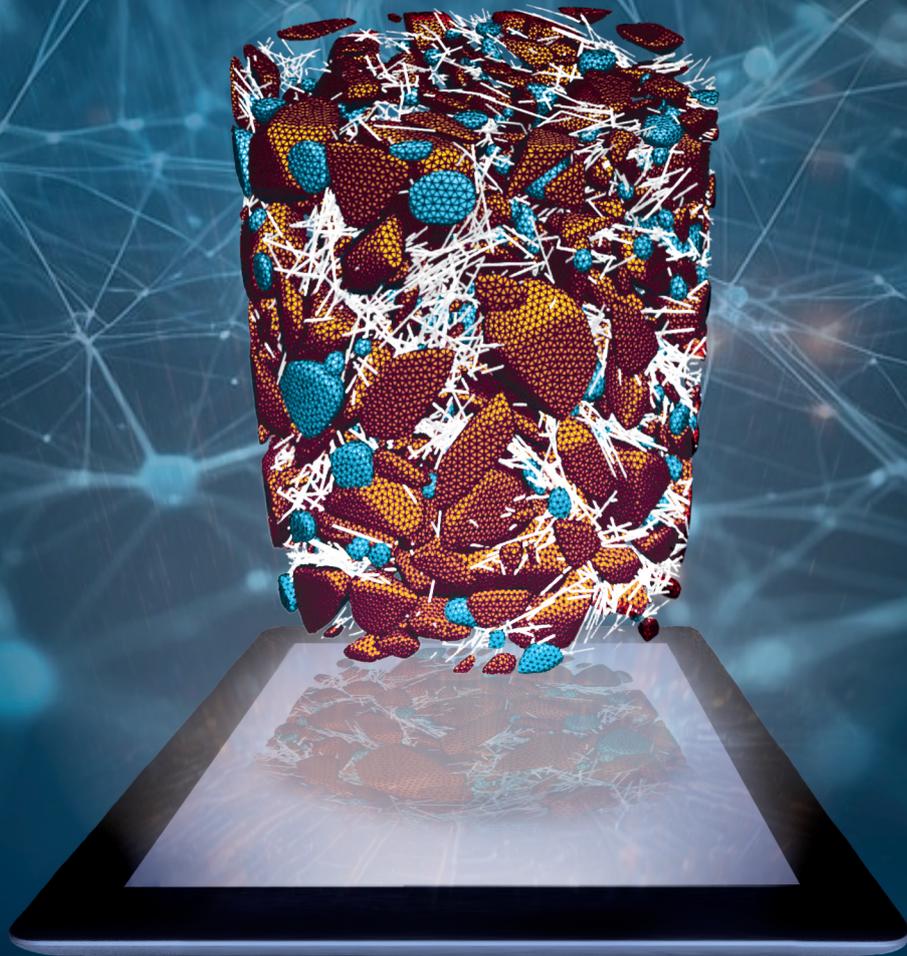


# EURO-C 2026

Computational Modelling  
of Concrete and  
Concrete Structures



# PROGRAM

March 9-12, 2026, Seefeld in Tirol, Austria

## CONFERENCE CHAIRMEN

**Günther Meschke**

Ruhr University Bochum, Germany

**Bernhard Pichler**

TU Wien, Austria

**Jan G. Rots**

Delft University of Technology, the Netherlands

## HONORARY CHAIRMEN

**René de Borst**

University of Sheffield, United Kingdom

**Herbert A. Mang**

TU Wien, Austria

## SCIENTIFIC ADVISORY COMMITTEE

**Zdenek P. Bažant** (USA)

**Tony Jefferson** (UK)

**Tinh Quoc Bui** (Vietnam)

**Milan Jirasek** (Czech Republic)

**Jan Cervenka** (Czech Republic)

**Koichi Maekawa** (Japan)

**Rostislav Chudoba** (Germany)

**Chris Pearce** (UK)

**Gianluca Cusatis** (USA)

**Gilles Pijaudier-Cabot** (France)

**Guillermo Etse** (Argentina)

**Bert Sluys** (the Netherlands)

**Dariusz Gawin** (Poland)

**Jacek Tejchman** (Poland)

**Stéphane Grange** (France)

**Franz-Josef Ulm** (USA)

**Christian Hellmich** (Austria)

**Miroslav Vorechovsky** (Czech Republic)

**Günter Hofstetter** (Austria)

**Yuan Yong** (China)

**Tetsuya Ishida** (Japan)

## CONFERENCE OFFICE

**Martina Pöll-Baumgartner**

TU Wien, Austria

Email: [euro-c@tuwien.ac.at](mailto:euro-c@tuwien.ac.at) | Web: <https://www.euro-c.org/>

## CONFERENCE PROCEEDINGS

Full papers are published as an online open access conference proceedings by CRC Press.

You can access them at <https://tinyurl.com/yxyumyzz>.



## GUIDE FOR PRESENTERS

- Please bring your own notebook for your presentation and connect it via HDMI.
- Technical staff is assigned to each lecture room for help with technical equipment.
- Please be present at least 10 minutes prior to the start of your session and let the chairperson know you are there.
- Please make sure to stay in your session from the beginning on in order to ensure smooth changes between the individual presentations.

## GUIDE FOR CHAIRPERSONS

- You are kindly asked to switch between presentations by simply announcing the name of the next presenter and the title of the presentation. Due to the tight schedule, there will not be sufficient time for introducing individual presenters in a more detailed manner.
- Please do your best to strictly limit the duration of each presentation and discussion to the allotted time (20 minutes incl. discussion).
- If a lecturer is missing, please stick to the original program, i.e., extend the discussion time of the preceding presentation or allow a break for the duration of the missing lecture(s). This enables participants to listen to chosen individual lectures according to the announced sequence.

## WLAN INFORMATION

At the conference venue, WLAN access is available to all participants. Please choose network “olympiabad” and connect with the password “olympiaseefeld”.

# CONFERENCE AGENDA

Monday, March 9, 2026

## Opening / Plenary Lecture Session

G. Meschke

Olympia

09:00-09:20 **Opening Session – Welcome Address**

[G. Meschke](#)

09:20-10:00



### Plenary Lecture 1

09:20-10:00

**Risk from using marginal design code equations and unphysical strength probability distributions in structural safety software – a wake-up call**

H. Xu<sup>3</sup>, Y. Zhao<sup>1</sup>, J.-L. Le<sup>2</sup>, A. T. Nguyen<sup>1</sup>, G. Deodatis<sup>4</sup>, [Z. P. Bažant](#)<sup>1</sup>

<sup>1</sup>Northwestern University, United States; <sup>2</sup>University of Minnesota, United States; <sup>3</sup>Johns Hopkins University, United States; <sup>4</sup>Columbia University, United States

**Abstract:** It is generally accepted that engineering structures, whether bridges or aircraft, should be designed to have failure probability no higher than  $10^{-6}$  per lifetime. The current probabilistic and computational predictions cannot satisfy this goal. While sophisticated probabilistic models have been developed to deal with the randomness of loads, the problem is the uncertainty of material failure, which has been relegated to empirical understrength (or capacity reduction) factors. Historically, the design equations of all design codes have been “marginal” equations, which is our name for the equations set at the lower margin of the test data cloud (depending on structure size, 25% to 40% below the data mean in the case of RC beam shear). Unfortunately, the offset of the mean and the variance of the database are not declared in the design code and have remained buried in the code committee documents. Furthermore, probabilistic modeling of the mechanics of failure process that determines the structural strength has been absent and the probability distribution function (pdf) required to extrapolate to  $10^{-6}$  has been chosen arbitrarily – often as the lognormal pdf, which gives the lowest (and thus least safe) estimate of the understrength factor. This pdf, which represents the least safe assumption possible, is shown to be physically impossible for a database with one-and-the-same concrete while playing some role in a database comprising concretes of very different strengths. All of these problems have rendered the current failure probability estimates of concrete structures virtually meaningless when computational stochastic mechanics software is used. There is a looming crisis and concrete design code clarifications are urgently needed. Related to this is the previous conclusion that the blind prediction competition of a single large test, in which only the required strength of concrete is revealed (which is all that is required in the design code), has been misleading. The sine qua non of the remedy is that the offset of the data mean from the code equation and the coefficient of variations of the data set must accompany each design code equation. A realistic probability distribution (or, at least, its acceptable forms) should also be suggested. To this end, a proof that the lognormal distribution, though often used in practice, can never characterize structural failure probability. More generally, it is proven that no distribution with positive skewness is possible. At  $10^{-6}$  this makes a difference as big as 1 : 2 to 1 : 3 in terms of the standard deviation. A complete remedy would require revising all the load and understrength factors of the design code and rescaling the design equations to the database means.

10:00-10:30 **Coffee Break**

# Monday, March 9, 2026

10:30-12:10	MM1/1: Constitutive models and computational frameworks  Günter Hofstetter Olympia	MM1/2: Analysis of concrete structures  Joaquim Barros Seefeld/Tirol
	10:30-10:50 <b>Model uncertainty of numerical crack width in reinforced concrete</b> <u>V. Cervenka</u> , J. Cervenka, A. Rimkus, V. Gribniak	10:30-10:50 <b>Reducing input uncertainties in damage-based finite element models of nuclear containment structures through Bayesian inference</b> <u>H. Al Elani</u> , L. Jason, D. Bouhjiti, B. Richard
	10:50-11:10 <b>DEM-based numerical analysis of fiber-reinforced concrete</b> <u>M. Nitka</u>	10:50-11:10 <b>Numerical simulation of experimentally determined shear capacity of a prestressed beam without transverse reinforcement</b> <u>S. Coppens</u> , R. Caspeepe, R. Wan-Wendner
	11:10-11:30 <b>Explicit consideration of the fiber orientation state in the design of fiber reinforced concrete structures with nonlinear FE-analysis</b> <u>G. E. Neu</u> , V. Gudžulić, K. Daadouch, G. Meschke, Z. Yang	11:10-11:30 <b>Computational confinement analysis of hollow circular concrete columns using a finite layer constitutive framework</b> <u>A. M. Abd El Fattah</u>
	11:30-11:50 <b>Numerical simulation of rust growth and corrosion-induced cracking in reinforced concrete samples</b> G. G. Noxpanco, <u>I. Marzec</u> , J. Bobiński	11:30-11:50 <b>Analytical prediction model for the mechanical response of concrete cover spalling supported by numerical simulations</b> <u>A. DeKeyser</u> , W. Botte, R. Caspeepe, R. Wan-Wendner, E. Verstryngge
	11:50-12:10 <b>Comprehensive validation of a 2.5D layered model for crack growth in concrete</b> <u>B. Kondys</u> , J. Bobiński	11:50-12:10 <b>Modeling PPFRC beams: assessment of constitutive and bond models</b> <u>K. Subramanian</u> , T. Molkens, R. Vrijdaghs, A. De La Fuente
12:10-13:30	<b>Lunch Break</b>	

## Plenary Lecture Session

Jan G. Rots

Olympia

13:30-14:10



### Plenary Lecture 2

13:30-14:10

**Time-dependent load-bearing capacity of corroded post-tensioned bridge beams with dapped-ends**

**B. Belletti, B. Calcavecchia, S. Ravasini**  
University of Parma, Italy

**Abstract:** Italian transportation networks include several existing bridges, built since the early '60s, usually characterized by simply supported prestressed concrete (PC) beams with post-tensioned steel tendons. Nowadays, a considerable number of such bridges are becoming obsolete due to deterioration caused by environmental exposure during their service life. In particular, bridge beams with dapped-ends are more prone to reinforcement corrosion due to the geometry of the nib, which can lead to a significant reduction in load-bearing capacity. In the present study, a numerical modelling approach is presented to evaluate the reduction of the load-bearing capacity of an existing Italian bridge by including defects and corrosion-induced effects varying over time on post-tensioned tendons. To this purpose, Non-Linear Finite Element Analyses (NLFEA) of an existing PC bridge beam have been performed. The corrosion over time of post-tensioning wires is considered by modifying their constitutive laws (in terms of residual stress vs strain) to reproduce the time-dependency of the load-bearing capacity of the bridge beam. The results demonstrate that numerical models can serve as digital twins of existing structures suitable to implement the effects of the spatial and temporal variability of corrosion process in the response prediction of existing structures.

14:10-15:30

### MA1: Analysis of concrete structures

Jan G. Rots

Olympia

14:10-14:30

**A generalized and parametrized finite-element model for flat slab punchin**

**U. Häußler-Combe, S. Faustmann, O. Fischer**

14:30-14:50

**A new model for anchorage length design in concrete elements considering support effects and ductility**

**T. Molkens, T. Jaspers, S. Geukens, P. Van Itterbeeck**

14:50-15:10

**Lattice discrete modeling of fatigue propagation in concrete validated using prestressed beam tests**

**M. Aguilar, M. Vořechovský, R. Chudoba**

15:10-15:30

**A platform for validation and verification of models for concrete and concrete structures**

**J. F. Unger, A. Robens-Radermacher, S. M. Rosenbusch, D. Tyagi, D. Iglezakis, M. Jafarkhani**

15:30-16:00

**Coffee Break**

# Monday, March 9, 2026

16:00-17:40	MA2/1: Analysis of concrete structures  Beatrice Belletti <span style="float:right">Olympia</span>	MA2/2: Constitutive models and computational frameworks  Jan Elias <span style="float:right">Seefeld/Tirol</span>
	16:00-16:20 <b>FE modelling of concrete biological shield exposed to neutron radiation</b> <u>J. Kovar</u> , J. Cervenka, Y. Khmurovska, P. Stemberk	16:00-16:20 <b>Fiber's key characteristics in aligned pullout: insights from computations</b> <u>S. Mehrpay</u> , R. Wan-Wendner, L. Wang, T. Ueda, D. Pelessone, J. Vorel, M. Adel
	16:20-16:40 <b>Composite behavior of concrete columns with one-directional section enlargements</b> <u>T. Jespers</u> , J. Smits, T. Molkens, R. Vrijdaghs, E. Reynders	16:20-16:40 <b>Modelling crack propagation in concrete structures using a cohesive fracture phase-field framework</b> <u>E. Lorentz</u> , S. Michel-Ponnelle, F. Hamon, M. Gantier
	16:40-17:00 <b>Structural vulnerability and catenary effects in concrete frames under high-energy events</b> <u>V. De Biagi</u> , F. Kiakojouri, B. Chiaia	16:40-17:00 <b>CT-image-based simulation of cracking of fiber-reinforced concrete beams</b> <u>V. Gudžulić</u> , K. Daadouch, G. Meschke, Z. Yang
	17:00-17:20 <b>Reliability assessment of concrete walls as systems for low impacted energies in steep mountainous areas</b> <u>M. Marchelli</u> , V. De Biagi	17:00-17:20 <b>On vertex instability of pressure-sensitive non-associated plasticity with hyperbolic plastic potential functions</b> <u>P. Hofer</u> , G. Hofstetter, M. Neuner
	17:20-17:40 <b>FEM analysis of punching shear in reinforced concrete slabs: role of concrete-steel interface</b> <u>F. Suárez</u> , J. C. Gálvez	17:20-17:40 <b>Revisiting equivalent strain concepts with reference to localizing gradient damage</b> <u>A. Wosatko</u> , J. Bobiński, M. German
17:45-20:00	<b>Welcome Cocktail</b>	

## Plenary Lecture Session

Bernhard Pichler

Olympia

09:00-09:40



### Plenary Lecture 3

09:00-09:40

**Mesoscale discrete modeling of monotonic, cyclic and fatigue loading of concrete**

M. Vořechovský, V. Sadílek, J. Eliáš, J. Květoň, J. Mašek

Brno University of Technology, Czech Republic

**Abstract:** Concrete fatigue controls long-term safety and serviceability, yet prediction is hampered by heterogeneous mesoscale mechanisms (microcracking, frictional sliding, damage accumulation) and their interaction under monotonic, cyclic, and high-cycle loading. We present a unified discrete mesoscale model in which rigid particles (aggregates) interact through vectorial interface laws coupling pressure-sensitive plasticity and damage derived from thermodynamic potentials. Normal response combines compression plasticity with tensile softening damage; tangential response employs coupled damage-plasticity with kinematic hardening, enabling hysteresis, stiffness degradation upon unloading, and fatigue damage growth below peak load. A mild shear-normal damage coupling reflects loss of tensile integrity after extensive sliding. The formulation yields an energy-consistent decomposition (elastic strain energy, plastic work, plastic free energy, damage dissipation) used to interpret fatigue degradation. Validation covers: (i) non-proportional compression-torsion (vertex effect), (ii) biaxial tension/compression, and (iii) notched three-point bending under monotonic, post-peak cyclic, and subcritical fatigue regimes. Simulations reproduce peak loads, unloading stiffness reduction, crack evolution, lifetime trends, and show that plastic dissipation is amplitude-dependent while damage dissipation is nearly amplitude-insensitive and correlates with failure. This supports damage energy as an objective indicator for remaining fatigue life.

09:40-10:10

**Coffee Break**

# Tuesday, March 10, 2026

10:10-12:10	<b>TM1/1: Constitutive models and computational frameworks</b> Daniela Addressi <span style="float: right;">Olympia</span>	<b>TM1/2: Multi-scale and multi-physics approaches</b> Jacek Tejchman <span style="float: right;">Seefeld/Tirol</span>
	10:10-10:30 <b>A phase-field damage-plasticity approach for analyzing bonded anchors with supplementing reinforcements</b> M. Neuner, <a href="#">L. Mitrovic</a> , K. Basche, P. Hofer, A. Dummer, I. Boumakis, N. Vita	10:10-10:30 <b>A novel meso-scale numerical implementation of the carbonation kinetics of cementitious materials</b> <a href="#">M. Tang</a> , J. Billiet, R. Wan-Wendner, Q. T. Phung, S. C. Seetharam, J. Shao, E. Coppens
	10:30-10:50 <b>An iterative-incremental energy-based micromechanical model for quasi-brittle materials with crack closure and friction</b> <a href="#">P. H. R. Silveira</a> , R. Esposito	10:30-10:50 <b>Multi-scale numerical investigation of freeze-thaw effects on fatigue behavior of RC slabs and development of strain energy-based damage factor</b> <a href="#">Y. Qin</a> , X. Ji, Y. Takahashi
	10:50-11:10 <b>A scalable hybridized mixed finite element formulation for 3D crack propagation under large strain and contact</b> C. Runcie, A. Bijaya, K. Lewandowski, A. G. Shvarts, <a href="#">L. Kaczmarczyk</a> , C. J. Pearce	10:50-11:10 <b>Multiscale thermo-elastic modeling of hydrating binders for waste confinement</b> <a href="#">N. Zeaiter</a> , B. Bary, J. Yvonnet, G. La Valle
	11:10-11:30 <b>A finite volume-based cyclic constitutive model for reinforced concrete</b> <a href="#">T. Jochyms</a> , S. Grange	11:10-11:30 <b>Multiscale strength modeling of low-carbon cement pastes: the roles of the stiffness of binder constituents and surrogate modeling</b> <a href="#">S. J. Schmid</a> , M. Königsberger, B. Pichler, A. Ouzia
	11:30-11:50 <b>Size-effect law in gap test recreated with damaged-plasticity model</b> <a href="#">M. Szczecina</a> , A. Winnicki	11:30-11:50 <b>Influence of wall effect on drying shrinkage of self-compacting concrete</b> <a href="#">P. Havlasek</a> , V. Smilauer, P. Reiterman, L. Dohnalova, W.-C. Liao
	11:50-12:10 <b>A frictional cohesive zone model for simulating quasi-brittle fracture: time-dependent vs time-independent regularizations of the frictional term</b> <a href="#">G. Cera</a> , J. G. Rots, F. Messali, A. T. Slobbe	11:50-12:10 <b>Multiscale modelling of carbonation in concrete made with RCA</b> <a href="#">E. Thommes</a> , A. Fanara, L. Courard, F. Collin
<b>12:10-13:30</b>	<b>Lunch Break</b>	

## Plenary Lecture Session

Günther Meschke

Olympia

13:30-14:10



### Plenary Lecture 4

13:30-14:10

**Establishing trust in nonlinear failure analysis of concrete structures through facilitating nuanced quantification of uncertainties**

M. Hendriks<sup>1,2</sup>

<sup>1</sup>Delft University of Technology, the Netherlands; <sup>2</sup>Norwegian University of Science and Technology, Norway

**Abstract:** After a somewhat loosely written introductory section, in which various opinions and statements only partly based on traceable facts were presented, this paper mainly intends to show that accurately defining a solution strategy is the basis for establishing trust in nonlinear failure analysis of concrete structures. The paper describes what is meant by such a solution strategy, how the concept of a solution strategy has been incorporated into a recent standard by which the practical use of non-linear finite element analyses has come a step closer, and refers to a recent blind prediction contest example to illustrate a major pitfall.

14:10-15:30

## TA1: Multi-scale analysis of concrete materials

Bernhard Pichler

Olympia

14:10-14:30

**Effects of fluid and aggregate fragmentation on dynamic concrete behavior using a novel DEM-based hydro-mechanical model**

M. Krzaczek, M. Nitka, J. Tejchman

14:30-14:50

**Modeling the contact problem for creep analysis in C-S-H nanoindentation**

J. Němeček, J. Němečková, J. Němeček

14:50-15:10

**Sensitivity and uncertainty analysis of surrogate-assisted micromechanical models for recycled aggregate concrete with ITZ considerations**

A. O. Shittu, L. Göbel

15:10-15:30

**2D framework for mesoscopic concrete simulations enriched with 3D topology information**

J. Bobiński, B. Kondys

15:30-16:00

**Coffee Break**

16:00-18:00	TA2/1: Analysis of concrete materials	TA2/2: Analysis of concrete structures
	<p>Luise Göbel <span style="float: right;">Olympia</span></p>	<p>Rostislav Chudoba <span style="float: right;">Seefeld/Tirol</span></p>
	<p>16:00-16:20  <b>Microstructural characterization and numerical evaluation of interfacial transition zones in cement-based composites with biomineralized-coated aggregates</b>  <u>S.-Y. Chung</u>, S.-E. Oh, J.-S. Kim</p>	<p>16:00-16:20  <b>Computational evaluation of strains measured in tubings of a segmental tunnel lining</b>  <u>M. Sorgner</u>, F. Stadlbauer, A. Razgordanisharahi, C. Hellmich, B. Pichler, T. Pilgerstorfer, B. Moritz</p>
	<p>16:20-16:40  <b>Multiscale modeling of the mechanical properties of mortars containing mineral additions and recycled sand</b>  <u>A. Adessina</u>, J.-F. Barthélémy, A. Ben Fraj</p>	<p>16:20-16:40  <b>Numerical study on matrix deterioration at the anodic region of impressed current cathodic protection system</b>  <u>Y. Ji</u>, Z. Wang, T. Ishida</p>
	<p>16:40-17:00  <b>Predictive modeling of concrete carbonation in urban tunnels using experimental data</b>  L. López-de Abajo, <u>J. C. Galvez</u>, M. G. Alberti, A. Moragues</p>	<p>16:40-17:00  <b>DCNN based on X-ray CT images for detection of cracking damage of in-service concrete structure</b>  <u>K. Ikeda</u>, K. Shibano, M. Mukai, T. Suzuki</p>
	<p>17:00-17:20  <b>Do we need environmental boundary conditions for the time-dependent material behaviour of concrete?</b>  <u>W. Bachofner</u>, P. Huber</p>	<p>17:00-17:20  <b>Study of the impact of coatings on the ageing assessment of double wall concrete containment building without metallic liner</b>  <u>A. Rima</u>, G. El Tabbal, J.-L. Adia</p>
	<p>17:20-17:40  <b>Thermo-hydro-mechanical study of creep in concrete at 150 °C and 90% RH: experimental characterization and modeling calibration</b>  <u>S. Cheng</u>, S. Poyet, T. Honorio, B. Bary, F. Hild</p>	<p>17:20-17:40  <b>Analysis with FEM and shear-lag theory for predicting stress distribution along interface of post-installed short-length epoxy anchor</b>  <u>A. Satoh</u></p>
	<p>17:40-18:00  <b>Modelling of the wall effect with the two-phase Lattice Discrete Particle Model</b>  <u>J. Billiet</u>, J. Wang, W. Botte, R. Wan-Wendner, J. Vorel</p>	<p>17:40-18:00  <b>Seismic capacity assessment of existing corroded RC viaduct piers in marine environment</b>  A. Safabakhsh, E. Michelini, S. Ravasini, <u>B. Belletti</u></p>

## Plenary Lecture Session

Jan G. Rots

Olympia

09:00-09:40



### Plenary Lecture 5

09:00-09:40

**Exploring the potential of new reinforcements for the structural strengthening using advanced numerical simulations**

**R. Talebkhah, J. Barros**

University of Minho, Portugal

**Abstract:** This study investigates the effectiveness of iron-based shape memory alloy (Fe-SMA) U-shaped stirrups for shear strengthening of reinforced concrete (RC) beams in combination with near-surface mounted (NSM) carbon fibre reinforced polymer (CFRP) laminates. A three-dimensional multidirectional fixed smeared crack model was used for numerical simulations. The model's accuracy was first verified using experimental data from RC beams strengthened solely with NSM CFRP laminates. Subsequently, Fe-SMA stirrups were incorporated to evaluate their performance under service and ultimate limit states. The effects of prestress level and activation sequence on Fe-SMA stirrups were examined to identify an optimal hybrid configuration. Results show that using  $\rho_{sw}=0.64\%$  U-shaped Fe-SMA stirrups prestressed to 80% of its yield stress, combined with  $\rho_{fw}=0.11\%$  NSM CFRP laminates, increased shear capacity by 100% compared to the reference beam and by 28% relative to beams strengthened only with NSM CFRP. Moreover, applying the estimation of the coefficient of variation (ECov) method reduced the predicted load capacity by 30–38%.

09:40-10:40

## WM1: Data-driven, AI and machine learning methods

Günther Meschke

Olympia

09:40-10:00

**Data-driven damage mechanics: an outlook to failure**

**G. Pijaudier-Cabot, J. Houry**

10:00-10:20

**Refining crack width predictions in RC beams using FEM and neural network-based surrogate models for crack band size correction**

**J. Kovar, J. Cervenka, V. Cervenka, D. Lehky, D. Novak**

10:20-10:40

**Strut and tie ML AI models for reinforced concrete analysis**

**O. Rashti, R. Eid, S. Greenberg, E. Gal**

10:40-11:10

**Coffee Break**

# Wednesday, March 11, 2026

11:10-12:30	<b>WM2/1: Data-driven, AI and machine learning methods</b> Jan Cervenka <span style="float: right;">Olympia</span>	<b>WM2/2: Analysis of concrete structures</b> Max Hendriks <span style="float: right;">Seefeld/Tirol</span>
	11:10-11:30 <b>Predicting fatigue lifetime of high-strength concrete with physics-based machine learning</b> <u>A. Baktheer</u> , E. S. Elasyed, F. Aldakheel	11:10-11:30 <b>Numerical study on effects of stud bolt and tiebar on impact resistance of SC panels under impact loads</b> J. Ye, H. Ahn, Y. Park, <u>J.-Y. Cho</u>
	11:30-11:50 <b>Scene classification-assisted deep learning for crack detection of asphalt pavements in RC bridge</b> <u>T. Suzuki</u>	11:30-11:50 <b>Prediction of post-fire performance of scaled cylindrical RC walls of RPV pedestal of nuclear power plant</b> <u>K. Iwama</u> , K. Maekawa
	11:50-12:10 <b>Computational thermal analysis for health monitoring of concrete dam structures using shadow modeling and deep learning</b> <u>K. Shibano</u> , M. Kimura, K. Ohno, N. Alver, T. Suzuki	11:50-12:10 <b>Key parameters for simulating Delayed Ettringite Formation in concrete structures</b> <u>J.-M. Sleiman</u> , T. Jochyms, L. Boutillon
	12:10-12:30 <b>Advancing impact simulation through physics-informed neural networks: application to multi-layer composites</b> <u>S. Pattajoshi</u> , S. Ray	12:10-12:30 <b>Design-oriented finite element method for solid reinforced concrete structures using convex optimisation</b> <u>J. Larsen</u> , J. M. Schulz, P. N. Poulsen, L. C. Hoang, M. E. M. Andersen
<b>12:30-12:40</b>	<b>Distribution of Lunch Boxes</b>	

# Wednesday, March 11, 2026

14:00-17:30

## Skiing Race

### Registration

If not yet done in advance, please register for the skiing race at the Registration Desk.

### Equipment

If you do not have your personal skiing equipment with you, you may rent both skis and ski boots from a ski rental. For online pre-reservations with [www.schimeier.at](http://www.schimeier.at), directly located at valley station of Gschwandtkopf, you will get a discount of 10 %.

### Place and Time

The valley station of Gschwandtkopf is located directly behind the conference venue.

The skiing race will take place on the slope "Brunnental" (marked in red). The fastest way to reach the race is by taking the lift "Happy Schleppi" (12) and then transferring to "Brunnental" (13).

We kindly ask all participants to gather at the starting area - mountain station of "Brunnental" - at 13:45, at the latest, in order to obtain the starting numbers and to ensure that the skiing race can start on time.

### Awards Ceremony

A joint Awards Ceremony with the participants of the curling is planned at 16:30 at the curling area. This allows participants of the skiing race to continue skiing until the ski lifts closes.



## 14:30-17:30 Alpine-style curling

### **Registration**

If not yet done in advance, please register for the alpine-style curling at the Registration Desk.

### **Experience and equipment**

No prior experience is required. Please wear appropriate winter clothing, including warm boots and gloves.

### **Place and Time**

The event's feasibility depends on sufficiently cold temperatures before and during the conference. A final decision on whether or not it will take place can only be made a few days in advance. We will keep you updated before and also during the conference.

The curling lanes are located just behind the conference venue. After a short introduction by the trainers, participants will be divided into groups of approximately five and compete against each other.

The curling will start at 14:30. Please be there in time.

### **Awards Ceremony**

A joint Awards Ceremony with the participants of the skiing race is planned at 16:30 at the curling area.

09:00-10:40	<b>ThM1/1: Constitutive models and computational frameworks</b> Matthias Neuner <span style="float: right;">Olympia</span>	<b>ThM1/2: Simulation methods for 3D concrete printing</b> Roman Wan-Wendner <span style="float: right;">Seefeld/Tirol</span>
	09:00-09:20 <b>A comparative study of state-of-the-art constitutive models for concrete failure under shear-dominated stress states</b> <u>K. Basche</u> , A. Dummer, P. Hofer, G. Hofstetter, M. Neuner	09:00-09:20 <b>Microstructural characterization and bonding performance evaluation of 3D-printed concrete-mortar composites</b> <u>J.-S. Kim</u> , C. Yoo, Y. Yang
	09:20-09:40 <b>Numerical study on prestressed concrete beams made continuous: blind predictions, post-dictions, and sensitivity studies</b> <u>N. W. Kostense</u> , Y. Yang, M. A. Hendriks, J. G. Rots	09:20-09:40 <b>Towards lattice modelling of additively manufactured cement-based composites with tailored Poisson's ratio-reinforcement</b> <u>R. J. M. Bol</u> , E. Schlangen, B. Šavija
	09:40-10:00 <b>Numerical modeling of concrete under large deformations</b> M. Vazana, <u>M. Jabareen</u>	09:40-10:00 <b>Assessing structural failure in extrusion-based 3D concrete printing using a plasticity model with non-linear hardening</b> <u>Saif-Ur-Rehman</u> , A. Robens-Radermacher, J. F. Unger, R. Wolfs
	10:00-10:20 <b>A position-based framework for modeling reinforced concrete beams and externally FRP-strengthened RC beams</b> <u>D. S. Bomfim</u> , F. Gatuingt, H. B. Coda, R. R. Paccola	10:00-10:20 <b>Multiphysics simulation of time-dependent early-age behaviour in 3D printed concrete</b> <u>Y. Hammad</u> , K. Van Tittelboom, R. Wan-Wendner, J. Vorel
	10:20-10:40 <b>Non-proportional sequentially-linear analysis for masonry structures: capturing combined foundation settlement and push-over loads</b> <u>Z. Dai</u> , P. A. Korswagen, J. G. Rots	10:20-10:40 <b>Optimization of mixing time for printcrete using a non-contact monitoring system</b> R. Sheng, <u>Y. Yuan</u> , J.-Y. Zhang, J.-L. Zhang
<b>10:40-11:10</b>	<b>Coffee Break</b>	

11:10-12:50	<b>ThM2: Constitutive models and computational frameworks including 3D concrete printing</b>
	<b>Gilles Pijaudier-Cabot</b> <span style="float: right;"><b>Olympia</b></span>
	11:10-11:30 <b>Gradient-enhanced damage-plasticity approaches for modeling failure of concrete: phase-field fracture vs. localizing gradient damage</b> A. Dummer, K. Basche, P. Hofer, G. Hofstetter, T. Mader, <a href="#">M. Neuner</a>
	11:30-11:50 <b>Numerical modelling of interlayer adhesion in 3D-printed concrete with LDPM</b> Y. Alzoubi, G. Muciaccia, L. Ferrara, A. Cibelli, <a href="#">R. Wan-Wendner</a>
	11:50-12:10 <b>Nonlinear force-based 3D beam model with bond-slip and time-staged prestressing for RC and PC structures</b> L. Parente, <a href="#">D. Addessi</a> , C.-L. Lee, E. Spacone
	12:10-12:30 <b>J-integral in random elastic medium</b> <a href="#">J. Eliáš</a> , J. Martínásek, J.-L. Le
	12:30-12:50 <b>On mapping algorithms for material random fields in stochastic FE analysis of quasibrittle structures</b> <a href="#">J.-L. Le</a> , J. Vievering
12:50-14:00	<b>Lunch Break</b>

14:00-15:20	<b>ThA1/1: Multi-scale and multi-physics approaches</b>	<b>ThA1/2: Analysis of concrete structures</b>		
	Enrico Masoero	Olympia	Tom Molkens	Seefeld/Tirol
	14:00-14:20 Boundary condition strategies for strain localization in discrete periodic unit cell <a href="#">J. Raisinger</a> , <a href="#">J. Eliáš</a>	14:00-14:20 Hybrid computational framework for nonlinear soil-structure interaction under seismic excitation using subdomain decomposition <a href="#">F. Osman</a> , <a href="#">S. Li</a> , <a href="#">W. Larbi</a> , <a href="#">N. Ayoub</a> , <a href="#">J. Pais</a> , <a href="#">R. Assaf</a>		
	14:20-14:40 Effect of mesostructure heterogeneity on the moisture and heat diffusion in concrete through a multi-phase discrete modelling approach <a href="#">A. Cibelli</a> , <a href="#">J. Billiet</a> , <a href="#">R. Wan-Wendner</a> , <a href="#">J. Vorel</a> , <a href="#">G. Di Luzio</a>	14:20-14:40 Shear and transverse bending in the webs of thin-walled bridge girders <a href="#">F. Untermaier</a> , <a href="#">J. Kollegger</a>		
	14:40-15:00 A novel DEM-based coupled 3D thermo-hydro-mechanical mesoscopic model with phase changes for modelling concrete behavior <a href="#">M. Krzaczek</a> , <a href="#">J. Teichman</a>	14:40-15:00 Benchmark on the modelling of RC structures affected by Delayed Ettringite Formation <a href="#">D. Bouhjiti</a> , <a href="#">R. Zhao</a>		
15:00-15:20 Building a bio-chemo-mechanical simulation tool for microbial induced carbonate precipitation (MICP) in concrete: coarse graining nano to micro <a href="#">A. Alex</a> , <a href="#">E. Masoero</a> , <a href="#">I. D. Ofiteru</a>	15:00-15:20 Fracture-based modelling and ductility quantification for structural health monitoring of reinforced concrete <a href="#">T. Fayyad</a>			
15:20-15:50	<b>Coffee Break</b>			

15:50-16:50	<b>ThA2: Advanced concrete simulations</b>	
	Miroslav Vorechovsky	Olympia
	15:50-16:10 Coarse-grained chemo-mechanical simulations: a cornerstone for long-term predictions of concrete degradation <a href="#">E. Masoero</a>	
	16:10-16:30 Three-dimensional analysis of box girders considering nonlinear creep, shrinkage, and cracking effects <a href="#">G. Di Luzio</a> , <a href="#">G. Odescalchi</a> , <a href="#">F. Puppo</a> , <a href="#">S. Wu</a>	
16:30-16:50 Lessons learned from simulations of the gap test <a href="#">M. Jirásek</a> , <a href="#">C. Li</a>		

## Plenary Lecture Session / Closing

Herbert A. Mang

Olympia

16:50-17:30



### Plenary Lecture 6

16:50-17:30

**Personal reflections on 40 years of research in computational modeling of the load-bearing behavior of concrete structures**

G. Hofstetter<sup>1</sup>, A. Dummer<sup>1</sup>, P. Gamnitzer<sup>1</sup>, P. Hofer<sup>1</sup>, M. Schreter<sup>1</sup>, M. Neuner<sup>2</sup>, T. Mader<sup>2</sup>, S. Smaniotto<sup>3</sup>, B. Valentini<sup>4</sup>, B. Winkler<sup>5</sup>

<sup>1</sup>University of Innsbruck, Austria; <sup>2</sup>BOKU University, Austria; <sup>3</sup>Schwenk Zement, Germany; <sup>4</sup>Plansee SE, Austria; <sup>5</sup>Hilti AG, Liechtenstein

**Abstract:** The progress in computational modeling of the load-bearing behavior of concrete structures from the 1980s until today is reviewed by focussing on selected topics, in which the first author and former and present co-workers were involved. The topics include ultimate load FE-analyses of a prestressed shell structure, regularization techniques for the softening behavior of concrete and modeling of the time-dependent material behavior of shotcrete. Special attention is paid to the validation and application of the numerical models to projects in engineering practice.

17:30-17:40

### Closing Session

G. Meschke, B. Pichler, J.G. Rots

19:30-23:00

## Conference Banquet

Restaurant Bräukeller

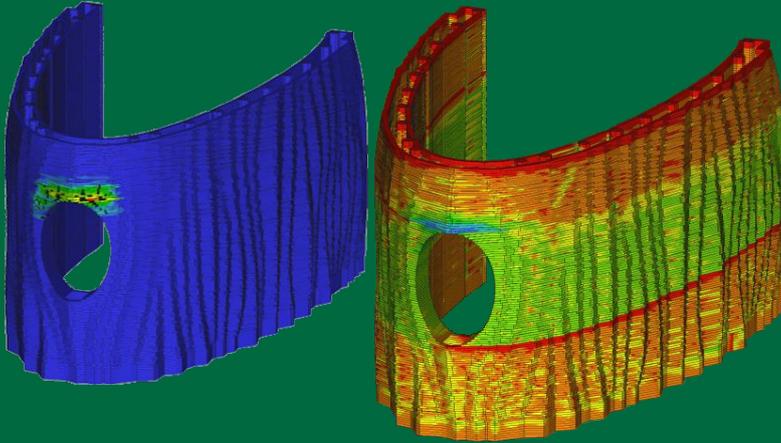
The conference banquet will take place at Restaurant Bräukeller at Hotel Klosterbräu (Klosterstraße 30) located in the center of Seefeld in Tirol. It will officially start at 19:30 with entrance and serving of aperitifs from 19:00 on.

Please do not forget to bring your banquet voucher.

# ATENA<sup>®</sup> 2026

## TEST YOUR STRUCTURE BEFORE YOU BUILD IT

Design and verify complex concrete structures with precision, efficiency and confidence!



### ATENA 2026 new and unique features:

- 2D and 3D modelling in a single user friendly environment
- Verification of structural capacity, deflections or crack width
- Thermal analysis of fresh concrete hydration and fire modelling
- Construction process modelling
- Unique run-time visualization
- Unique concrete crack display
- Durability models for reinforcement corrosion, ASR
- Dynamic load simulation
- 3D print process modeling
- Python scripting
- NURBS lines and surfaces
- CAD import: BIM/IFC, GiD, IGES
- 64-bit technology and parallel processing

