18th INTERNATIONAL CONFERENCE ON

COMPUTER METHODS IN MECHANICS

CMM 2009

18-21 May 2009, Zielona Góra, Poland

PROGRAMME

Editors:

M. Kuczma
K. Wilmański
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Zielona Góra 2009

Organized by

Committee on Mechanics,
Department of Technical Sciences,
Polish Academy of Sciences

Polish Association for Computational Mechanics

University of Zielona Góra

Under the auspices of

European Community on Computational Methods
in Applied Sciences

Central European Association
for Computational Mechanics

Under the honourable patronage of

Marshall of the Lubuskie Province

Mayor of the City of Zielona Góra

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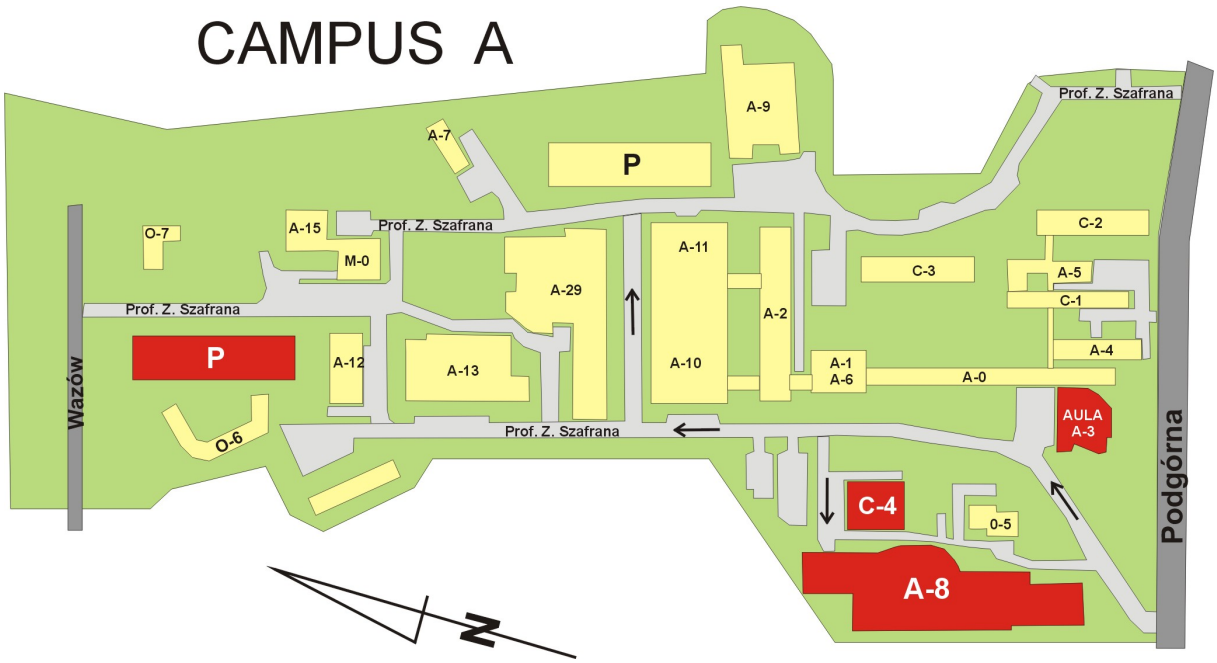
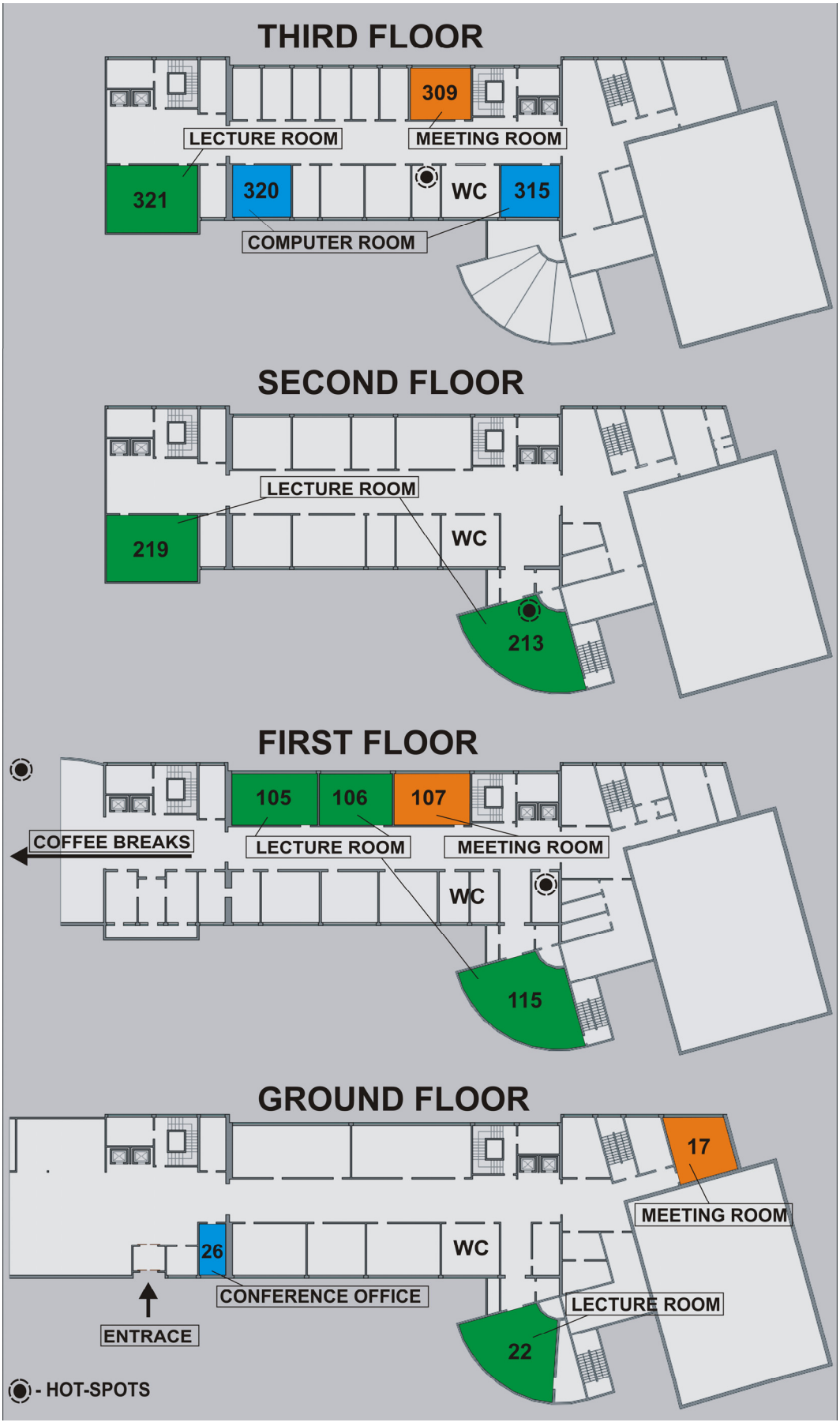
PLAN OF ZIELONA GÓRA

CAMPUS A



BUILDING A-8


THIRD FLOOR
309
LECTURE ROOM
MEETING ROOM
321
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COMPUTER ROOM
SECOND FLOOR
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213
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COFFEE BREAKS
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MEETING ROOM
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CONFERENCE OFFICE
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- HOT-SPOTS

PLENARY LECTURES

All plenary lectures take place in aula of the University of Zielona Góra, campus A, 50 Podgórna str.

Monday, 18 May

10:00 **Tadeusz Burczyński** *Silesian University of Technology, Gliwice, Poland*
Immune computing: intelligent methodology and its applications in bioengineering and computational mechanics

10:40 **Erwin Stein** *Leibniz Universität Hannover, Germany*
Combined model and finite element discretization adaptivity for quantities of interest with upper error bounds

15:10 **Herbert Mang** *Vienna University of Technology, Austria*
Answers to Three not quite Straightforward Questions in Structural Stability

Tuesday, 19 May

8:30 **Leszek Demkowicz** *University of Texas at Austin, USA*
hp-Adaptive Finite Elements for Wave Propagation Problems

9:10 **John Osborn** *University of Maryland, College Park, USA*
Quadrature for Meshless Methods

13:40 **Rene de Borst** *Eindhoven University of Technology (TU/e), The Netherlands*
Computational Mechanics of Evolving Discontinuities

Wednesday, 20 May

8:30 **Eugenio Oñate** *Technical University of Catalonia, Spain*
Advances in the Particle Finite Element Method for Multidisciplinary Problems in Computational Mechanics

9:10 **Gulio Maier** *Politecnico di Milano, Italy*
Synergistic combinations of computational methods and experiments for structural diagnosis

13:40 **Miles B. Rubin** *Technion, Israel*
Accuracy and Robustness of a 3-D Brick Cosserat Point Element (CPE) for finite elasticity

Thursday, 21 May

10:50 **Jörg Schröder** *Universität Duisburg-Essen, Germany*
Two-Scale Modeling of Ferroelectric Materials

11:30 **Tomasz Łodygowski** *Poznań University of Technology, Poland*
Tooth-implant life cycle design

MINISYMPOSIA

MS1: Meshless and Related Methods
Organizer: Janusz Orkisz

MS2: Multiscale Modelling and Nanomechanics
Organizers: Tadeusz Burczyński, Paweł Dłużewski and Maciej Pietrzyk

MS3: Optimization and Identification of Structures
Organizers: Krzysztof Dems, Andrzej Garstecki and Witold Gutkowski

MS4: Computational Methods of Artificial Intelligence
Organizers: Tadeusz Burczyński, Zenon Waszczyszyn and Leonard Ziemiański

MS5: Topology Optimization
Organizers: Tomasz Lewiński and Antoni Żochowski

MS6: Textile Reinforced Concrete
Organizer: Bernd W. Zastrau

MS7: Computer Methods in Geomechanics and Granular Flow
Organizers: Pieter Vermeer and Zdzisław Więckowski

MS8: Heat Transfer
Organizers: Ewa Majchrzak and Bohdan Mochnacki

MS9: Computational Mechanics of Composite Materials and Structures
Organizers: Rene de Borst and Tomasz Sadowski

MS10: Computer Methods in Biomechanics
Organizers: Romuald Będziński and Krzysztof Ścigała

MS11: Boundary Element Methods
Organizer: Matthias Maischak

MS12: Computational Contact Mechanics
Organizers: Przemysław Litewka and Alfred Zmitrowicz

MS13: Adaptive Methods and Error Estimation
Organizers: Witold Cecot, Waldemar Rachowicz and Grzegorz Zboiński

MS14: Computational Mechanics of Multiphase Porous Materials Including Durability
Organizers: Dariusz Gawin, Francesco Pesavento and Berhard A. Schrefler

THEMATIC SESSIONS

TS1: Dynamics

TS2: Mechanics of Structures

TS3: Material Properties

TS4: Heat Conduction

TS5: Fluid Mechanics

TS6: Damage and Failure

TS7: Inverse Problems

TS8: Applied Mathematics and Computational Mechanics

INDUSTRIAL SESSIONS

IS1: Structural Monitoring and Measurement Techniques

IS2: FEA Software and Industrial Problems

KEYNOTE LECTURES

M. Ainsworth, H. A.Wajid (MS13)
Optimally Blended Spectral-Finite Element Scheme for Wave Propagation, and Non-Standard Reduced Integration

S. Amstutz, A. A. Novotny (MS5)
Topological optimization of structures subject to stress constraints

A. Belkadi, P. Dłużewski, G. Dimitrakopulos, T. D. Young, P. Komninou (MS2)
The nonlinear finite element and atomistic modelling of dislocations in semiconductor structures

W. Beluch, T. Burczyński, A. Długosz, P. Orantek (MS4)
Granular computing in evolutionary identification

R. Będziński, K. Ścigała (MS10)
Biomechanical basis of implant – tissue interactions

M. Kohr, G. P. Raja Sekhar, W. L. Wendland (MS11)
Boundary integral equations for a three-dimensional Stokes-Brinkman cell model

W. Kuś, T. Burczyński (MS2)
Bioinspired algorithms in multiscale optimization

M. Lefik, D. P. Boso, B. A. Schrefler (MS2)
Generalised self consistent homogenisation using finite element method

P. Litewka (MS12)
The node-preserving beam-to-beam contact smoothing using Bezier's curves

G. R. Liu (MS1)
A weakened weak (W2) form for a unified formulation of compatible and incompatible displacement methods for solid mechanics problems

S. Migórski, A. Ochal (MS12)
Nonconvex inequality models for contact problems of nonsmooth mechanics

Z. Mróz (MS12)
Material contact interfaces: numerical modelling of frictional slip, wear and damage

L. Murawski, W. Ostachowicz (MS3)
Optimization of Marine Propulsion System's Alignment for Aged Ships

J. Orkisz, S. Milewski (MS1)
Higher Order discretization of the Meshless Local Petrov Galerkin formulations

Ch. J. Pearce, Ł. Kaczmarczyk (MS14)
Numerical multi-scale simulation of fracturing heterogeneous porous materials

P. J. Prendergast, S. Checa, H. Khayyeri, C. Boyle, D. P. Byrne, A. B. Lennon (MS10)
Predictive modelling in mechanobiology: combining algorithms for cell activities in response to physical stimuli using a lattice-modelling approach

G. Salerno, S. Mariani, A. Corigliano (MS9)
Experimental-numerical investigation of impact-induced failure in layered composites

J. Sokołowski, A. Żochowski (MS5)
Topological derivatives of shape functionals for elasticity systems

L. Stefan, F. Benboudjema, J. M. Torrenti (MS14)
Modelling Concrete at Early Age using Percolation

E. P. Stephan , T. Tran, A. Costea (MS11)
A boundary integral equation on the sphere for high-precision geodesy

D. Stolle, I. Jassim, P. Vermeer (MS7)
Accurate simulation of incompressible problems in geomechanics

G. Szefer (MS2)
Molecular and FEM-Molecular analysis of strains and stresses at the nanoscale range

G. Szefer (MS12)
Contact Problems in Advanced Materials and Structures

J. Tejchman (MS7)
Boundary effects on behaviour of granular material

D. Uciński (MS3)
Sensor network design for spatio–temporal prediction of distributed parameter systems

W. Wagner (MS9)
FE-Modeling of Fiber Reinforced Polymer Structures

Z. Waszczyszyn, E. Pabisek, J. Kaliszuk (MS4)
Hybrid computational systems in structural mechanics

G. Zboiński (MS13)
Unresolved problems of adaptive hierarchical modelling and hp-adaptive analysis within computational solid mechanics

SOCIAL PROGRAMME AND MEALS

The conference social programme is addressed to the participants and accompanying persons.
It includes the Get-together, Concert of Zielona Góra Philharmonics, Dinner with regional specialities, a Conference Banquet, all of which are free for the registered participants and accompanying persons.

Get-together
Sunday, 17 May from 17:00 to 21:00; building A-8 (see the campus plan).

Concert and dinner
Monday, 18 May at 20:00; Zielona Góra Philharmonic Hall:
- Memorial presentation to Professor O.C. Zienkiewicz by Professor Eugenio Oñate
- Awards Ceremony of O.C. Zienkiewicz Medal
- Concert performed by Zielona Góra Philharmonic Orchestra conducted by Czesław Grabowski, director of Zielona Góra Philharmony, and accompanied by the world famous mezzo-soprano Magdalena Idzik, a soloist of the Polish National Opera
- Dinner served in *foyer* after the concert

The concert is sponsored by Marshal of the Lubuskie Province – Marcin Jabłoński.
(Address: *Filharmonia, pl. Powstańców Wlkp. 10*)

Dinner with regional specialities
Tuesday, 19 May at 20:30; building A-8.
Presentation and tasting of regional products (bread, cured meats, vodka).
The dinner is sponsored by "Kiciński" Butcher and "Dębowa Polska" Company.

Conference Banquet
Wednesday, 20 May at 20:00; The Palm House
The conference Banquet is sponsored by Mayor of Zielona Góra City– Janusz Kubicki.
(Address: *Palmiarnia, ul. Wrocławska 12*)

Lunches
Lunches are served in the University canteen, building C-4, close to building A-8 (see the campus plan)

MEMORIAL EVENT
Sunaday, 17 May, 19:15; Holy Saviour Roman Catholic Church
Church service for the Soul of Professor O.C. Zienkiewicz.
(Address: *Kościół Najświętszego Zbawiciela, al. Niepodległości 8*)

PACM MEETING
Tuesday, 19 May, 18:30; building A-8, room 213.
Meeting of Polish Association for Computational Mechanics

COMPETITION
The Scientific Committee of the conference organizes a competition for the best paper presented by a young researcher. The rules of the competition are available on the conference website and the conference office room 26 (ground floor).

FOR SPEAKERS
Please note that 15 minutes will be allowed for the presentation of each contributed paper and 25 minutes for the keynote lecture, followed by a 5-minute discussion. This rule will be enforced by session chairs to ensure that all presenters will have their allotted time and that no session ends late. For the plenary lecture 40 minutes are allotted.

Speakers who wish to use computers and multi-media projectors are asked to supply their contribution on CD or USB stick one day before their lecture. Acceptable formats are PPT, PPS (MS Power Point 2003), ODP, SXI (OpenOffice Impress) and PDF (Adobe Acrobat). Please deliver your presentation to the computer room 320 located on the 3rd floor, where you can also check compatibility of your presentation with our system . Speakers who do not supply their contribution act on their own risk of technical incompatibilities and loss of speaking time.

Overhead projectors will also be available for presentations on transparencies.

FACILITIES

Internet access
Internet access is available for the conference participants in the following places in building A-8:
Computer rooms:

- computer room 320 (third floor)
- computer room 315 (third floor)

Hot spots with internet access:

- hot spot 1, around *News Cafe* bar (first floor hall)
- hot spot 2 in front of 115 lecture room (first floor)
- hot spot 3 in front of 213 lecture room (second floor)
- hot spot 4 in front of 321 lecture room (third floor)

All the hot spots are marked.

Meeting rooms
The following rooms in building A-8 are available for informal meetings and discussions:

- meeting room 17 (ground floor)
- meeting room 107 (first floor)
- meeting room 309 (third floor)

Formal meetings take place in room 403 (fourth floor)

Car park
A grass car park for the conference participants is situated at the back of building A-12 (see the campus plan).

CONFERENCE EXCURSIONS

Zielona Góra Old Town sightseeing tour
Monday, 18th May, 5 pm
A guided walk to the centre of Zielona Góra which includes a visit to the Town Hall and the Cathedral.
Gathering in front of the main entrance to the Palm House (see the city map).

A trip to Łęknica and Żagań.
Tuesday, 19th May, 8 am
15 € / 70 PLN; free for the registered accompanying persons. Trips are paid just before start.
A guided walk through the Polish and German parts of Muskauer Park which includes a visit to the landscape garden registered on the UNESCO World Heritage List and to two castles of Prince of Pückler. A sightseeing tour of Żagań Old Town. A visit to a former St. August Monastery, where Johannes Kepler worked, and to the Palace of Dorothea de Talleyrand – Perigord.
Gathering at the hall of A-8 building at 7:45 am. Lunch about 0:30 pm. Return about 6 pm.
Please confirm your attendance during registration.
There are still some free places!
Small changes are possible.

TIMETABLE of the CMM2009

Sunday, 17 May	
17:00 – 21:00	Registration + Get-together, *UZ, campus A, building A-8*
19:15 – 20:00	Holy Mass for the Soul of Professor O.C. Zienkiewicz, *Holy Saviour Roman Catholic Church, al. Niepodległości 8*

Monday, 18 May							
Lecture rooms in bldg A-8 / Time	321	219	213	115	106	105	22
08:00 – 12:00	Registration + buffet, *UZ, campus A, building A-8*						
09:30 – 10:00	**Opening Ceremony**, *UZ aula*						
10:00 – 10:40	**O.C. Zienkiewicz Memorial Lecture: T. Burczyński**, *UZ aula*						
10:40 – 11:20	**PL: E. Stein**, *UZ aula*						
11:20 – 12:00	Coffee break, *building A-8*						
12:00 – 13:40	**TS1.1**	**TS2.1**	**MS2.1**	**MS11.1**	**MS5.1**		**IS1**
13:40 – 15:10	Lunch, *university canteen*						
15:10 – 15:50	**PL: H. Mang**, *UZ aula*						
15:50 – 16:20	Coffee break, *building A-8*						
16:20 – 18:00	**TS1.2**	**TS2.2**	**MS2.2**	**MS11.2**	**MS5.2**	**MS6**	

20:00 – 21:45	Concert in Zielona Góra Philharmony
21:45 – 23:30	Dinner, *foyer*

Tuesday, 19 May							
Lecture rooms in bldg A-8 / Time	321	219	213	115	106	105	22
08:30 – 09:10	**PL: L. Demkowicz**, *UZ aula*						
09:10 – 09:50	**PL: J. Osborn**, *UZ aula*						
09:50 – 10:30	Coffee break, *building A-8*						
10:30 – 12:10	**MS1.1**	**MS13.1**	**MS2.3**	**MS3.1**	**MS9.1**		**MS7.1**
12:10 – 13:40	Lunch, *university canteen*						
13:40 –14:20	**PL: R. de Borst**, *UZ aula*						
14:30 – 16:10	**MS1.2**	**MS13.2**	**MS2.4**	**MS3.2**	**MS9.2**		**MS7.2**
16:10 – 16:40	Coffee break, *building A-8*						
16:40 – 18:20	**MS1.3**	**MS13.3**		**MS3.3**	**MS9.3**	**TS3**	**MS7.3**
18:30 – 20:30	PACM Meeting, *building A-8 (213)*						
20:30 – 22:00	Presentation & tasting of regional products (bread, cured meats, vodka), *building A-8*						

Wednesday, 20 May							
Lecture rooms in bldg A-8 / Time	321	219	213	115	106	105	22
08:30 – 09:10	**PL: E. Oñate**, *UZ aula*						
09:10 – 09:50	**PL: G. Maier**, *UZ aula*						
09:50 – 10:30	Coffee break, *building A-8*						
10:30 – 12:10	**MS10.1**	**MS14.1**	**MS4.1**	**TS4**	**MS9.4**	**MS12.1**	
12:10 – 13:40	Lunch, *university canteen*						
13:40 –14:20	**PL: M. Rubin**, *UZ aula*						
14:30 – 16:10	**MS10.2**	**MS14.2**	**MS4.2**	**MS8.1**		**MS12.2**	**IS2**
16:10 – 16:40	Coffee break, *building A-8*						
16:40 – 18:20	**MS10.3**	**MS14.3**	**MS4.3**	**MS8.2**	**TS5.1**	**MS12.3**	

20:00 – 23:00	Banquet, *Palmiarnia (Palm House)*

Thursday, 21 May							
Lecture rooms in bldg A-8 / Time	321	219	213	115	106	105	22
08:30 – 10:10	**TS8**	**TS7**	**MS4.4**	**TS6**	**TS5.2**		
10:10 – 10:50	Coffee break, *building A-8*						
10:50 – 11:30	**PL: J. Schröder**, *UZ aula*						
11:30 – 12:10	**PL: T. Łodygowski**, *UZ aula*						
12:10 – 12:30	**Closing session**, *UZ aula*						
12:30	Lunch, *university canteen*						

Notations:

PL - Plenary Lecture

MS - Mini-Symposium

TS - Thematic Session

IS - Industrial Session

PROGRAMME of the CMM2009

SUNDAY, 17 MAY

17:00 – 21:00 Registration + Get-together, *UZ, campus A, building A-8*
19:15 – 20:00 Holy Mass for the Soul of Professor O.C. Zienkiewicz,
Holy Saviour Roman Catholic Church, al. Niepodległości 8

MONDAY, 18 MAY

08:00 – 12:00 Registration + buffet, *UZ, campus A, building A-8*
09:30 – 10:00 **Opening Ceremony**, *UZ aula*

PLENARY LECTURES 10:00 – 11:20

Room: *UZ aula*

Chair: M. Kleiber

10:00 – 10:40 **T. Burczyński**
Immune computing: intelligent methodology and its applications in bioengineering and computational mechanics

10:40 – 11:20 **E. Stein**, M. Rüter, S. Ohnimus
Combined model and finite element discretization adaptivity for quantities of interest with upper error bounds

11:20 – 12:00 **Coffee break, *building A-8***

PARALLEL SESSIONS 12:00 – 13:40

Room: 321 **TS1.1: Dynamics**

Chair: M. Klasztorny, R. Lewandowski

12:00 – 12:20 B. V. Sobol, L. P. Vovk
The oscillations of elastic prism of compound rectangular cross-section

12:20 – 12:40 T. Mikulski, Cz. Szymczak
Dynamic response of frames made of thin-walled members

12:40 – 13:00 R. Lewandowski, Z. Pawlak
Determination of dynamic properties of frames with viscoelastic dampers

13:00 – 13:20 M. M. Kamiński, J. Szafran
Random eigenvibrations of elastic structures by the response function method and the generalized stochastic perturbation technique

13:20 – 13:40 K. Winkelmann
A probabilistic description of footbridges vibration serviceability

Room: 219 **TS2.1: Mechanics of structures**

Chair: Cz. Cichoń, B. Albers

12:00 – 12:20 Z. Kala, L. Puklický, A. Omishore, J. Melcher, M. Karmazínová
Application of sensitivity analysis to stability problems of steel-concrete structural members

12:20 – 12:40 J. Rakowski, P. Wielentejczyk
An exact cubic beam finite element

12:40 – 13:00 W. Witkowski, J. Chróścielewski, J. Górski, M. K. Jasina
Buckling analysis of shell structures with stochastic imperfections using six parameter nonlinear shell theory

13:00 – 13:20 M. Chybiński, A. Garstecki, K. Rzeszut
Stability analysis of steel welded girders with diagonal rib configuration

13:20 – 13:40 Z. Pawlak, J. Rakowski
Stiffness and mass matrices for a sinusoidal finite beam element

Room: 213 **MS2.1: Multiscale Modelling and Nanomechanics**
Organizers: Tadeusz Burczyński, Paweł Dłużewski and Maciej Pietrzyk

Chair: T. Burczyński, D. Gross

12:00 – 12:30 **G. Szefer**
Molecular and FEM-Molecular analysis of strains and stresses at the nanoscale range (KEYNOTE)

12:30 – 13:00 A. Belkadi, **P. Dłużewski**, G. Dimitrakopulos, T. D. Young, P. Komninou
The nonlinear finite element and atomistic modelling of dislocations in semiconductor structures (KEYNOTE)

13:00 – 13:20 Wen-Ping Wu, Ya-Fang Guo, Yue-Sheng Wang, R. Mueller, D. Gross
Atomistic simulation of misfit dislocation network structures evolution in γ/γ' phase interface of Ni-based superalloys under tensile loading

13:20 – 13:40 T. Burczyński, R. Górski, W. Kuś, A. Mrozek
Multiscale modelling using molecular statics and the subregion boundary element method

Room: 115 **MS11.1: Boundary Element Methods**
Organizer: Matthias Maischak

Chair: M. Maischak, D. Praetorius

12:00 – 12:30 **E. P. Stephan**, T. Tran, A. Costea
A boundary integral equation on the sphere for high-precision geodesy (KEYNOTE)

12:30 – 13:00 M. Kohr, G. P. Raja Sekhar, **W. L. Wendland**
Boundary integral equations for a three-dimensional Stokes-Brinkman cell model (KEYNOTE)

13:00 – 13:20 M. Schanz, M. Messner
A fast elastodynamic Boundary Element formulation in time domain

13:20 – 13:40 J. Ptaszny, P. Fedeliński
Stress analysis of linear elastic structures by the fast multipole boundary element method

Room: 106 **MS5.1: Topology Optimization**
Organizers: Tomasz Lewiński and Antoni Żochowski

Chair: T. Lewiński, A. Myśliński

12:00 – 12:30 J. Sokołowski, **A. Żochowski**
Topological derivatives of shape functionals for elasticity systems (KEYNOTE)

12:30 – 13:00 S. Amstutz, **A. A. Novotny**
Topological optimization of structures subject to stress constraints (KEYNOTE)

13:00 – 13:20 Z. W. Bieniek
General classification of the tensegrity systems

13:20 – 13:40 G. Dzierżanowski, W. Gilewski, M. Sitek
On the application of physical shape functions in optimal design of bar structures

Room: 22 **IS1: Structural Monitoring and Measurement Techniques**

Chair: W. Karmowski, P. Osterrieder

12:00 – 12:30 Leica Geosystems Sp. z o.o. (K. Karsznia)
Structural monitoring systems exampled by Leica GeoMoS projects

12:30 – 13:40 GOM - ITA (M. Klein, M.Radke)
Optical 3D measuring in experimental mechanics and industrial applications
(lecture followed by the equipment demonstration in the institute's laboratory)

PLENARY LECTURE 15:10 – 15:50

Room: *UZ aula*

Chair: D. Gross

15:10 – 15:50 A. Steinböck, G. Höfinger, X. Jia, **H. A. Mang**
Answers to three not quite straightforward questions in structural stability

15:50 – 16:20 Coffee break, *building A-8*

PARALLEL SESSIONS Monday, 16:20 – 18:00

Room: 321 **TS1.2: Dynamics**

Chair: J. Rakowski, C. König

16:20 – 16:40 M. Kopecky
Computed analysis to determine service life criteria of special elements and applications

16:40 – 17:00 J. Wdowicki, E. Wdowicka
Free vibration analysis of non-planar shear wall structures with variable cross-section

17:00 – 17:20 Ł. Pieczonka, T. Uhl
Exact geometrical modelling and uncertainty analysis of metal foams

17:20 – 17:40 A. A. Bondarenko
Root finding method for dispersion equations in problems of dynamic theory of elasticity

17:40 – 18:00 G. Cyrok
Free vibrations of a rigid footing on an elastic half space

Room: 219 **TS2.2: Mechanics of structures**

Chair: W. Gilewski, P. Osterrieder

16:20 – 16:40 W. Frącz, P. Litwin, F. Stachowicz
Analysis of bending characteristics of open structural profile

16:40 – 17:00 M. Wojciechowski, M. Lefik, B. Schrefler
Generation of the geometry of a hierarchically twisted cable

17:00 – 17:20 A. Skowronek
A conception of multi-generated smart designs of experiment

17:20 – 17:40 A. Denisiewicz, M. Kuczma
Analysis of a layered model of RC discs by an adaptive finite element method

17:40 – 18:00 T. Socha, M. Kuczma
Numerical analysis of viscoelastic layered beams by using object-oriented programming

Room: 213 **MS2.2: Multiscale Modelling and Nanomechanics**
Organizers: Tadeusz Burczyński, Paweł Dłużewski and Maciej Pietrzyk

Chair: G. Szefer, G. Ziętek

16:20 – 16:40 P. Perzyna
Micromechanics of localized fracture phenomena in inelastic solids generated by impact-loaded adiabatic processes

16:40 – 17:00 K. Perzyński, L. Madej, K. Muszka, M. Pietrzyk
Numerical investigation of the Bauschinger effect during the low reversal cyclic torsion test

17:00 – 17:20 R. Górski, P. Fedeliński
Evaluation of effective elastic properties of polymer/clay nanocomposites

17:20 – 17:40 S. M. Giusti, A. A. Novotny, J. Sokolowski, E. A. de Souza Neto
Topological Sensitivity Analysis of a Multi-scale Constitutive Model Considering a Cracked Microstructure

17:40 – 18:00 C. Cattani
Nonlinear Waves in Nanocomposites

Room: 115 **MS11.2: Boundary Element Methods**
Organizer: Matthias Maischak

Chair: E. Stephan, W. Wendland

16:20 – 16:40 M. Aurada, S. Ferraz-Leite, D. Praetorius
Convergence of adaptive boundary element methods

16:40 – 17:00 M. Maischak
Mixed fem-bem coupling for non-linear transmission problems with Signorini contact

17:00 – 17:20 R. Sygulski
Added mass matrix of floating bodies calculated by BEM

17:20 – 17:40 P. Fedeliński
Overall elastic moduli of solids with defects

Room: 106	**MS5.2: Topology Optimization** *Organizers: Tomasz Lewiński and Antoni Żochowski*
Chair:	A. Żochowski, A.A. Novotny
16:20 – 16:40	M. Mrzygłód *Using layer expansion algorithm in topology optimization with stress constraints*
16:40 – 17:00	S. Czarnecki, T. Lewiński *Optimum distribution of elastic moduli in the minimum compliance problem of 3D elasticity*
17:00 – 17:20	C. Graczykowski, T. Lewiński, G. Rozvany *Recent advances in the theory of Michell continua*
17:20 – 17:40	A. Myśliński *An Extended Level Set Method in Structural Optimization with Unilateral Constraints*

Room: 105	**MS6: Textile Reinforced Concrete** *Organizer: Bernd W. Zastrau*
Chair:	B. Zastrau, J. Pamin
16:20 – 16:40	R. Ortlepp, F. Schladitz, M. Curbach *TRC-Strengthening for Normal and Torsion Loads*
16:40 – 17:00	I. G. Lepenies, M. Richter, B. W. Zastrau *A hierarchical material model for textile reinforced concrete*
17:00 – 17:20	J. Hartig, U. Häußler-Combe *A model for Textile Reinforced Concrete exposed to uniaxial tensile loading*
17:20 – 17:40	A. Scholzen, R. Chudoba, J. Hegger *Microplane model with initial and damage-induced anisotropy applied to textile-reinforced concrete*
17:40 – 18:00	F. Steinigen, W. Graf, A. Hoffmann, M. Kaliske *Rehabilitation of existing spatial RC structures with textile strengthening*
18:00 – 18:20	R. Ortlepp, E. Lorenz *Anchoring of textile reinforcements in a fine-grained concrete matrix*

ZIELONA GÓRA PHILHARMONY **Monday, 20:00 – 23:30**

20:00 – 21:45	**Memorial presentation devoted to Professor O.C. Zienkiewicz, E. Onate** **Awards Ceremony of O.C. Zienkiewicz Medal** **Concert of Zielona Góra Philharmonic Orchestra**
21:45 – 23:30	**Dinner, *foyer***

TUESDAY, 19 MAY

PLENARY LECTURES 8:30 – 9:50

Room: *UZ aula*

Chair: J. Orkisz

08:30 – 09:10 **L. Demkowicz**
hp-Adaptive Finite Elements for Wave Propagation Problems

09:10 – 09:50 **J. E. Osborn**
Quadrature for Meshless Method

09:50 – 10:30 Coffee break, *building A-8*

PARALLEL SESSIONS 10:30 – 12:10

Room: 321 **MS1.1: Meshless and Related Methods**
Organizer: Janusz Orkisz

Chair: G.R. Liu, J. Orkisz

10:30 – 11:00 **G. R. Liu**
A weakened weak (W2) form for a unified formulation of compatible and incompatible displacement methods for solid mechanics problems (KEYNOTE)

11:00 – 11:30 J. Orkisz, **S. Milewski**
Higher Order discretization of the Meshless Local Petrov Galerkin formulations (KEYNOTE)

11:30 – 11:50 C. Gáspár
Divergence-free vectorial interpolation – a meshless approach

11:50 – 12:10 T. M. Łukasiak
The 3D Adaptive NEM – Delaunay Elements

Room: 219 **MS13.1: Adaptive Methods and Error Estimation**
Organizers: Witold Cecot, Waldemar Rachowicz and Grzegorz Zboiński

Chair: W. Cecot, W. Rachowicz

10:30 – 11:00 **M. Ainsworth**, H. A.Wajid
Optimally Blended Spectral-Finite Element Scheme forWave Propagation, and Non-Standard Reduced Integration (KEYNOTE)

11:00 – 11:30 **G. Zboiński**
Unresolved problems of adaptive hierarchical modelling and hp-adaptive analysis within computational solid mechanics (KEYNOTE)

11:30 – 11:50 R. Tews, W. Rachowicz
A goal-oriented hp-adaptive FEM for thin-walled structures

11:50 – 12:10 J. Kucwaj
The effieciency of the remeshing algorithm based on grid generator with mesh size function

Room: 213 **MS2.3: Multiscale Modelling and Nanomechanics**
Organizers: Tadeusz Burczyński, Paweł Dłużewski and Maciej Pietrzyk

Chair: M. Pietrzyk, J. Schröder

10:30 – 11:00 M. Lefik, **D. P. Boso**, B. A. Schrefler
Generalised self consistent homogenisation using finite element method (KEYNOTE)

11:00 – 11:30 **W. Kuś**, T. Burczyński
Bioinspired algorithms in multiscale optimization (KEYNOTE)

11:30 – 11:50 J. Gawąd, D. Kuc
Identification of initial microstructure representation using Cellular Automata model and Particle Swarm Optimization

11:50 – 12:10 D. S. Svyetlichnyy
Simulation of microstructure evolution during and after the rolling by using cellular automata

Room: 115 **MS3.1: Optimization and Identification of Structures**
Organizers: Krzysztof Dems, Andrzej Garstecki and Witold Gutkowski

Chair: W. Gutkowski, J. Korbicz

10:30 – 11:00 **L. Murawski**, W. Ostachowicz
Optimization of Marine Propulsion System's Alignment for Aged Ships (KEYNOTE)

11:00 – 11:30 **D. Uciński**
Sensor network design for spatio–temporal prediction of distributed parameter systems (KEYNOTE)

11:30 – 11:50 E. Radaszewska, K. Dems
Design of composite structure subjected to thermal loading using the hybrid optimization system

11:50 – 12:10 M. Sosnowski, L. C. Wrobel
CFD Analysis and Optimisation of a Vertical Multi-Deck Display Cabinet for Food Refrigeration

Room: 106 **MS9.1: Computational Mechanics of Composite Materials and Structures**
Organizers: Rene de Borst and Tomasz Sadowski

Chair: R. de Borst, T. Łodygowski

10:30 – 11:00 **W. Wagner**
FE-Modeling of Fiber Reinforced Polymer Structures (KEYNOTE)

11:10 – 11:30 C. L. Mauff, P. Ladevèze, G. Lubineau
Multiscale approach to simulate laminated composite structures until failure

11:30 – 11:50 M. Klasztorny, T. M. Niezgoda
Homogenization and constitutive equations of viscoelasticity of regular cross-ply laminates

11:50 – 12:10 V. N. Burlayenko, T. Sadowski
Dynamics of sandwich plates weakened by single/multiple debonding

Room: 22 **MS7.1: Computer Methods in Geomechanics and Granular Flow**
Organizers: Pieter Vermeer and Zdzisław Więckowski

Chair: P. Vermeer, Z. Więckowski

10:30 – 11:00 **D. Stolle**, I. Jassim, P. Vermeer
Accurate simulation of incompressible problems in geomechanics (KEYNOTE)

11:00 – 11:30 **J. Tejchman**
Boundary effects on behaviour of granular material (KEYNOTE)

11:30 – 11:50 E. Bauer, S. F. Tantono
Numerical simulation of the influence of the fluctuation of micro-polar boundary conditions on the shearing of a granular layer along a rough wall

11:50 – 12:10 M. Łupieżowiec
Implicit algorithm for the integration of constitutive equations of the elasto-viscoplastic model

12:10 – 13:40 Lunch, *university canteen*

PLENARY LECTURE 13:40 – 14:20

Room: *UZ aula*

Chair: Z. Waszczyszyn

13:40 – 14:20 **R. de Borst**
Computational mechanics of evolving discontinuities

PARALLEL SESSIONS Tuesday, 14:30 – 16:10

Room: 321 **MS1.2: Meshless and Related Methods**
Organizer: Janusz Orkisz

Chair: V. Sladek, J. Orkisz

14:30 – 14:50 J. Krok
A Unified Approach to the Adaptive FEM and Meshless Methods - True History State of the Art and Future Directions

14:50 – 15:10 M. J. Pazdanowski
Analysis of residual stresses in prismatic bodies subject to conditions of fuzziness

15:10 – 15:30 J. Magiera
Impact of the rail grinding strategy on the redistribution of the residual stress studied with a hybrid experimental-numerical metod

15:30 – 15:50 J. Orkisz, I. Jaworska
Multipoint meshless FDM for weak formulations of boundary value problems

15:50 – 16:10 G. Dziatkiewicz
Stroh formalism and Trefftz boundary collocation technique for solving plane magnetoelectroelastic boundary-value problems

Room: 219 **MS13.2: Adaptive Methods and Error Estimation**
Organizers: Witold Cecot, Waldemar Rachowicz and Grzegorz Zboiński

Chair: W. Rachowicz, G. Zboiński

14:30 – 14:50 M. Serafin, W. Cecot
Adaptive finite element method in modeling of heterogeneous materials

14:50 – 15:10 W. Cecot, M. Serafin
A 2D mixed quadrilateral hp-adaptive finite element for solid mechanics

15:10 – 15:30 M. Paszyński, R. Schaefer
Graph grammar based model of concurrency for the self-adaptive hp Finite Element Method algorithm

15:30 – 15:50 M. Stojek
Computation of exterior acoustics problems in two dimensions by Trefftz-type finite elements

15:50 – 16:10 Y. Abramov, H. Shynkarenko
h-adaptive finite element method for one-dimensional boundary value problems

Room: 213 **MS2.4: Multiscale Modelling and Nanomechanics**
Organizers: Tadeusz Burczyński, Paweł Dłużewski and Maciej Pietrzyk

Chair: P. Dłużewski, B. Schrefler

14:30 – 14:50 E. Majchrzak, J. Poteralska
Numerical modelling of short-pulse laser interactions with thin metal films using two-temperature model

14:50 – 15:10 E. Gawrońska, N. Sczygiol
Using a mixed time partitioning to improve performance of solidification modeling

15:10 – 15:30 D. Balzani, J. Schröder, D. Brands
Modeling of Two-Phase Steels based on Statistically Similar Microstructures

15:30 – 15:50 W. Sumelka, A. Glema
Theoretical and computational aspects of implementation of anisotropic constitute model for metals with microstructural defects

15:50 – 16:10 A. S. Kravchuk, P. Neittaanmaki
On a models of nanotribology

Room: 115 **MS3.2: Optimization and Identification of Structures**
Organizers: Krzysztof Dems, Andrzej Garstecki and Witold Gutkowski

Chair: K. Dems, W. Ostachowicz

14:30 – 14:50 Z. Kala
Finite element methods for sensitivity analysis of stability problems of steel plane frames

14:50 – 15:10 R. Studziński, Z. Pozorski, A. Garstecki
Sensitivity analysis and optimal design of sandwich panels accounting for variable support conditions

15:10 – 15:30 J. Latalski, W. Gutkowski
Ply Thickness Tolerances in Laminate Plates Optimization

15:30 – 15:50 M. Mrzygłód
Two-stage optimization approach for thin-walled structures subjected to high-cycle load conditions

15:50 – 16:10 V. E. Volkova
Development of methods of nonparametric identification of models of non-liner mechanical systems

Room: 106 **MS9.2: Computational Mechanics of Composite Materials and Structures**
Organizers: Rene de Borst and Tomasz Sadowski

Chair: R. de Borst, W. Wagner

14:30 – 14:50 T. Łodygowski, P. W. Sielicki
The behavior of masonry walls subjected to unusual dynamic loading

14:50 – 15:10 J. Bobiński, T. Majewski, Ł. Skarżyński, E. Syroka, J. Tejchman
FE modelling of strain localization in large reinforced concrete elements within elasto-plasticity with non-local softening

15:10 – 15:30 M. Kitzig, U. Häußler-Combe
A fracture energy-based anisotropic damage law for the simulation of plain concrete structures

15:30 – 15:50 J. Kozicki, J. Tejchman
Simulation of fracture process in fibrous concrete

15:50 – 16:10 I. Marzec, J. Tejchman
Analysis of concrete behaviour under cyclic loading within coupled elasto-plastic-damage with non-local softening

Room: 22 **MS7.2: Computer Methods in Geomechanics and Granular Flow**
Organizers: Pieter Vermeer and Zdzisław Więckowski

Chair: P. Vermeer, D. Stolle

14:30 – 14:50 P. A. Vermeer, Y. Yuan, L. Beuth, P. Bonnier
Application of interface elements with the Material Point Method

14:50 – 15:10 W. St. Szajna
Nonlinear problem of soil–structure interaction in plane strain conditions

15:10 – 15:30 John van Esch, D. Stolle, P. Bonnier
Consideration of pore pressures in MPM

15:30 – 15:50 Z. Więckowski, L. Beuth, I. Jassim
Parallel computations in material point method with application to soil mechanics

15:50 – 16:10 A. Stankiewicz, J. Pamin, T. Żebro
Gradient plasticity models in analysis of slope stability benchmark

16:10 – 16:40 **Coffee break, *building A-8***

PARALLEL SESSIONS Tuesday, 16:40 – 18:20

Room: 321 **MS1.3: Meshless and Related Methods**
Organizer: Janusz Orkisz

Chair: M. Pazdanowski, J. Orkisz

16:40 – 17:00 V. Sladek, J. Sladek, Ch. Zhang
Local integral equations implemented by MLS-approximation and analytical integrations

17:00 – 17:20 V. Kompiš, Z. Murčinková
Heat flow in composites reinforced by short fibres

17:20 – 17:40 A. Uscilowska
Method of Fundamental Solutions for isotropic heat conduction with temperature dependent thermal conductivity

17:40 – 18:00 E. V. Glushkov, N. V. Glushkova, A. A. Eremin
Application of laminate element method to lengthy structures with contrast layer properties

Room: 219 **MS13.3: Adaptive Methods and Error Estimation**
Organizers: Witold Cecot, Waldemar Rachowicz and Grzegorz Zboiński

Chair: G. Zboiński, W. Cecot

16:40 – 17:00 Z. Malinowski, A. Gołdasz, B. Hadała
Estimation of the solution accuracy to the billet temperature field in the process of rolling

17:00 – 17:20 A. Schröder
Goal-oriented error control in h- and hp-adaptive FEM for Signorini's problem

17:20 – 17:40 H. Kvasnytsa, F. Chaban, H. Shynkarenko
Construction of the h-adaptive FEM schema for the forced vibration problems

17:40 – 18:00 W. Rachowicz
Application of h-adaptivity and Linear Sampling Method for inverse scattering problems

18:00 – 18:20 M. Nosarzewska, G. Zboiński
An algorithm of the enhanced 3D-based solid-to-shell transition elements for adaptive modelling and analysis of complex structures

Room: 115 **MS3.3: Optimization and Identification of Structures**
Organizers: Krzysztof Dems, Andrzej Garstecki and Witold Gutkowski

Chair: A. Garstecki, Cz. Szymczak

16:40 – 17:00 J. Weichert, P. Osterrieder
Computer-Based Yield Line Analysis for Ultimate Load Design of Plates

17:00 – 17:20 M. Zając, R. Stetter, D. Uciński
Particle Filter in Fault Detection for a Mobile Robot with an Innovative Drive System

17:20 – 17:40 M. Nowak
Topology optimization with different material parameters using a biomimetic approach

17:40 – 18:00 M. Patan
Configuring sensor network for parameter estimation of distributed parameter systems under the location uncertainty

Room: 106 **MS9.3: Computational Mechanics of Composite Materials and Structures**
Organizers: Rene de Borst and Tomasz Sadowski

Chair: T. Sadowski, P. Trovalusci

16:40 – 17:00 J. Podgórski
A proposition of the crack orientation angle criterion for heterogeneous rock-like materials

17:00 – 17:20 T. Sadowski, L. Marsavina, E. Craciun
On the problem of cracks propagation in orthotropic polymer matrix composite under uniaxial tension

17:20 – 17:40 T. Czapliński, Ł. Maciejewski, A. Przygoda, G. Ziętek
A model of textile reinforced composite: homogenisation and identification

17:40 – 18:00 M. Kuczma, B. Kuczma
A finite element model of composite beams with interface slip

18:00 – 18:20 K. Urbańska, M. Kuczma
Computational modelling of masonry aided by modern laboratory experiments

Room: 105	**TS3: Material properties**
Chair:	Z. Mróz, H. Hübel
16:40 – 17:00	W. Wen, S. Yun *Numerical Investigations in Effects of Damage for Concrete with Ogival or Flat Nose Projectiles*
17:00 – 17:20	Bai-Xiang Xu, D. Schrade, R. Mueller, D. Gross *Simulation of polarization switching in the vicinity of crack tip in ferroelectrics*
17:20 – 17:40	P. Pluciński, Cz. Cichoń *Modelling of physical properties of rust in the FE analysis of rebar corrosion*
17:40 – 18:00	T. Kubiak, K. Kowal-Michalska *The influence of material properties modelling on results for thin-walled orthotropic structures*

Room: 22	**MS7.3: Computer Methods in Geomechanics and Granular Flow** *Organizers: Pieter Vermeer and Zdzisław Więckowski*
Chair:	Z. Więckowski, J. Tejchman
16:40 – 17:00	M. Wójcik, J. Tejchman *Modeling of patterns of shear zones during granular flow in silos using uncoupled ALE-formulation and non-local hypoplasticity*
17:00 – 17:20	J. Rojek, E. Oñate, C. Labra, H. Kargl *3D discrete element simulation of rock cutting*
17:20 – 17:40	Ł. Widuliński, J. Kozicki, J. Tejchman *Numerical simulations of a triaxial test in granular bodies using discrete particle simulations with contact moments*
17:40 – 18:00	J. Błaszczuk *Numerical analysis of force network in static granular packings*
18:00 – 18:20	Z. Więckowski *Numerical dynamic analysis of pressure distribution under sand piles*

18:30 – 20:30 PACM Meeting, *building A-8 (room 213)*

20:30 – 22:00 Presentation and testing of regional products (bread, cured meats, vodka), *building A-8*

WEDNESDAY, 20 MAY

PLENARY LECTURES 8:30 – 9:50

Room: *UZ aula*

Chair: E. Stephan

08:30 – 09:10 **E. Oñate**, S. R. Idelsohn, M. A. Celigueta, R. Rossi
Advances in the Particle Finite Element Method for multidisciplinary problems in computational mechanics

09:10 – 09:50 **G. Maier**, G. Bolzon, V. Buljak, T. Garbowski, B. Miller
Synergistic combinations of computational methods and experiments for structural diagnosis

09:50 – 10:30 Coffee break, *building A-8*

PARALLEL SESSIONS 10:30 – 12:10

Room: 321 **MS10.1: Computer Methods in Biomechanics**
Organizers: Romuald Będziński and Krzysztof Ścigała

Chair: A. John, D. Ivanov

10:30 – 11:00 P. J. Prendergast, **S. Checa**, H. Khayyeri, C. Boyle, D. P. Byrne, A. B. Lennon
Predictive modelling in mechanobiology: combining algorithms for cell activities in response to physical stimuli using a lattice-modelling approach (KEYNOTE)

11:00 – 11:30 **R. Będziński**, K. Ścigała
Biomechanical basis of implant – tissue interactions (KEYNOTE)

11:30 – 11:50 C. Pezowicz, K. Ścigała
Analysis of mechanical behavior of intervertebral disc annulus fibrosus wall model with complex internal structure

11:50 – 12:10 M. Paszyński, L. Demkowicz, P. Gatto
Finite Element Modeling of the Acoustics of Human Head

Room: 219 **MS14.1: Computational Mechanics of Multiphase Porous Materials Including Durability**
Organizers: Dariusz Gawin, Francesco Pesavento and Berhard A. Schrefler

Chair: B. Schrefler, J. Ozbolt

10:30 – 11:00 L. Stefan, F. Benboudjema, J. M. Torrenti
Modelling Concrete at Early Age using Percolation (KEYNOTE)

11:00 – 11:30 Ch. J. Pearce, Ł. Kaczmarczyk
Numerical multi-scale simulation of fracturing heterogeneous porous materials (KEYNOTE)

11:30 – 11:50 Ł. Skarżyński, J. Tejchman
FE modelling of brittle materials at the meso-scale

11:50 – 12:10 B. Albers, K. Wilmański
Multiscale modeling of two-and three-component media

Room: 213 **MS4.1: Computational Methods of Artificial Intelligence**
Organizers: Tadeusz Burczyński, Zenon Waszczyszyn and Leonard Ziemiański

Chair: J. Orkisz, W. Kosiński

10:30 – 11:00 **W. Beluch**, T. Burczyński, A. Długosz, P. Orantek
Granular computing in evolutionary identification (KEYNOTE)

11:00 – 11:30 **Z. Waszczyszyn**, E. Pabisek, J. Kaliszuk
Hybrid computational systems in structural mechanics (KEYNOTE)

11:30 – 11:50 J. Kaliszuk, E. Grochowska
Application of hybrid Monte Carlo method to the reliability analysis of a short steel girder

11:50 – 12:10 A. Długosz, T. Burczyński
Multiobjective evolutionary optimization of structures under thermomechanical loading

Room: 115 **TS4: Heat conduction**

Chair: M. Pietrzyk, M. Morzyński

10:30 – 10:50 R. Korycki
Coupled heat and mass transfer within 2D textile composite structure

10:50 – 11:10 J. A. Kołodziej, M. Mierzwiczak, M. Ciałkowski
Inverse determination of sources in the steady heat conduction by means of method of fundamental solutions with the use of radial basis functions

11:10 – 11:30 E. Hetmaniok, A. Zielonka
Solving the Inverse Heat Conduction Problem by using the Ant Colony Optimization algorithm

11:30 – 11:50 A. Zielonka, E. Hetmaniok
Solving the Inverse Heat Conduction Problem for the curvilinear region by using Haar's System

11:50 – 12:10 A. Ryfa, R. Białecki
Direct and inverse methods in impingement heat transfer

Room: 106 **MS9.4: Computational Mechanics of Composite Materials and Structures**
Organizers: Rene de Borst and Tomasz Sadowski

Chair: T. Sadowski, A. Corigliano

10:30 – 11:00 G. Salerno, S. Mariani, **A. Corigliano**
Experimental-numerical investigation of impact-induced failure in layered composites (KEYNOTE)

11:10 – 11:30 P. Trovalusci
A multiscale-multifield approach to 'complex' materials: theoretical modelling and computational results

11:30 – 11:50 V. Salit, D. Gross
Effective elastic properties of an isotropic interpenetrating composite – does the microstructure really matter?

11:50 – 12:10 T. Nowicki, T. Sadowski
Micromechanical studies of local mechanical properties of WC/Co composite under compression state

Room: 105 **MS12.1: Computational Contact Mechanics**
Organizers: Przemysław Litewka and Alfred Zmitrowicz

Chair: A. Zmitrowicz, P. Litewka

10:30 – 11:00 **G. Szefer**
Contact Problems in Advanced Materials and Structures (KEYNOTE)

11:00 – 11:30 **Z. Mróz**
Material contact interfaces: numerical modelling of frictional slip, wear and damage (KEYNOTE)

11:30 – 12:00 **S. Migórski**, A. Ochal
Nonconvex inequality models for contact problems of nonsmooth mechanics (KEYNOTE)

12:10 – 13:40 Lunch, *university canteen*

PLENARY LECTURE 13:40 – 14:20

Room: *UZ aula*

Chair: E. Bauer

13:40 – 14:20 **M. B. Rubin**
Accuracy and Robustness of a 3-D brick Cosserat Point Element (CPE) for finite elasticity

PARALLEL SESSIONS Wednesday, 14:30 – 16:10

Room: 321 **MS10.2: Computer Methods in Biomechanics**
Organizers: Romuald Będziński and Krzysztof Ścigała

Chair: R. Będziński, R. Checa

14:30 – 14:50 A. John, P. Orantek
The uncertain analysis of thigh bone with artificial implant

14:50 – 15:10 A. Tomczuk, K. Ścigała
Numerical analysis of application of biodegradable materials for high tibial "plus" osteotomy

15:10 – 15:30 M. Duda, A. John, D. Tejszerska
Modeling and static analysis of child's rib cage

15:30 – 15:50 M. Charlebois, P. K. Zysset, M. Jirásek
Nonlocal Constitutive Law for Softening of Trabecular Bone

15:50 – 16:10 A. John, P. Wysota
QCT as a base of numerical modeling of the osteoporotical changes

Room: 219 **MS14.2: Computational Mechanics of Multiphase Porous Materials Including Durability**
Organizers: Dariusz Gawin, Francesco Pesavento and Berhard A. Schrefler

Chair: D. Gawin, J.M. Torrenti

14:30 – 14:50 D. Gawin, F. Pesavento, B. A. Schrefler
Numerical modelling of non-isothermal calcium leaching process in cementitious materials

14:50 – 15:10 J. Ožbolt, G. Balabanić, G. Periškić
Numerical analysis of effect of damage on chloride penetration into concrete

15:10 – 15:30 T. Krykowski, A. Zybura
Fem modeling of concrete cover degradation caused by rebar's corrosion in reinforced concrete – computational approach

15:30 – 15:50 E. Syroka, J. Bobiński, J. Górski, J. Tejchman
Concrete beams under bending – calculations of size effects within stochastic elasto-plasticity with non-local softening

15:50 – 16:10 T. Małecki, J. Tejchman
Analysis of strain localization in reinforced concrete elements with explicit second-gradient strain damage approach

Room: 213 **MS4.2: Computational Methods of Artificial Intelligence**
Organizers: Tadeusz Burczyński, Zenon Waszczyszyn and Leonard Ziemiański

Chair: Z. Waszczyszyn, Shuan-Fa Hwang

14:30 – 14:50 M. Wojciechowski
Feed-forward neural network as a tool for solving nonlinear differential equations

14:50 – 15:10 M. Wojciechowski, M. Koniorczyk
Application of artificial neural network in numerical modelling of hygral state of cement mortar

15:10 – 15:30 A. Poteralski, M. Szczepanik, A. Długosz, W. Kuś, T. Burczyński
Optimization of thermomechanical structures by using artificial immune systems

15:30 – 15:50 M. Szczepanik, A. Poteralski, W. Kuś, T. Burczyński
Application of artificial immune systems in optimization of shell-solid structures

Room: 115 **MS8.1: Heat Transfer**
Organizers: Ewa Majchrzak and Bohdan Mochnacki

Chair: E. Majchrzak, N. Sczygiol

14:30 – 14:50 B. Mochnacki, G. Kałuża
Hyperbolic Stefan problem: application for numerical modeling of biological tissue freezing

14:50 – 15:10 E. Majchrzak, M. Paruch
Numerical modelling of temperature distribution in tissue with a tumor subjected to the external electromagnetic field

15:10 – 15:30 E. Majchrzak
Numerical solution of dual-phase-lag model of bioheat transfer using the boundary element metod

15:30 – 15:50 M. Jasiński
Sensitivity analysis of transient bioheat transfer with perfusion rate dependent on tissue injury

15:50 – 16:10 R. Szopa, M. Dziewoński
Numerical model of tissue freezing using the Cattaneo equation

Room: 105 **MS12.2: Computational Contact Mechanics**
Organizers: Przemysław Litewka and Alfred Zmitrowicz

Chair: R. Buczkowski, P. Litewka

14:30 – 14:50 A. Chudzikiewicz, A. Myśliński
On Wheel - Rail Thermoelastic Contact Problems for a Two-Layer Structure

14:50 – 15:10 I. Páczelt, Z. Mróz
Numerical analysis of some steady state thermoelastic wear problems

15:10 – 15:30 A. Zmitrowicz
Contact models incorporating effects of wear debris

15:30 – 15:50 A. Y. Yanakieva, K. S. Kazakov
Comparison of FE computational models of the pullout process of steel bar in concrete solid

15:50 – 16:10 E. Szymczyk, A. Derewońko, G. Sławiński, J. Jachimowicz
Numerical estimation of internal stress relieving in destructive test

Room: 22 **IS2: FEA Software and Industrial Problems**

Chair: H. Hübel, C. König

14:30 – 15:10 ABAQUS (W. Kąkol)
Design exploration and optimization technology for Abaqus FEA software

15:10 – 15:40 ADB (A. Biniszkiewicz)
Successful marriage of science and mass production in Digital TV – ADB Polska Sp. z o.o.

15:40 – 16:20 ADB (D. Cichoński)
Cooling small and big objects - the same physics, different problems.
Digital TV Receiver perspective

Coffee break, *building A-8*

PARALLEL SESSIONS Wednesday, 16:40 – 18:20

Room: 321 **MS10.3: Computer Methods in Biomechanics**
Organizers: Romuald Będziński and Krzysztof Ścigała

Chair: K. Ścigała, T. Łodygowski

16:40 – 17:00 A. Bielecki, P. Kalita, B. Siwek
Numerical method for simulation of the presynaptic episode of synaptic transmission

17:00 – 17:20 W. Sosnowski, A. Mandera
Modelling the blood flow and the strength of the carotid walls in Comsol Multiphysics environment

17:20 – 17:40 D. Ivanov
Mechanical properties of Willis circle arteries

17:40 – 18:00 A. Musiolik, A. John
Multibody Model of the Human Hand for a Hand Rehabilitation Device

18:00 – 18:20 M. Stefańska, K. Ścigała, M. Czyż, W. Jarmundowicz
Finite Element Analysis of Cervical Spinal Cord Injury

Room: 219 **MS14.3: Computational Mechanics of Multiphase Porous Materials Including Durability**
Organizers: Dariusz Gawin, Francesco Pesavento and Berhard A. Schrefler

Chair: D. Gawin, J. Tejchman

16:40 – 17:00 M. Zeiml, R. Lackner
Concrete at high temperatures – influence of combined thermal and mechanical loading on the strain behavior

17:00 – 17:20 L. Ostermann, D. Dinkler
Coupled modelling and numerical simulation of concrete at high temperatures

17:20 – 17:40 D. Gawin, L. Sanavia, B. Schrefler
A multiphase approach for a unified modelling of fully and partially saturated porous materials by considering air dissolved in water

17:40 – 18:00 L. Nagler, M. Schanz
An alternative approach in deriving poroelastic plate theories

18:00 – 18:20 J. Bobiński, J. Tejchman
FE modelling of cracks in concrete elements within continuum mechanics

Room: 213 **MS4.3: Computational Methods of Artificial Intelligence**
Organizers: Tadeusz Burczyński, Zenon Waszczyszyn and Leonard Ziemiański

Chair: T. Burczyński, J. Korbicz

16:40 – 17:00 W. Kosiński, K. Frischmuth, W. Piasecki
Fuzzy approach to hyperbolic heat conduction equations

17:00 – 17:20 A. Piasecka Belkhayat, J. Mendakiewicz
Modelling of cast iron solidification process with interval thermophysical parameters

17:20 – 17:40 J. Pietraszek
Fuzzification of a rough set formalized inference process in a DOE supporting material-science oriented expert system

17:40 – 18:00 J. Orkisz, A. Kleszcz, M. Glowacki
On evolutionary algorithms efficiency increase in residual stress analysis

18:00 – 18:20 G. Kokot, W. Kuś
Evolutionary optimization of corrugated Pipes

Room: 115 **MS8.2: Heat Transfer**
Organizers: Ewa Majchrzak and Bohdan Mochnacki

Chair: B. Mochnacki, R. Szopa

16:40 – 17:00 A. K. Nallathambi, Y. Kaymak, E. Specht, A. Bertram
Distortion prediction during atomized spray and array of jets quenching

17:00 – 17:20 J. Weres, S. Kujawa, W. Olek
Software development for inverse FEA, 3D mesh generation from image analysis and visualization for heat and mass transport in biomaterials

17:20 – 17:40 D. Słota
Reconstruction of the heat transfer coefficient in solidification of the aluminium

17:40 – 18:00 M. Ciesielski, Z. Domański
Thermal interactions between metal matrix and fibers during cast composite solidification

18:00 – 18:20 Z. Lipnicki, M. Kuczma
Numerical solution of the problem of variable thermal contact resistance

Room: 106 **TS5.1: Fluid Mechanics**

Chair: I. Szczygieł, R. Białecki

16:40 – 17:00 A. J. Nowak, J. Smołka, Z. Buliński, K. Banasiak
Computational model of an ejector with two-phase flow of CO2

17:00 – 17:20 M. Morzyński, B. R. Noack, G. Tadmor
Reduced order and statistical modeling of incompressible fluid flows

17:20 - 17:40 J. Dobeš, J. Fořt, J. Fürst, J. Halama, P. Louda, K. Kozel, J. Příhoda
Numerical simulation of turbulent flows through a 2D turbine cascade

17:40 – 18:00 R. Keslerová, K. Kozel, V. Prokop
Numerical Simulation of Newtonian and Non-Newtonian Flows in Various Geometries

18:00 – 18:20 S. Sulaimany, H. Zeytoonian, S. Navardi, S. N. Azar
The solving of the Taylor Quette flow with Time Relaxed Mont Carlo method: an axisymmetrical model

Room: 105 **MS12.3: Computational Contact Mechanics**
Organizers: Przemysław Litewka and Alfred Zmitrowicz

Chair: I. Paczelt, A. Zmitrowicz

16:40 – 17:00 R. Buczkowski, W. Torbacki
FEM analysis of plate on layered foundation

17:00 – 17:20 J. Garjonisa, R. Kačianauskasb, E. Stupak
Fe simulation of the contact behaviour of layered spherical particles

17:20 – 17:40 Z. Pozorski, M. Chuda-Kowalska
Numerical analysis of sandwich panels with non-continuous soft core

17:40 – 18:10 P. Litewka
The node-preserving beam-to-beam contact smoothing using Bezier's curves (KEYNOTE)

20:00 – 23:00 Banquet, *Palmiarnia (Palm House)*

THURSDAY, 21 MAY

PARALLEL SESSIONS 8:30 – 10:10

Room: 321 **TS8: Applied mathematics and computational mechanics**

Chair: A. Schröder, M. Schanz

08:30 – 08:50 S. Yu. Fialko
A block sparse direct multifrontal solver in SCAD software for multi-core computers

08:50 – 09:10 T. Sokół
On the automatic step size adjustment for path-following algorithms

09:10 – 09:30 M. Sokała
Solution of 2D non-homogenous wave equation using polywave functions

09:30 – 09:50 A. Maciąg
Solving thermoelasticity problems by means of Trefftz functions

09:50 – 10:10 P. Mika
Well-posedness analysis for a temperature-dependent elastic-brittle damage model

Room: 219 **TS7: Inverse problem**

Chair: K. Dems, W. Wen

08:30 – 08:50 K. Grysa, A. Maciag, B. Maciejewska
Trefftz function for solving a quasi-static inverse problem of thermal stresses

08:50 – 09:10 M. Kroon
Material properties of inhomogeneous hyperelastic membranes assessed by inverse analysis

09:10 – 09:30 Y. L. Menshikov
Inverse Problems with Big Size of Initial Data Inaccuracy

09:30 – 09:50 G. Bolzon, T. Garbowski, G. Maier, G. Novati
A parameter identification procedure for the mechanical characterization of free foils

09:50 – 10:10 M. Hojny, M. Głowacki, Z. Malinowski
The computer aided methodology of strain-stress curve construction for semi-solid steels

Room: 213 **MS4.4: Computational Methods of Artificial Intelligence**
Organizers: Tadeusz Burczyński, Zenon Waszczyszyn and Leonard Ziemiański

Chair: L. Ziemiański, M. Słoński

08:30 – 08:50 Shun-Fa Hwang, Wei-Jie Wu
Deformation measurement around a high strain rate region by a digital image correlation based on a hybrid genetic algorithm

08:50 – 09:10 M. Słoński
A comparison between Bayesian neural networks and other machine learning methods for predicting properties of concrete

09:10 – 09:30 P. Nazarko, L. Ziemiański
Damage detection in structure elements using neural networks

09:30 – 09:50 K. Kuźniar, M. Zając
Neural networks and combined approximations method for identification of the modified load-bearing walls natural frequencies

09:50 – 10:10 M. Mrówczyńska
Approximation of multivariable functions by means of Wang-Mendel neuro-fuzzy system

Room: 115 **TS6: Damage and failure**

Chair: P. Perzyna, A.Glema

08:30 – 08:50 J. A. Rodriguez-Martinez, A. Rusinek, P. Chevrier, A. Arias
Numerical survey on the perforation process of ES steel sheets subjected to impact by hemispherical projectiles

08:50 – 09:10 M. Krawczuk, P. Kudela, L. Murawski, W. Ostachowicz, A. Żak
Elastic Wave Propagation Software – Visualization Methods

09:10 – 09:30 A. Żak, W. Ostachowicz, M. Krawczuk
Propagation of elastic waves in structural elements by spectral finite element methods

09:30 – 09:50 T. Jankowiak, T. Łodygowski
Numerical analysis of concrete slab perforation

09:50 – 10:10 A. Wosatko, J. Pamin
Gradient damage for dynamic Brazilian test

Room: 106 **TS5.2: Fluid Mechanics**

Chair: A.J. Nowak, J.A. Kołodziej

08:30 – 08:50 E. Błazik-Borowa
The quality of numerical solutions for the flow around two buildings with different heights

08:50 – 09:10 R. Honzátko, J. Horáček, K. Kozel
Numerical simulations of incompressible viscous flow in interaction with a vibrating profile

09:10 – 09:30 J. Halama, F. Benkhaldoun, J. Fořt
Numerical method for transonic two-phase flow with vapor/liquid phase change

09:30 – 09:50 M. Rojczyk, I. Szczygieł
Thermal analysis of infant radiant warmer

09:50 – 10:10 A. Klimanek, R. A. Białecki
CFD Analysis of Fixed and Varying Fill Height Natural Draft Wet-cooling Tower

10.10 – 10.50 **Coffee break, *building A-8***

PLENARY LECTURES 10:50 – 12:10

Room: *UZ aula*

Chair: B. W. Zastrau

10:50 – 11:30 **J. Schröder**
Two-Scale Modeling of Ferroelectric Materials

11:30 – 12:10 **T. Łodygowski**, M. Wierszycki, K. Szajek, W. Hędzelek, R. Zagalak
Tooth-implant life cycle design

12:10 – 12:30 Closing session, *UZ aula*

12:30 Lunch, *university canteen*