Thursday, September 10th

15.00-20.00  Registration of On-site participants
15.00 -        Check-in
18.00–21.00  Dinner

Friday, September 11th

07.00–08.45  Breakfast
08.50–09.00  Opening of the conference (Congress Hall, 8th floor)

09.00–10.40  Plenary lectures (Congress hall, 8th floor) – chairman Karol Mikula

09.00–09.50  D. Kuzmin: Bound-preserving discretizations of conservation laws using high-
              order finite elements
09.50–10.40  J. Droniou (Online): High-order methods for linear and non-linear elliptic
              equations
10.40–11.10  Coffee break

11.10–12.10  Parallel sessions

Session A (Congress Hall, 8th floor) – session on Innovative models and algorithms for
inverse problems in imaging and image processing – chairman Jooyoung Hahn

11.10–11.40  M. Kollár et al.: NaturaSat – software for segmentation of Natura 2000 habitats
              from Sentinel-2 satellite images
11.40–12.10  S. Ah Park et al.: Segmentation and tracking of macrophages in 2D+time
              microscopy images

Session B (Blue Hall, 7th floor) – session on Numerical simulation of multiphase flow,
transport and phase transitions – chairman Dmitri Kuzmin

11.10–11.40  V. Fuka: LES simulation and tracking of very large structures over rough surfaces
11.40–12.10  P. Knobloch: On the solvability of the nonlinear problems in an algebraically
             stabilized finite element method for evolutionary transport-dominated equations

12.10–14.00  Lunch

14.00–16.20  Parallel sessions

Session A (Congress Hall, 8th floor) – contributed session on Biology and medical image
processing and cell modelling – chairman Elfriede Friedmann

14.00–14.20  M. Oluuna Uba et al.: Segmentation of cell microscopy images in developmental
              biology
14.20–14.40  B. Kósa et al.: Image segmentation and point cloud surface reconstruction by
              level set methods
14.40–15.00  I. Cimrák: Modelling of cells with inner structures
15.00–15.20  A. Bohiniková: Computational models of cells with nucleus
15.20–15.40  O. Stašová: Regularised coherence enhancing diffusion
15.40–16.00  P. Omondi Okock et al.: Efficient 3D shape registration in medical image
              processing
16.00–16.20  K. Kovalčíková: Obstacle Design in ESPResSo
Session B (Blue Hall, 7th floor) – contributed session on Numerical linear algebra and ODEs with applications – chairman Jiří Vala

14.00-14.20  M. Tůma: Null-space approach for solving least squares with constraints
14.20-14.40  M. Rozložník: Near optimal scalings in the SR decomposition
14.40-15.00  P. Tichý: The multiplicative Schwarz method for matrices with a special block structure
15.00-15.20  J. Papež: From a posteriori algebraic error estimator to multilevel iterative solvers with p-robust behavior
15.20-15.40  J. Šístek: Towards a parallel domain decomposition solver for immersed boundary finite element method
15.40-16.00  J. Kopfová et al.: Long term analysis of non-pharmaceutical interventions in SIR model
16.00-16.20  T. Schneidereit, Michael Breuss: Solving ordinary differential equations using artificial neural networks - a study on the solution variance

16.20-17.00  Coffee break

17.00-18.40  Plenary lectures (Congress hall, 8th floor) – chairman Daniel Ševčovič

17.00-17.50  E. Haber (Online): Machine learning meets optimal control and PDEs inspired neural networks
17.50-18.40  C. Vazquez Cendon (Online): Computational advances in financial mathematics

19.00-21.00  Dinner
**Saturday, September 12th**

07.00-08.55  Breakfast

09.00-10.40  Plenary lectures  *(Congress hall, 8th floor)*  - chairman Martin Gander

09.00-09.50  Jooyoung Hahn: Finite volume level set methods in combustion engines
09.50-10.40  Xue-Cheng Tai (Online): Deep neural networks in image processing

10.40-11.10  Coffee break

11.10-12.10  Parallel sessions

**Session A (Congress Hall, 8th floor) –** session on Combustion in gas and other materials and flame propagation - *chairman Ivan Čimrák*

11.10-11.40  Martin Ambrož et al.: Forest fire propagation numerical model and its parameters estimation

**Session B (Blue Hall, 7th floor) –** session on High-order numerics for multiscale time-dependent problems - *chairman Václav Kučera*

11.10-11.40  Hennes Hajduk: Discrete maximum principle preserving methods for hyperbolic systems
11.40-12.10  Andreas Rupp: Simulating structure formation in soils across scales using discontinuous Galerkin methods

**Session C (Conference room, 12th floor) –** session on Iterative methods with applications – fast, robust and parallelizable solvers (Online) - *chairman Radim Blaheta*

11.10-11.40  Owe Axelsson: Regularization methods for the construction of preconditioners for saddle point problems
11.40-12.10  Maya Neytcheva, Owe Axelsson: Numerical solution methods for implicit Runge-Kutta methods of arbitrary high order

12.10-14.00  Lunch

14.00-16.00  Parallel sessions

**Session A (Congress Hall, 8th floor) –** session on Numerical simulations of fluid flows – *chairman Miloslav Feistauer*

14.00-14.30  Miloslav Feistauer et al.: Discontinuous Galerkin method for the fluid-structure interaction
14.30-15.00  Petr Sváček: On finite element approximation of incompressible fluid flow in computational domain with vibrating walls: mathematical models for treatment of channel closing
15.00-15.30  Václav Kučera: On the time growth of the error of the discontinuous Galerkin method for advection-reaction problems
15.30-16.00  Jan Valášek et al.: Fluid-structure-acoustic interaction problem in modelling of human vocal folds vibration

**Session B (Blue Hall, 7th floor) –** session on New trends in domain decomposition methods - *chairman Martin Gander*

14.00-14.30  Martin Gander: Finite volume schemes and Schwarz methods for anisotropic diffusion image restauration
14.30-15.00 Michal Outrata: Optimized Schwarz methods with low-rank transmission conditions
15.00-15.30 Conor McCoid: A provably robust algorithm for triangle intersections
15.30-16.00 Pierre Marchand: Schwarz methods for the boundary element method (Online)

**Session C (Conference room, 12th floor) – session on Novel methods in computational finance – chairman Daniel Ševčovič**

14.00-14.30 Matthias Ehrhardt: High-order methods for parabolic equations in multiple space dimensions for option pricing problems
14.30-15.00 Zuzana Bučková, Beáta Stehlíková: Dynamic correlation in a convergence model of interest rates
15.00-15.30 Tatiana Jašurková, Beáta Stehlíková: Calibration of the Vašíček model of interest rates using bicriteria optimization
15.30-16.00 Beatriz Salvador Mancho (Online): XVA for a stochastic volatility model

16.00-16.30 **Coffee break**

**16.30-18.30 Parallel sessions**

**Session A (Congress Hall, 8th floor) – session on Iterative methods with applications - fast, robust and parallelizable solvers – chairman Radim Blaheta**

16.30-17.00 Radim Blaheta et al.: Schwarz DD methods for coupled flow and elasticity in porous media
17.00-17.30 Michal Béreš et al.: Numerical models for coupled hydro-mechanics in disturbed continua
17.30-18.00 Jakub Kružík et al.: Convergence improvement of SMALXE and MPRGP algorithms
18.00-18.30 Simona Domesová: Surrogate accelerated sampling methods for Bayesian identification of material properties

**Session B (Blue Hall, 7th floor) – session on Computational models for pharmacy and related areas – chairman Jurjen Duinjter Tebbens**

16.30-17.00 Veronika Bernhauerová: Mathematical modelling of viral infections
17.00-17.30 Ctirad Matonoha: Adding spatial resolution to a pharmacodynamic model for nuclear receptors behavior
17.30-18.00 Karel Tůma: Light-activated shape memory polymers in bio-applications
18.00-18.30 Elfriede Friedmann et al.: A computational model for the drug treatment of age related macular degeneration

**Session C (Conference room, 12th floor) – session on Novel methods in computational finance – chairman Matthias Ehrhardt**

16.30-17.00 Soňa Kilianová: Transformation techniques of Hamilton-Jacobi-Bellman equations
17.00-17.30 Cyril Izuchukwu Udeani, Daniel Ševčovič: Application of maximal monotone operator method for solving Hamilton-Jacobi-Bellman equations
17.30-18.00 Igor Melicherčík et al.: Different ways of using second pillar savings in Slovakia
18.00-18.30 Terézia Fulová: Finding low-rank solutions in financial factor models

18.30-21.00 **Dinner**
Sunday, September 13th

Complementary activities of the ALGORITMY conference

1. Hike to Kriváň
   07.00–08.45 Breakfast, participants take lunch in a packet from baskets in breakfast room
   9.00 Departure of the conference bus to Štrbské pleso
   9.30–17.00 Hike to Kriváň
   17.00–22.00 Permon’s Paradise

2. Independent participants activities
   18.00–21.00 Dinner
Monday, September 14th

07.00–08.25  Breakfast

08.30–12.30  Online parallel sessions

Session A (Congress Hall, 8th floor) – session on Low and high-order numerical methods for porous media: developments and applications – chairmen Daniele Di Pietro and Jérôme Droniou

08.30–09.00  Iuliu Sorin Pop: Linear domain decomposition schemes for non-standard porous media flow models
09.00–09.30  Luca Formaggia: Some hybrid dimensional models for porous media flow
09.30–10.00  Simon Lemaire: Multiscale polytopal methods for highly heterogeneous diffusion problems
10.00–10.30  Jochen Schutz: A parallel-in-time IMEX multiderivative method

10.30–11.00  Coffee break and space for online discussion

11.00–11.30  Francesco Bonaldi: The gradient discretisation method for two-phase discrete fracture matrix models in deformable porous media
11.30–12.00  André Harnist: A hybrid high-order method for creeping flows of non-Newtonian fluids
12.00–12.30  Florent Hédin: A hybrid high-order method with non-matching meshes in discrete fracture networks
12.30–13.00  Stephan Garttner et al.: Efficiency of micro-macro models for dissolution/precipitation in two-mineral systems

Session B (Blue Hall, 7th floor) – session on New trends in numerical optimization and Advances in model order reduction and its applications – chairmen Gabriele Ciaramella and Tim Keil

09.00–09.30  Gabriele Ciaramella: On a greedy operator reconstruction algorithm
09.30–10.00  Anna Schlintl: All-at-once formulations of inverse problems within the Bayesian approach
10.00–10.30  Luca Mechelli: Reduced basis trust region method for PDE-constrained parameter optimization

10.30–11.00  Coffee break and space for online discussion

11.00–11.30  Dominik Garmatter: Reduced basis methods for Magnetic Resonance Electrical Impedance Tomography (MREIT) – On-site
11.30–12.00  Tim Keil: Advances for Reduced Basis methods for PDE-constrained optimization: a non conforming approach
12.00–12.30  Josua Sassen: Nonlinear reduced bases for the space of discrete shells

Session C (Conference room, 12th floor) – session on Numerical simulation of multiphase flow, transport and phase transitions – chairmen Pavel Strachota and Robert Straka

09.00–09.30  Pavel Strachota: CFD Simulation and experimental analysis of fluidization in a model of an oxyfuel fluidized bed boiler
09.30–10.00  Ferdinand Thein: The Riemann problem for a barotropic two fluid model
10.00–10.30  Aleš Wodecki: Efficiency of a hybrid parallel algorithm for phase-field simulation of polycrystalline solidification in 3D

10.30–11.00  Coffee break and space for online discussion
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<tr>
<th>Time</th>
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<tr>
<td>11.00–11.30</td>
<td>Kateřina Škardová: Investigation of blood-like non-Newtonian fluid flow in</td>
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<td>stenotic arteries using the Lattice Boltzmann method in 2D</td>
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<td>11.30–12.00</td>
<td>Pavel Eichler: Lattice Boltzmann simulations of turbulent flow above rough</td>
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<td>12.00–12.30</td>
<td>Ondřej Pártl: Mathematical modeling of non-isothermal compositional</td>
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<td>compressible fluid flow in zeolite bed and above its surface</td>
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**Session D (Conference room, 10th floor) – session on Pressure-robust discretisations for flow problems and their applications – chairman Christian Merdon**

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<th>Time</th>
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<tr>
<td>09.00–09.30</td>
<td>Christian Merdon: A Gradient-robust discretisation of the compressible Stokes</td>
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<td>09.30–10.00</td>
<td>Jürgen Fuhrmann: Quality preserving numerical methods for electroosmotic flow</td>
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<td>10.00–10.30</td>
<td>Volker Kempf: Anisotropic pressure-robust discretizations of the Stokes equations</td>
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<td>10.30–11.00</td>
<td>Coffee break and space for online discussion</td>
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<td>11.00–11.30</td>
<td>Christian Kreuzer: Quasi-optimal and pressure robust Stokes discretisations</td>
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<td>11.30–12.00</td>
<td>Daniel Castanon Quiroz: A hybrid high-order method for the incompressible</td>
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<td>Navier-Stokes problems robust for large irrotational body forces</td>
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<td>12.00–12.30</td>
<td>Derk Frerichs: A really pressure-robust virtual element method for the Stokes</td>
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<td>13.00–15.00</td>
<td>Lunch</td>
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<td>15.00–17.00</td>
<td>Parallel sessions</td>
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**Session A (Congress Hall, 8th floor) – contributed session on Numerical methods in flows – chairman Petr Knobloch**

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<tr>
<td>15.00–15.20</td>
<td>Lukáš Vacek, Václav Kučera: Traffic flow model on networks using numerical</td>
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<td>fluxes at the junctions</td>
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<td>15.20–15.40</td>
<td>Gergő Ibolya, Karol Mikula: Numerical solution of the 1D viscous Burgers’ and</td>
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<td>traffic flow equations by the inflow-implicit outflow-explicit finite volume</td>
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<td>15.40–16.00</td>
<td>Klára Jurčáková: Boundary-layer flows - challenges for measurement and numerical</td>
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<td>16.00–16.20</td>
<td>Richard Liska: Lagrangian Lax-Wendroff methods for hydrodynamic and elastoplastic</td>
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<td>16.20–16.40</td>
<td>Miloslav Vlasák: On robustness of flux reconstructions - discontinuous Galerkin</td>
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**Session B (Blue Hall, 7th floor) – contributed session on Mathematical and numerical modelling in porous media flow and Earth sciences – chairman Miroslav Tůma**

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<tr>
<td>15.00–15.20</td>
<td>Patrik Mihala, Jozef Kačur: Water suspension infiltration with adsorption in</td>
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<td>unsaturated-saturated porous media</td>
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<td>15.20–15.40</td>
<td>Johanna Blöcher, Michal Kuráž: On the issue of switching between non-freezing</td>
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<td>and freezing in soils</td>
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<td>15.40–16.00</td>
<td>Jiří Vala: Modelling of micro- and macro-fracture in cementitious composites</td>
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<td>16.00–16.20</td>
<td>Marek Macák et al.: On the finite element method for solving the oblique</td>
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<td>derivative boundary value problems in gravity field modelling</td>
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<td>16.20–16.40</td>
<td>Jan Valdman: Matlab vectorization of FEM</td>
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<td>16.40–17.00</td>
<td>Martin Ladecký: Well-conditioned finite element method for the periodic</td>
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<td>homogenisation</td>
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Session C (Conference room, 12th floor) – Online session on innovative models and algorithms for inverse problems in imaging and image processing – chairman Fiorella Sgallari

15.00–15.30  Alessandro Lanza: Convex-nonconvex variational models for sparse-regularized inverse problems

15.30–16.00  Kostas Papafitsoros: Automatic distributed regularization parameter selection in total generalized variation based image reconstruction via bilevel optimization

16.00–16.30  Luca Calatroni: Accelerated iterative regularization via inertial dual diagonal descent

16.30–17.00  Andres Almansa: Solving inverse problems with neural regularizers and convergence guarantees

19.00–24.00  Conference dinner (Halla Grande – 5th floor) with Slovak food and wines, music and dancing
Tuesday, September 15th

07.30–08.55  Breakfast

Plenary lectures (Congress hall, 8th floor) – chairman Miloslav Feistauer

09.00–09.50  Stefan Volkwein (Online): Reduced basis methods for PDE-constrained parameters optimization

09.50–10.40  Alexander Linke (Online): On pressure-robust space discretizations and incompressible high Reynolds number flows

10.40–11.30  Check-out

12.00–14.00  Lunch