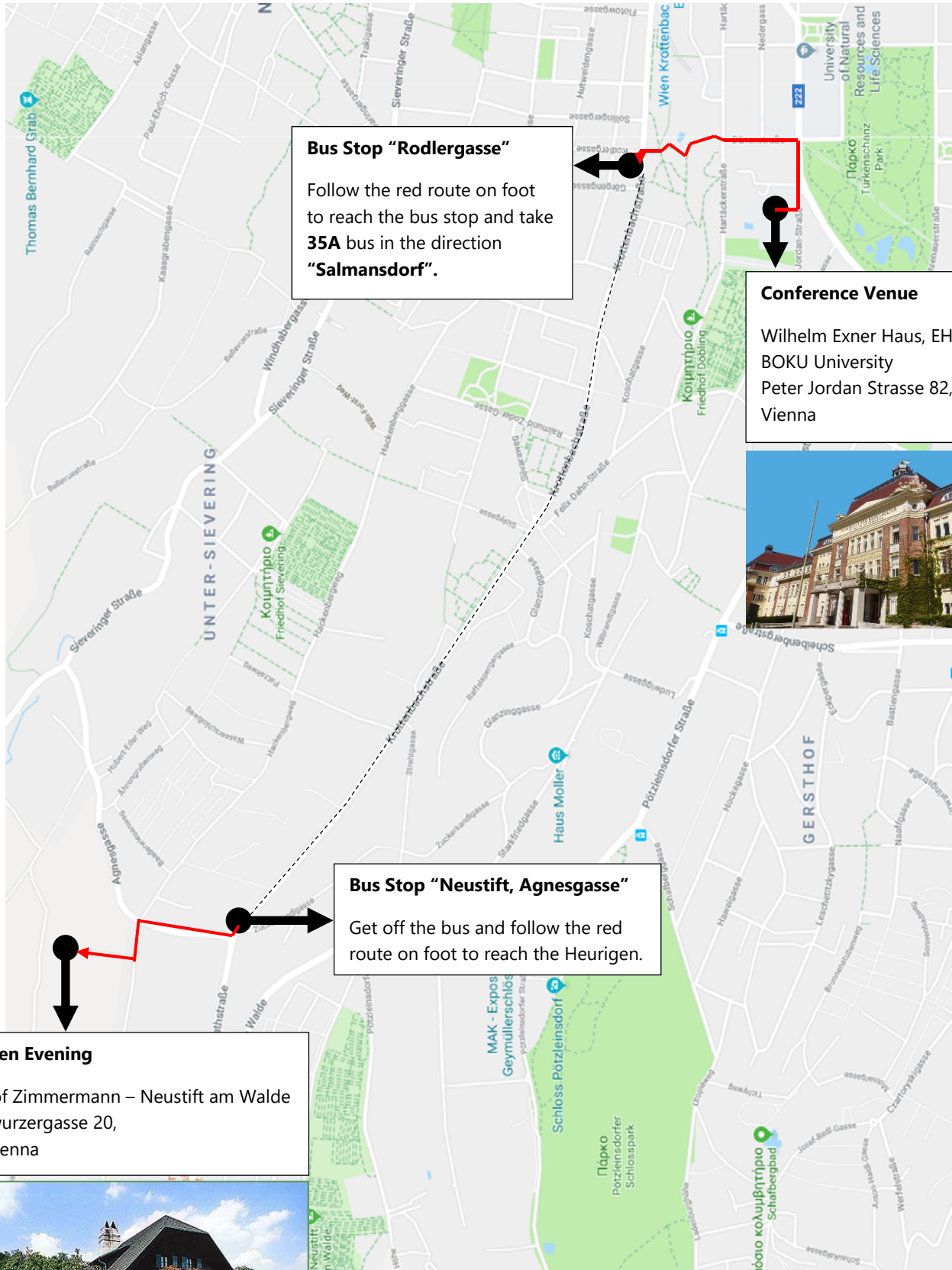
Heurigen Evening

In Austria, the current year's wine is served in the legendary wine taverns (Heurigen), and the Weinhof Zimmermann ranks among the most famous in Vienna. Based in the Neustift district amongst a maze of rustic vineyards, visitors can enjoy the unique Wiener Gemütlichkeit (relaxed, companionable cosiness) over a glass of local wine. The Heuriger is also a popular dining venue amongst locals, where guests can enjoy a fine selection of sauerkraut, dumplings and salads and various meats such as barbecued chicken, knuckle of smoked meat, lean loin, rost cumin and neck of pork.



The dinner will take place at the Heurigen "Weinhof Zimmermann – Neustift am Walde" on Thursday, 13 September 2018 from 19:30 until 22:30.

To reach the Heurigen by public transport, take bus 35A from Spittelau, or follow the instructions on the following map on how to get there from the conference venue



Bus Stop "Rodlergasse"

Follow the red route on foot to reach the bus stop and take **35A** bus in the direction **"Salmansdorf"**.

Conference Venue

Wilhelm Exner Haus, EH 04+05
BOKU University
Peter Jordan Strasse 82, 1190
Vienna



Bus Stop "Neustift, Agnesgasse"

Get off the bus and follow the red route on foot to reach the Heurigen.

Heurigen Evening

Weinhof Zimmermann – Neustift am Walde
Mitterwurzgasse 20,
1190 Vienna



Program at a glance

Wednesday 12 September		
12:30 – 13:00	Welcome and Opening	11:30 – 18:00 Registration
13:00 – 13:30	Keynote Lecture 1	
13:30 – 15:15	Session 1	
15:15 – 15:45	<i>Coffee break</i>	
15:45 – 18:00	Session 2	

Thursday 13 September		
09:00 – 09:30	Keynote Lecture 2	08:30 – 17:45 Registration
09:30 – 10:10	Session 3	
10:10 – 10:40	<i>Coffee break</i>	
10:40 – 12:30	Session 4	
12:30 – 13:30	<i>Lunch Break</i>	
13:30 – 14:00	Keynote Lecture 3	
14:00 – 15:30	Session 5	
15:30 – 16:00	<i>Coffee break</i>	
16:00 – 17:45	Session 6	
19:30 – 22:30	<i>Dinner – Heurigen Evening</i>	

Friday 14 September		
09:00 – 09:30	Keynote Lecture 4	08:30 – 10:30 Registration
09:30 – 10:30	Session 7	
10:30 – 11:00	<i>Coffee break</i>	
11:00 – 12:00	Session 8	
12:00 – 12:30	<i>Closure</i>	

Detailed program

Wednesday 12 September	
11:30 – 18:00	Registration
12:30 – 13:00	Welcome and Opening
13:00 – 13:30	Keynote Lecture 1 (session chair: Strauss)
	Reliability-based assessment of existing structures: from fundamental research towards standardisation <i>Caspeele</i>
13:30 – 15:15	Session 1: Safety of Structures – Part I (session chair: Proske)
	Comparison of dam failure frequencies and failure probabilities <i>Proske</i> (J)
	Structural safety referring to ultra-sound on concrete bridges: From non-valuated measurands to reliable knowledge about the inner construction without destructive interventions <i>Küttenbaum, Maack, Taffe</i> (J)
	Calibrating safety factors for carbon concrete: An approach based upon safety margins demonstrated with selected examples <i>Weselek, Häussler-Combe</i> (J)
	Reliability levels related to different reference periods and consequence classes <i>Holicky, Diamantidis, Sykora</i> (J)
	Reliability of TRC structures under bending load: Application of probabilistic methods to analyse selected TRC structures regarding the required safety level according to Eurocode 0 <i>Bergmann, Hegger, Ricker, Rempel</i> (E)
15:15 – 15:45	Coffee break
15:45 – 18:00	Session 2: Probabilistic modelling and soft computing techniques (session chair: Spyridis)
	Design optimisation of tunnel profiles and lining support based on probabilistic finite element analyses <i>Kalogeraki, Gakis, Spyridis</i> (E)
	A comparison of stochastic inverse methods with sampling and functional-based linear and non-linear update procedures <i>Landi, Marsili, Friedman, Croce</i> (E)
	Sensitivity analysis of pre-stressed concrete girders based on artificial neural network surrogate model <i>Pan, Lehký, Novák, Slowik</i> (E)
	Polynomial chaos expansion for surrogate modelling: Theory and software <i>Novák L., Novák D.</i> (J)
	Robustness-evaluation of a stochastic dynamic system and the instant equivalent extreme-value event: The PDEM-based structural reliability evaluation of a dynamic system <i>Ding, Botte, Van Coile, Caspeele</i> (J)
Poster	An adaptive ANN-based inverse response surface method <i>Šomodíková, Lehký</i> (J)
Poster	Safety concept for temporary works on the basis of project-specific risk acceptance <i>Spyridis, Strauss</i> (E)
	Effects of multivariate dependence modelling on reliability estimates <i>Spyridis, Tamparopoulos, Bergmeister</i> (J)

Thursday 13 September	
08:30 – 17:45	Registration
09:00 – 09:30	Keynote Lecture 2 (session chair: Wan-Wendner)
	Tackling uncertainty in structural lifetime evaluations: Assessment of the impact of monitoring data and correlated input parameters on a prognosis <i>Sanio, Ahrens, <u>Mark</u></i> (J)
09:30 – 10:10	Session 3: Probabilistic aspects of fastening systems (session chair: Mark)
	Influence of temperature and measurement uncertainty in sustained load testing on bonded fasteners <i>Stierschneider, Schwenn, Tamparopoulos, Zeman, Bergmeister</i> (J)
	Design for lifecycle robustness of fastening systems <i>Podroužek, Vorel, Wan-Wendner</i> (J)
Poster	Uncertainty of measurement and its influence on essential characteristics of post-installed fasteners <i>Schwenn, Zeman, Bergmeister</i> (J)
10:10 – 10:40	Coffee break
10:40 – 12:30	Session 4: Safety of Structures – Part II (session chair: Van Gelder)
	Probabilistic model for steel yield strength retention factor at elevated temperatures: Influence of model choice on structural failure fragility curve for steel columns exposed to fire <i>Stephani, <u>Van Coile</u>, Elhami Khorasani, Gernay, Hopkin</i> (E)
	Applying queueing theory for managing waterways systems subject to service interruptions <i>Marsili, Bödefeld, Daduna, Croce</i> (E)
	Increasing the safety level in the public transport sector: An application to support decision making in a rail network <i>Talarico, Reniers, <u>Van Gelder</u></i> (E)
	Modelling knot size and location distribution for implementation in structural safety analysis of timber elements <i>Sousa, Matos, Branco, Lourenço, Machado, Pereira</i> (E)
	Uncertainties of concrete parameters in shear strength calculation of RC members without shear reinforcement <i><u>Tran</u></i> (E)
Poster	Influence of material spatial variability on the shear strength of concrete members without stirrups <i><u>Tran</u>, Graubner</i> (E)
Poster	Study on reliability of pre-stressed concrete bridge using ANN-based inverse method <i>Lipowczan, Lehký, Šomodíková, Novák</i> (E)
12:30 – 13:30	Lunch Break
13:30 – 14:00	Keynote Lecture 3 (session chair: Strauss)
	Events with very small probability of occurrence and their big consequences <i><u>Bergmeister</u></i>

14:00 – 15:30	Session 5: Probability and multi-criteria optimization techniques (session chair: Huber)
	Design optimization of combined piled raft foundations considering uncertainty <i>Huber, Dufour, Adam, Wieser</i> (J)
	Advanced hysteresis method for early damage detection of fastening systems in concrete under fatigue load <i>Höpfner</i> (J)
	Reliability-based design optimization using artificial neural network inverse analysis <i>Slowik, Lehký, Novák</i> (E)
	Transient reliability evaluation of a stochastic structural system in fire <i>Hopkin D., Van Coile, Hopkin C., Fu, Spearpoint</i> (E)
15:30 – 16:00	Coffee break
16:00 – 17:45	Session 6: Material properties (session chair: Van Coile)
	Statistical determination of characteristic shear parameters <i>Schneider-Muntau, Schranz, Fellin</i> (J)
	Discrete element simulation of concrete fracture and crack evolution: Statistically varying properties of concrete specimens <i>Beckmann, Schicktanz, Curbach</i> (J)
	Stochastic engineering frame-work for timber structural elements <i>Kandler, Lukacevic, Wolff, Füssl</i> (J)
Poster	Identification of mechanical fracture parameters for estimation of statistical properties of geopolymer mortars <i>Šimonová, Lipowczan, Lehký, Kucharczyková, Keršner</i> (E)
	Effect of shape memory alloys (SMA) on self-healing rein-forced concrete flexural members: Sensitivity of residual displacements to diameter and percentage of SMA bars used in concrete beams <i>Molod, Barthold</i> (E)
	Stochastic sensitivity analysis of the vibro-impact energy harvester using a novel UQ metric <i>Bi, Beer, Thompson, Val, Yurchenko</i>
Poster	Reliability based optimization of fiber reinforced elastomeric bearings <i>Castillo Ruano, Apostolidi, Strauss</i> (J)
19:30 – 22:30	Dinner – Heurigen Evening

Friday 14 September	
08:30 – 10:30	Registration
09:00 – 09:30	Keynote Lecture 4 (session chair: Caspeelee)
	Longevity of civil engineering structures under uncertainties <i>Frangopol</i>
09:30 – 10:10	Session 7: Natural Hazards and Inspection of Structures – Part I (session chair: Caspeelee)
	Uncertainty in mapping heavy rain flood hazards <i>Sauer, Olfert, Körte, Ortlepp</i> (E)
<i>Poster</i>	Characterization of robustness indicators: Using testing and structural health monitoring information <i>Mold, Strauss, Krug, Frangopol</i> (E)
	A novel probabilistic methodology for the local assessment of future trends of climatic actions <i>Croce, Formichi, Landi, Marsili</i> (J)
10:10 – 10:30	Information about committees and working groups
10:30 – 11:00	Coffee break
11:00 – 12:00	Session 8: Inspection of Structures II (session chair: Lehký)
	Bayesian network for risk-informed inspection planning in ships <i>Kim, Hamann, Straub</i> (J)
	Evaluating strength of historic cast iron using destructive and non-destructive tests <i>Jung, Marková, Sýkora</i> (E)
	Probabilistic maintenance optimization with respect to inspection quality <i>Zou, Banisoleiman, González</i> (E)
12:00 – 12:30	Closure

