

**INSTITUTE OF FUNDAMENTAL  
TECHNOLOGICAL RESEARCH  
and  
COMMITTEE ON MECHANICS  
Polish Academy of Sciences**



**39<sup>th</sup> SOLID MECHANICS  
CONFERENCE**



Zakopane, Poland  
September 1-5, 2014  
**CONFERENCE PROGRAMME**

# Acknowledgements for support to

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# SOLMECH2014 - PROGRAMME

## SELECT A TOPIC

| Monday, 01.09 |       | ROOM A          | ROOM B                            | ROOM C                                |
|---------------|-------|-----------------|-----------------------------------|---------------------------------------|
|               | 8:00  | Registration    |                                   |                                       |
|               | 9:00  | Opening         |                                   |                                       |
|               | 10:00 | Plenary lecture | P080 S.A. Meguid                  |                                       |
|               | 11:00 | Coffee break    |                                   |                                       |
|               | 11:20 |                 | <i>P. Perzyna<br/>In Memoriam</i> | <i>W. Szczepiński<br/>In Memoriam</i> |
|               | 11:30 | P077            | P089                              | P107                                  |
|               | 11:50 |                 |                                   | P003                                  |
|               | 12:10 | P032            | P119                              | P085                                  |
|               | 12:30 |                 | P027                              | P146                                  |
|               | 12:50 |                 | P072                              |                                       |
|               | 13:10 | Lunch           |                                   |                                       |
|               | 14:40 | Plenary lecture | P128 H. Altenbach                 |                                       |
|               | 15:40 | P076            | P018                              | P158                                  |
|               | 16:00 | P046            | P020                              | P109                                  |
|               | 16:20 | Coffee break    |                                   |                                       |
|               | 16:40 | P001            | P050                              | P160                                  |
| 17:00         | P145  | P078            | P049                              |                                       |
| 17:20         | P095  | P060            | P016                              |                                       |
| 17:40         | P047  | P023            |                                   |                                       |

| Tuesday, 02.09 |       | ROOM A          | ROOM B        | ROOM C               |
|----------------|-------|-----------------|---------------|----------------------|
|                | 9:00  | Plenary lecture | D.R. Hayhurst |                      |
|                | 10:00 | P129            | P057          | P103                 |
|                | 10:20 | P073            | P082          | P092                 |
|                | 10:40 | P101            | P118          | P081                 |
|                | 11:00 | Coffee break    |               |                      |
|                | 11:20 | P090            | P155          | P098                 |
|                | 11:40 | P009            |               | P084                 |
|                | 12:00 | P143            | P036          | P051                 |
|                | 12:20 | P062            | P115          | P083                 |
|                | 12:40 | P044            | P065          | Sponsor presentation |
|                | 13:00 | Lunch           |               |                      |
|                | 14:40 | Plenary lecture | P140 R. Zaera |                      |
|                | 15:40 | P058            | P075          | P071                 |
|                | 16:00 | P066            | P014          | P099                 |
|                | 16:20 | Coffee break    |               |                      |
|                | 16:40 | P030            | P033          | P034                 |
| 17:00          | P125  | P028            | P048          |                      |
| 17:20          | P153  | P087            | P021          |                      |
| 17:40          | P116  | P086            | P117          |                      |

# SOLMECH2014 - PROGRAMME

## SELECT A TOPIC

|                         |       | ROOM A   | ROOM B                  | ROOM C |
|-------------------------|-------|--|-------------------------|--------|
| <b>Wednesday, 03.09</b> |       |  |                         |        |
|                         | 9:00  | Plenary lecture                                | P141 J. Eberhardsteiner |        |
|                         | 10:00 | P061   | P091                    | P157   |
|                         | 10:20 | P013   |                         |        |
|                         | 10:40 | P102   |                         |        |
|                         | 11:00 | Coffee break                                   |                         |        |
|                         | 11:20 | P002   | P064                    | P088   |
|                         | 11:40 | P106   | P035                    |        |
|                         | 12:00 | P008   | P151                    | P110   |
|                         | 12:20 | P029   | P052                    | P120   |
|                         | 12:40 |  | P113                    | P019   |
|                         | 13:00 | Lunch  |                         |        |
|                         | 14:00 |  | Poster session          |        |
|                         | 16:00 |  | Sponsors' session       |        |
|                         | 17:15 | Excursion                                      |                         |        |
|                         | 20:00 | Meeting of the Conference Scientific Committee |                         |        |

|                        |       | ROOM A          | ROOM B             | ROOM C |
|------------------------|-------|-----------------|--------------------|--------|
| <b>Thursday, 04.09</b> |       |                 |                    |        |
|                        | 9:00  | Plenary lecture | P156 N. Gupta      |        |
|                        | 10:00 | P108            | P112               | P043   |
|                        | 10:20 | P004            | P038               |        |
|                        | 10:40 | P010            | P104               |        |
|                        | 11:00 | Coffee break    |                    |        |
|                        | 11:20 | P121            | P070               |        |
|                        | 11:40 | P025            | P096               |        |
|                        | 12:00 | P012            | P132               |        |
|                        | 12:20 | P022            | P011               |        |
|                        | 13:00 | Lunch           |                    |        |
|                        | 14:40 | Plenary lecture | P148 K. Wiśniewski |        |
|                        | 15:40 | P024            | P162               |        |
|                        | 16:00 |                 |                    |        |
|                        | 16:20 | P042            | P063               |        |
|                        | 19:00 | Gala Dinner     |                    |        |

# SOLMECH2014 - PROGRAMME

**SELECT A TOPIC**

| Friday, 05.09 |       | ROOM A           | ROOM B           | ROOM C |
|---------------|-------|------------------|------------------|--------|
|               | 9:00  | Plenary lecture  | P161 R. Peçerski |        |
|               | 10:00 |                  | P069             | P137   |
|               | 10:20 |                  | P041             |        |
|               | 10:40 |                  | P122             |        |
|               | 11:00 | Coffee break     |                  |        |
|               | 11:20 |                  |                  | P100   |
|               | 11:40 |                  |                  |        |
|               | 12:00 |                  |                  | P136   |
|               | 12:20 | Closing ceremony |                  |        |
| 12:30         | Lunch |                  |                  |        |

- Invited plenary lecture – 45 min + 15 min discussion
- Keynote lecture – 30 min + 10 min discussion
- Oral presentation – 15 min + 5 min discussion
- Poster presentation – 3 min + discussion in front of poster

## Thematic Sessions

**SELECT A TOPIC**

|   |
|---|
| Computational Aspects of Solid Mechanics                    |
| Continuum Mechanics, Elasticity and Plasticity              |
| Dynamics of Solids and Structures                           |
| Experimental Mechanics                                      |
| Fracture, Damage and Fatigue of Materials                   |
| Geomechanics  |
| Mechanics of Composites, Porous Media                       |
| Micromechanics, Interfaces and Multi-Scale Modelling        |
| Plates and Shells   |
| Smart Materials and Structures                              |
| Structural Mechanics, Optimization and Reliability Analysis |

## About SolMech

The series of Solid Mechanics Conferences have been organized by the Institute of Fundamental Technological Research since 1953. The conferences have maintained high scientific standard and served as a forum for exchange of ideas and research information. Traditionally a set of invited lectures have been presented at the Conferences by outstanding researchers. The aim of the Conference is to bring together the researches from different countries and to create them the possibilities for the presentation of scientific results from a wide area of solid mechanics.

## Organizing Committee

Z. Kowalewski – *Chairman of the Conference*  
Z. Ranachowski – *Scientific Secretary*  
A. Rutecka, J. Żychowicz-Pokulniewicz,  
J. Widłaszewski, D. Kukła, P. Grzywna,  
T. Libura – *Managing assistants*  
U. Czubacka – *Secretary*

## Scientific Committee

|                    |                    |                |
|--------------------|--------------------|----------------|
| J. Badur           | P. Kowalczyk       | M. Pietrzyk    |
| M. Basista         | Z. Kowalewski      | E. Pieczyska   |
| A. Borkowski       | J. Kubik           | J. Rojek       |
| T. Burczyński      | T. Łodygowski      | B. Skoczeń     |
| P. Dłużewski       | Z. Mróz            | S. Stupkiewicz |
| W. Gutkowski       | A. Nowicki         | G. Szefer      |
| J. Holnicki-Szulc  | <u>P. Perzyna</u>  | J. Tejchman    |
| M. Kleiber         | H. Petryk          | A. Tylikowski  |
| <u>W. Kosiński</u> | R. Pęcherski       | K. Wiśniewski  |
| Z. Kotulski        | W. Pietraszkiewicz |                |

## Organizing Institute

Institute of Fundamental Technological Research  
Polish Academy of Sciences  
ul. Pawińskiego 5 B  
02-106 Warszawa, Poland, <http://solmech2014.ippt.pan.pl/>

## Invited Plenary Lectures

**Shaker A. Meguid**, Canada

Multiscale Modeling of Multifunctional Aerospace Nanocomposites: Challenges and Opportunities

**Holm Altenbach**, Germany

Mechanics of Nanostructures

**David R. Hayhurst**, U.K.

High-temperature Continuum Damage Mechanics. Simulation of Materials and Components from Processing and Manufacture to Component Performance

**Krzysztof Wiśniewski**, Poland

Recent Improvements in Mixed/Enhanced Shell Elements with Drilling Rotation

**Josef Eberhardsteiner**, Austria

Mechanical Behavior of Wood – A Bridge from Microstructure to Structural Applications by Means of Computational Methods

**Narinder Gupta**, India

Plasto-Mechanics of Large Deformation under Impact Loading

**Ramon Zaera Polo**, Spain

Deformation of Dynamically Phase Transforming Metals in Adiabatic Conditions: Thermal Effects and Instabilities

**Ryszard Pęcherski**, Poland

Plastic Flow and Failure of Solids. Modelling across Scales

## Conference Venue

Conference will take place in the Hotel Belvedere,  
ul. Droga do Białego 3, Zakopane.

### Working hours of the Registration Desk (Hotel Belvedere)

August 31, Sunday, 16:00 – 20:00  
September 1-4, Monday to Thursday, 8:30 – 12:00 and 14:00 – 18:00  
September 5, Friday, 8:30 – 11:30

## Thematic Sessions and Their Organizers

### **Computational Aspects of Solid Mechanics**

J. Eberhardsteiner (Austria) & T. Burczyński (Poland)

### **Continuum Mechanics, Elasticity and Plasticity**

(Special Session in Memory of Prof. Piotr Perzyna)

H. Altenbach (Germany), B. Skoczeń (Poland) & R. Pęcherski (Poland)

### **Dynamics of Solids and Structures**

R. Iwankiewicz (Germany) & Z. Kotulski (Poland)

### **Experimental Mechanics**

(Special Session in Memory of Prof. Wojciech Szczepiński)

N.K. Gupta (India) & A. Rusinek (France)

### **Fracture, Damage and Fatigue of Materials**

D.R. Hayhurst (UK) & Z. Nowak (Poland)

### **Geomechanics**

Z. Mróz (Poland), S. Pietruszczak (Canada) & J. Tejchman (Poland)

### **Mechanics of Composites, Porous Media**

P. Kowalczyk (Poland) & J. Rojek (Poland)

### **Micromechanics, Interfaces and Multi-Scale Modelling**

S.A. Meguid (Canada) & H. Petryk (Poland)

### **Plates and Shells**

W. Pietraszkiewicz (Poland) & K. Wiśniewski (Poland)

### **Smart Materials and Structures**

H. Tobushi (Japan) & E. Pieczyska (Poland)

### **Structural Mechanics, Optimization and Reliability Analysis**

J. Holnicki-Szulc (Poland) & T. Szolc (Poland)

## Social Events

Welcome reception – Sunday, August 31<sup>st</sup>, 18:00

Hotel Belvedere

Tour around Zakopane – Wednesday, September 3<sup>rd</sup>, 17:15

Meeting point at the Hotel Belvedere Lobby

Gala Dinner – Thursday, September 4<sup>th</sup>, 19:00

“Biały Potok” Restaurant, ul. Droga do Białego 7, Zakopane



## Room A

10:00 (invited plenary lecture)

Chairman: **D.R. Hayhurst**

**Shaker A. Meguid**, Canada

Multiscale Modeling of Multifunctional Aerospace Nanocomposites: Challenges and Opportunities

Coffee break

14:40 (invited plenary lecture)

Chairman: **R. Pęcherski**

**Holm Altenbach**, Germany

Mechanics of Nanostructures

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### **Micromechanics, Interfaces and Multi-Scale Modelling I**

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Chairmen: **S.A. Meguid & S. Schmauder**

11:30 (P077 – keynote lecture)

**S. Schmauder**

Recent Developments in Atomistic and Atomistic-Continuum Modelling for Materials Development

12:10 (P032)

**P. Hołobut, M. Kurska, A. Macios, and J. Lengiewicz**

Evolving Microstructures for Scalable Actuation in Programmable Matter

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**Micromechanics, Interfaces  
and Multi-Scale Modelling**

## Room A

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### **Micromechanics, Interfaces and Multi-Scale Modelling II**

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Chairmen: **S.A. Meguid & S. Schmauder**

15:40 (P076)

**K. Frydrych, K. Kowalczyk-Gajewska and S. Stupkiewicz**

Modelling of Microstructure Evolution in hcp Polycrystals on Non-Proportional Strain Paths

16:00 (P046)

**A. Zmitrowicz**

Variational Settings in Mechanics of Wear

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**Coffee break**

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### **Plates and Shells I**

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Chairmen: **E. Pruchnicki & K. Wiśniewski**

16:40 (P001)

**N. Chinchaladze**

On a Variational Problem for a Cusped Elastic Prismatic Shells in Case of the Third Model of Vekua's Hierarchical Model

17:00 (P145)

**V. Konopińska and W. Pietraszkiewicz**

Irregular Base Surface in the Resultant Thermomechanics of Shells

17:20 (P095)

**Ch.F. Markides and S.K. Kourkoulis**

Elliptically Perforated Circular Discs under Parabolic Pressure

17:40 (P047)

**G. Knor and J. Holnicki-Szulc**

Modelling Propagation of Lamb Waves in CFRP Plates for Damage Detection

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## Room B

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### Continuum Mechanics, Elasticity and Plasticity I

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Chairmen: **H. Altenbach & B. Skoczeń**

11:20

**R. Pęcherski**

Professor Piotr Perzyna's life and scientific activity

11:30 (P089 – keynote lecture)

**A. Ganczarski and M. Adamski**

Tertragonal or Hexagonal Symmetry of Failure Tsai–Wu Criterion for Transversely Isotropic Materials

12:10 (P119)

**M. Chudzicka-Adamczak and T.J. Hoffmann**

Dilatational and Non-Dilatational Strain in Coaxial Cable

12:30 (P027)

**H. Egner, W. Egner and P. Sulich**

Effect of Temperature Rate in Modeling Nonisothermal Low Cycle Fatigue of Steel

12:50 (P072)

**R. Ortwein and B. Skoczeń**

Shakedown Mechanism in Round Rods Subjected to Cyclic Torsion at Cryogenic Temperatures

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### Continuum Mechanics, Elasticity and Plasticity II

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Chairmen: **R. Pęcherski & B. Skoczeń**

15:40 (P018)

**H. Egner and M. Ryś**

On the Thermodynamic Modeling of Coupling Between Plasticity, Damage and Phase Transformation

16:00 (P020)

**A. Młeczek and P. Kłowski**

Identification of Parameters of Bodner – Partom Viscoplastic Model for Aluminum Alloy at Elevated Temperature

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**Coffee break**

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## Room B

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### **Continuum Mechanics, Elasticity and Plasticity II**

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Chairmen: **R. Pęcherski & B. Skoczeń**

16:40 (P050)

**A. Bajkowski** and **R. Kulchytsky-Zhyhailo**

Effect of Interlayer on Stresses in Coating under Normal and Tangential Loading

17:00 (P078)

**W. Sumelka**, **J. Fernández-Sáez**, **R. Zaera**

Small-Scale Effect in the Framework of Fractional and Eringen Non-Local Models

17:20 (P060)

**M. Karyakin**, **I. Pozdnyakov** and **N. Shubchinskaya**

The Equilibrium and Stability of the Nonlinearly Elastic Cylinder with Internal Stresses under Tension and Inflation

17:40 (P023)

**H. Egner** and **M. Ryś**

Effect of Phase Transformation Rate on the Response of Elastic-Plastic Two-Phase Material Subjected to Cyclic Loading at Cryogenic Temperatures

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## Room C

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### **Experimental Mechanics I**

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Chairmen: **N.K. Gupta & G. Socha**

11:20

**Z.L. Kowalewski**

Professor Wojciech Szczepiński's life and scientific activity

11:30 (P107)

**G. Hloupis**, **I. Stavrakas**, **I. Dakanali**, **A. Kyriazopoulos** and **D. Triantis**

Natural Time Analysis of Acoustic Emissions when Cement Mortar Specimens are Subjected to Three Point Bending Loading

## Room C

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### Experimental Mechanics I

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Chairmen: **N.K. Gupta & G. Socha**

11:50 (P003)

**J. Janiszewski**

Methodological Remarks on Conducting High-Strain Rate Testing with the Use of SHPB Technique

12:10 (P085)

**P. Lymperta, S.K. Kourkoulis, P. Poulin and N.D. Alexopoulos**

Piezoelectric Behavior of Aeronautical GFRP with Embedded Strain Sensor under Bending Loads

12:30 (P146)

**I. Markiewicz**

Design with SADS Method and Analyses of Elastic Properties of Torsion-Loaded Structures Based on Double-TEE Sections

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### Experimental Mechanics II

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Chairmen: **N. Alexopoulos & E. Pieczyska**

15:40 (P158)

**L. Kruszka, W. Moćko, E. Cadoni and L. Fenu**

Effect of Fibre Content on Static and Dynamic Properties of Fibre Reinforced Concrete

16:00 (P109)

**G. Stefanou, S.K. Kourkoulis, Z. Velonaki, E. Lympiraki and N.D. Alexopoulos**

Fracture Toughness of Aeronautical Aluminum Alloys 6156 and 2024 for Different Artificial Aging Conditions

————— **Coffee break** —————

16:40 (P160)

**B. Augustyniak, M. Chmielewski, L. Piotrowski and P. Maciakowski**

Stress Evaluation in Steel Elements with Novel Barkhausen Effect Meter

17:00 (P049)

**T. Szymczak and Z.L. Kowalewski**

Analysis of Tensile Force Variation due to Application of Cyclic Torsion for a Range of Frequency Levels

17:20 (P016)

**A. Ohtsuki**

A New Method for Measuring Young's Modulus of Thin Multi-Layered Materials Using Postbuckling Behavior

## Room A

9:00 (invited plenary lecture)

Chairman: **S.A. Meguid**

**David R. Hayhurst**, U.K.

High-temperature Continuum Damage Mechanics. Simulation of Materials and Components from Processing and Manufacture to Component Performance

14:40 (invited plenary lecture)

Chairman: **H. Altenbach**

**Ramon Zaera Polo**, Spain

Deformation of Dynamically Phase Transforming Metals in Adiabatic Conditions: Thermal Effects and Instabilities

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### Plates and Shells II

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Chairmen: **N. Chinchaladze & K. Wiśniewski**

10:00 (P129)

**E. Pruchnicki**

Two-Dimensional Model of Fifth Order for the Combined Bending, Stretching and Shearing of Shells Derived from Three-Dimensional Elasticity: General Approach and Application to Cylindrical Shells

10:20 (P073)

**B. Gulua**

Vekua's Hierarchical Models of the Second Type for Elastic Shallow Shells

10:40 (P101)

**M. Kolesnikov**

Wrinkling of Inflated Elastic Curved Tube under Pure Bending

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**Coffee break**

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11:20 (P090)

**W. Wagner, J. Läufer**

On the Influence of Shell-Kinematics on the Failure Behaviour of Composite Shell Structures

11:40 (P009)

**S. Fialko**

Quadrilateral Flat Shell Finite Element for Simulation of Reinforced Concrete Structural Elements

## Room A

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### Plates and Shells II

---

Chairmen: **N. Chinchaladze & K. Wiśniewski**

12:00 (P143)

**S. Burzyński, J. Chróścielewski and W. Witkowski**

Some Aspects of Buckling in Geometrically and Materially Nonlinear Cylindrical Shells

12:20 (P062)

**D. Ribarić, G. Jelenić**

Distortion-Immune 9-node Quadrilateral Thick Plate Finite Elements that Satisfy Constant-Bending Patch Test

12:40 (P044)

**B. Tóth**

A Comparative Study of New Dual-Mixed  $h$ - and  $p$ - Version Cylindrical Shell Finite Elements for Elastostatic Problems

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### Plates and Shells III

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Chairmen: **S. Fialko & W. Wagner**

15:40 (P058)

**A. Wirowski, M. Rabenda and B. Michalak**

Modelling of Thin Skeletal Annular Plates with Dense System of Ribs

16:00 (P066)

**B. Tomczyk**

Tolerance Models of Stability Problems for Micro-Periodic Cylindrical Shells

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**Coffee break**

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16:40 (P030)

**M. Gohnert**

Natural Shapes Applied to Shell Structures

17:00 (P125)

**P. Kowalczyk, J. Rojek, R. Stocki, T. Bednarek, P. Tazowski, R. Lasota, D. Lumelsky and K. Wawrzyk**

Numpress – Integrated Computer System for Analysis and Optimization of Industrial Sheet Metal Forming Processes: Numerical Investigation of Square Cup Drawing

## Room A

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### Plates and Shells III

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Chairmen: **S. Fialko & W. Wagner**

17:20 (P153)

**P. Jarzębski and K. Wiśniewski**

On Parallelization of the Loop over Elements for Composite Shell Computations

17:40 (P116)

**Ł. Żmuda-Trzebiatowski**

Comparison of Buckling Resistance of Columns Modelled by Beam and Shell Elements Using Non-Linear Analysis

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## Room B

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### Continuum Mechanics, Elasticity and Plasticity III

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Chairmen: **A. Ganczarski & L. Sudak**

10:00 (P057)

**V. Nežerka, J. Antoš, P. Tesárek and J. Zeman**

Two-Scale Modeling Approach for Prediction of Masonry Column Failure

10:20 (P082)

**D.R. Mc Arthur and L.J. Sudak**

Arbitrary Piezoelectric Inclusion with Weakly and Highly Conducting Imperfect Interface

10:40 (P118)

**B. Wcisło and J. Pamin**

Thermomechanical Modeling of Elastic-Plastic Materials Undergoing Large Deformations

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**Coffee break**

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11:20 (P155 – keynote lecture)

**B. Skoczeń**

Plastic Strain and Radiation Induced Phenomena between Absolute Zero and Room Temperature

12:00 (P036)

**M. Somr and P. Kabele**

Magma Flow Caused by Inverted Density Stratification



## Room B

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### Continuum Mechanics, Elasticity and Plasticity III

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Chairmen: **A. Ganczarski & L. Sudak**

12:20 (P115)

**A. Uściłowska and M. Kulczyńska**

An Elastic - Plastic Torsion of a Profile – Comparison of Meshless Methods Implementations

12:40 (P065)

**W. Kosiński, W. Oliferuk, K. Kochanowski and A. Adamowicz**

Inverse Problem for Heat Conduction Equation in IR Thermography

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### Dynamics of Solids and Structures

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Chairmen: **J.A. Rodriguez-Martinez & R. Zaera Polo**

15:40 (P075)

**Ł. Domagalski and J. Jędrysiak**

Large Amplitude Forced Vibrations of Micro-Periodic Slender Beams

16:00 (P014)

**A. Goodarzi, H.M. Shodja and B. Hashemian**

Dynamic Stress Concentration Factor around an Embedded Nano-Cavity in the Context of Couple Stress Theory

Coffee break

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16:40 (P033)

**S. Kokot, Z. Zembaty and P. Bobra**

Application of Rotation Rate Sensors to Improve Structural Health Monitoring of Beams in Flexure

17:00 (P028)

**D. Pisarski**

On Real-Time Distributed Adaptation of Structures Subjected to Travelling Loads

17:20 (P087)

**A. Vaz-Romero, J.A. Rodríguez-Martínez and A. Arias**

Interplay between Stress Waves Propagation and Flow Localization in the Dynamic Tensile Test: Application to Steel Sheets

17:40 (P086)

**R. Wiszowaty, G. Mikułowski, K. Sekuła and J. Biczyc**

Application of Piezoelectric Actuators for the Gas Valve Opening Control

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## Room C

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### Experimental Mechanics III

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Chairmen: **J. Janiszewski & L. Kruszka**

10:00 (P103)

**Z. Velonaki, S.K. Kourkoulis, W. Dietzel and N.D. Alexopoulos**

Mechanical Behaviour of Aluminum Alloy 2198 under Different Corrosion Exposure Times

10:20 (P092)

**J. Widłaszewski**

Application of the Inherent Strain Method in Modeling of Laser Thermal Forming

10:40 (P081)

**W. Oliferuk and M. Maj**

Energy Storage Rate Components

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**Coffee break**

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11:20 (P098)

**S.K. Kourkoulis, E.D. Pasiou, I. Stavrakas, G. Hloupis, D. Triantis and K. Moutzouris**

An Experimental Study of the Mechanical Response of a Typical Epistyles' Connection under Pure Shear

11:40 (P084)

**N.D. Alexopoulos, S.K. Kourkoulis and P. Poulin**

Sensing of Cement Mortar with Embedded Polyvinyl Alcohol – Carbon Nanotube Fiber

12:00 (P051)

**P. Sadowski and S. Stupkiewicz**

Estimation of the Effective Properties of Composites with Inclusions of Diverse Shapes and Properties

12:20 (P083)

**K. Makowska and Z.L. Kowalewski**

Microstructural Assessment and Magnetic Structuroscopy of Middle-Carbon Steel after Simulated Creep

12:40 (Sponsor presentation)

**P. Bailey, INSTRON**

Enhanced Fatigue Testing of Composites

## Room C

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### Structural Mechanics, Optimization and Reliability Analysis

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Chairmen: **M. Kotełko & I. Pączelt**

15:40 (P071)

**I. Pączelt and Z. Mróz**

Analysis of Steady Wear States for Monotonic and Periodic Sliding

16:00 (P099)

**T. Tokunaga, D. Szeliga, K. Matsuura, M. Ohno and M. Pietrzyk**

Sensitivity Analysis for the Indirect Extrusion of Mg Alloy with Al Coating

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**Coffee break**

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16:40 (P034)

**T. Ueda, S. Shimizu, G. Fujita and N. Tanaka**

Flange Vertical Buckling of Hybrid Steel Girders under Bending

17:00 (P048)

**M. Kotełko, P. Lis**

Probabilistic Approach to the Load-Carrying Capacity Estimation of Thin-Walled Structural Members

17:20 (P021)

**A. Marek and T. Garbowski**

Sensitivity Analysis in Homogenization Process of Corrugated Paperboards

17:40 (P117)

**A.V. Zaitsev, I. Yu. Zubko, O. Yu. Isaev, D. M. Karavaev, V. S. Koksharov, D. V. Smirnov and A. M. Khanov**

Mathematical Model for Inelastic Deformation of Flexible Graphite O-Ring Seals and Seal Packs under Their Exploitation in Stop Valves

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## Room A

9:00 (invited plenary lecture)

Chairman: **R. Zaera Polo**

**Josef Eberhardsteiner**, Austria

Mechanical Behavior of Wood – A Bridge from Microstructure to Structural Applications by Means of Computational Methods

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### Fracture, Damage and Fatigue of Materials I

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Chairmen: **D.R. Hayhurst & Z. Nowak**

10:00 (P061)

**T. Paris** and **A. Migliarini**

Abnormal Fracture in Titanium Alloy TA6V

10:20 (P013)

**G. Socha** and **L. Dietrich**

Evolution of Damage for P91 Steel under Cyclic Load

10:40 (P102)

**A. Rutecka** and **P. Grzywna**

Metal Matrix Composites under Fatigue Conditions

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**Coffee break**

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11:20 (P002)

**Y. Akinci** and **O.C. Celik**

Parametric Study on Collapse Investigation in Steel Vierendeel Beams

11:40 (P106)

**P. Fiborek**

Defects and Non-Destructive Detection Methods for Adhesive Bonds in Composite Structures – Preliminary Study

12:00 (P008)

**A. Kaczyński**

An Anticrack in a Transversely Isotropic Space under a Remote Uniform Heat Flow

12:20 (P029)

**A. Knitter-Piątkowska** and **M. Guminiak**

Damage Detection in Plate Structures Using Wavelet Transformation

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## Room B

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### Geomechanics

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Chairmen: **S.K. Kourkoulis & S. Pietruszczak**

10:00 (P091 – keynote lecture)

**S.K. Kourkoulis**

The Brazilian-Disc- and the Ring-Tests as Means to Determine the Tensile Strength of Brittle Materials: Some New Insights

10:40 (P015)

**S. Pietruszczak and M. Oboudi**

On the Description of Inherent / Induced Anisotropy in Porous Media

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**Coffee break**

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11:20 (P064)

**Z. Więckowski**

Analysis of Soil - Fluid - Structure Interaction Problems by Material Point Method

11:40 (P035)

**R. Staroszczyk**

Modelling of Sea Ice Flow by the Smoothed Particle Hydrodynamics Method

12:00 (P151)

**I. Marczevska, J. Rojek and R. Kačianauskas**

Micro-Macro Dependency for Elastic Constants in a Numerical Model of Granular Material

12:20 (P052)

**A. Pożarycki and T. Garbowski**

Soft Computing in Mechanical Characterization of Pavement Structures

12:40 (P113)

**A.V. Zaitsev, A.V. Kutergin, Yu.V. Sokolkin and A.A. Fukalov**

Exact Analytical Solutions to Problems on Equilibrium State of Elastic Anisotropic Heavy Spheres and Cylinders and Their Applications to Geometrical Problems

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## Room C

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### Mechanics of Composites, Porous Media I

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Chairmen: **N. Alexopoulos & T. Burczyński**

10:00 (P157 – keynote lecture)

**T. Burczyński and A. Mrozek**

Atomistic Models of Polycrystalline and Porous Structures

10:40 (P006)

**Z. Ranachowski, D. Józwiak-Niedźwiedzka, P. Ranachowski, A. Pawełek, S. Kudela Jr., T. Dvorak**

The Analysis of Pore Distribution and Pore Connectivity in Concrete Samples Using X-Ray Microtomography

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**Coffee break**

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11:20 (P088 – keynote lecture)

**P. Papanikos**

Finite Element Modelling of the Mechanical Behavior of Polymers Reinforced by Randomly Distributed Carbon Nanotubes

12:00 (P110)

**S. Hernik**

New Hybrid Weight Homogenization Rule for Fiber-Reinforced Orthotropic Composite

12:20 (P120)

**I. Yu. Zubko, V.I. Kochurov and R.S. Gorodilov**

Finding Second-Order Nonsymmetric Thermoelastic Properties of Graphene Monolayer Using Lattice Statics Approach

12:40 (P019)

**M. Svanadze**

Boundary Value Problems in the Theory of Thermoelasticity of Double - Porosity Materials

## Room B

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**14:00 Poster Session** (3 min oral presentation + discussion in front of poster)

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Chairman: **Z. Ranachowski**

1. (P037), **V. Baklanov**  
Dynamic Model Aircraft Engine from the Solid to Multicoupling System  
(on Experimental Studies of Dynamic Compliance Engine Housing)
2. (P127), **P. Drzymała, J. Bonarski and Z. Ranachowski**  
The Role of Microstructure in Deformation Mechanisms in Extruded  
AZ31 Magnesium Alloy
3. (P074), **A. Klasik, K. Pietrzak N. Sobczak, K. Makowska and D. Rudnik**  
Wetting - Bonding Relationship in Lead – Free Solder Joints  
for High Temperature Applications
4. (P094), **S.K. Kourkoulis and G.E. Exadaktylos**  
Prismatic Beams Made of Shellstone under Three-Point Bending: Implications  
due to the Transverse Isotropy
5. (P097), **S.K. Kourkoulis and E.D. Pasiou**  
A Validated Numerical Model for the Response of Typical Parthenon Epistyles'  
Connections under Pure Shear
6. (P114), **M.S. Koziń and D. Smolarski**  
Formulation of the Spectral Direct Method for Cycle Counting  
of Bimodal Multiaxial Stress
7. (P149), **D. Kukła, P. Grzywna and Z.L. Kowalewski**  
Assessment of Damage Development due to Fatigue of 2017 Aluminum Alloy  
on the Basis of Conductivity Measurements
8. (P152), **T. Libura, W. Moćko and Z.L. Kowalewski**  
A New Version of Hopkinson Bar Testing Stand for Determination  
of Dynamic Tensile Characteristics
9. (P134), **M. Maj, A. Klasik, K. Pietrzak and D. Rudnik**  
Mechanical Low Cycle Fatigue (LCF) Test and Its Modified (MLCF) Version

## Room B

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**14:00 Poster Session** (3 min oral presentation + discussion in front of poster)

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Chairman: **Z. Ranachowski**

10. (P007), **J. Melcer**  
Numerical and Experimental Analysis of a Bridge
11. (P093), **K. Pietrzak, A. Klasik, K. Makowska, J.J. Sobczak and D. Rudnik**  
Mechanical Properties of Aluminum Composites Reinforced with  $Al_2O_3$  Particles after Multiple Remelting
12. (P053), **P. Sadowski, S. Kucharski, J. Lengiewicz and S. Stupkiewicz**  
Soft Elastohydrodynamic Lubrication Problems in the Finite Deformation Regime: Experimental Testing and Modelling
13. (P135), **T. Szymczak, A. Brodecki and Z.L. Kowalewski**  
An Effect of Technological Notches on Stress and Strain Distribution during Monotonic Tension
14. (P150), **T. Szymczak, A. Brodecki, A. Eminger and Z.L. Kowalewski**  
Experimental Assessment of Ball Joints Operation Using Servo-Hydraulic Testing Systems
15. (P068), **A. Ustrzycka and B. Skoczeń**  
Degradation of Material Properties due to Evolution of Radiation Induced Damage
16. (P154), **D. Mężyk**  
Failure Frequency of Steam Pipelines – Operational Conclusions
17. (P159), **G. Mura**  
Geometry Optimization Method of the Cores of the Energy – Absorbing Protective Panels
18. (P163), **P. Kulak, J. Piwnik, T. Węgrzyn, D. Sialeski and Ł. Wszolek**  
Innovative Micro Welding Technologies



## Room B

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### 16:00 Sponsors' Session

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Chairman: **Z.L. Kowalewski**

- 16:00 **A. Kharlamov, INSTRON**  
Modern Solutions for Materials Testing and Mechanical Characterisation
- 16:20 **T. Rusin, MTS**  
Universal Material Testing Machines with Expanded Capabilities
- 16:40 **A. Khvorostov, NANOVEA**  
Optical Profilometry in Material Engineering
- 16:50 **B. Zajączkowska, HBM**  
Strain Gauge Technology in Research and Industrial Applications
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## Room A

9:00 (invited plenary lecture)

Chairman: **J. Eberhardsteiner**

**Narinder Gupta**, India

Plasto-Mechanics of Large Deformation under Impact Loading

14:40 (invited plenary lecture)

Chairman: **W. Wagner**

**Krzysztof Wiśniewski**, Poland

Recent Improvements in Mixed/Enhanced Shell Elements with Drilling Rotation

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### Fracture, Damage and Fatigue of Materials II

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Chairmen: **G. Mejak & W. Moćko**

10:00 (P108)

**C.V. Kukudzhyanov** and **A.V. Kolomiets**

Deformation and Fracture of the Preliminary Damaged Material under the Impact of Electric Current

10:20 (P004)

**G. Mejak**

Effective Linear Elastic Properties of a Solid with Periodic Distribution of Penny Shaped Cracks

10:40 (P010)

**W. Moćko**

Influence of the Fatigue Loadings on the Residual Stress-Strain Characteristic of the Engineering Materials

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Coffee break

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## Room A

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### Smart Materials and Structures I

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Chairmen: **E.A. Pieczyska & H. Tobushi**

11:20 (P121)

**V. Dunić, E.A. Pieczyska, N. Busarac, R. Slavković and V. Slavković**

Partitioned Thermo-Mechanical Coupling of SMA Constitutive Model

11:40 (P025)

**M. Xia and Q. Sun**

Jump Phenomenon of Thermomechanical Responses in Nonlinear Torsional Vibration of NiTi Tube

12:00 (P012)

**P. Sowa, A. Biborski, R. Kozubski, E.V. Levchenko, A.V. Evteev, I.V. Belova and G.E. Murch**

Ordering and Segregation Processes in Binary Intermetallic Nanofilms with Triple Defects: Atomistic Simulations

12:20 (P022)

**R. Matsui and R. Takenouchi**

Transformation and Deformation Properties of Functionally Graded Shape Memory Alloy Fabricated by SPS and Rolling Processes

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### Smart Materials and Structures II

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Chairmen: **R. Kozubski & K. Kowalczyk-Gajewska**

15:40 (P024 – keynote lecture)

**K. Takeda, R. Matsui, H. Tobushi, N. Levintant-Zayonts and S. Kucharski**

Deformation and Fatigue Properties of Nitrogen Ion Implanted TiNi Shape Memory Alloy

16:20 (P042)

**T. Ikeda**

Analysis of Effect of Loading Frequency on Stress - Strain - Temperature Relationship of Shape Memory Alloys

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## Room B

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### Computational Aspects of Solid Mechanics I

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Chairmen: **T. Szymczak & Z. Więckowski**

10:00 (P112)

**A. Gialos, V. Zeimpekis, N.D. Alexopoulos, S. Riekehr and N. Kashaev**

Integrated Laser Beam Welded Structures for Aircraft Applications: Manufacturing, Weight Saving and Testing Aspects

10:20 (P038)

**G. Hénap, L. Szabó**

Analytical Solution of an Elastic-Plastic Wedge Subjected to Uniform Shear on Its Face

10:40 (P104)

**P. Landkammer and P. Steinmann**

On Recursive Strategies for Inverse Form Finding in Metal Forming Applications

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**Coffee break**

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11:20 (P070)

**J. Lengiewicz, P. Sadowski and S. Stupkiewicz**

Finite Element Modelling of Elastohydrodynamic Lubrication in the Finite Deformation Regime

11:40 (P096)

**D. Lumelskyy, J. Rojek, R. Pęcherski, F. Grosman and M. Tkocz**

Numerical Investigation of Influence of Friction on Strain Distribution and Forming Limit Curve in Nakazima Formability Test

12:00 (P132)

**Z. Nowak, F. Grosman, D. Lumelskyy, M. Nowak, R. Pęcherski, J. Rojek, M. Tkocz**

Metal Cup Deep Drawing Processes - Numerical Simulation and Experimental Verification

12:20 (P011)

**M. Romanowicz**

Region of Higher Misalignment in Carbon Fiber Reinforced Polymers as an Initiator for Kink Band Formation

## Room B

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### Computational Aspects of Solid Mechanics II

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Chairmen: **P. Kowalczyk & J. Rojek**

15:40 (P162 – keynote lecture)

**P. Dłużewski, M. Maździarz and P. Tazowski**

Third-Order Elastic Coefficients and Logarithmic Strain in Finite Element Modelling of Anisotropic Elasticity

16:20 (P063)

**H. Šimonová, D. Lehký, Z. Keršner, V. Veselý and J. Macur**

Relationships between Mechanical Fracture and Durability Parameters of Selected Concretes

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## Room C

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### Mechanics of Composites, Porous Media II

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Chairman: **P. Papanikos**

10:00 (P043 – keynote lecture)

**K. Kowal-Michalska and Z. Kołakowski**

Inelastic Buckling of Thin-Walled FML Columns by Elastic Asymptotic Solutions

10:40 (P130)

**Z.S. Metaxa, E.P. Favvas, C. Mercader, F. Poulin and N.D. Alexopoulos**

A Preliminary Study on the Development of Graphene / Cement Based Nanocomposites

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Coffee break

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## Room C

9:00 (invited plenary lecture)

Chairman: **N.K. Gupta**

**Ryszard Pęcherski**

Plastic Flow and Failure of Solids. Modelling across Scales

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### Smart Materials and Structures III

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Chairmen: **E.A. Pieczyska & H. Tobushi**

10:00 (P137 – keynote lecture)

**E.A. Pieczyska**

Ferromagnetic Single Crystal Shape Memory Alloy  
Subjected to Subsequent Compression Cycles

10:40 (P026)

**K. Takeda, R. Matsui, H. Tobushi and E.A. Pieczyska**

Stress Relaxation and Stress Recovery of TiNi Shape Memory Alloy  
in Stress-Controlled Subloop Loading

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Coffee break

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11:20 (P100 – keynote lecture)

**K. Kowalczyk-Gajewska, E. Pieczyska, M. Maj, M. Staszczak, M. Majewski,  
M. Cristea and H. Tobushi**

Two-Phase Model of Shape Memory Polymers at Finite Strains: Formulation  
and Experimental Verification

12:00 (P136)

**M. Staszczak, E.A. Pieczyska, M. Maj, K. Kowalczyk-Gajewska, M. Cristea,  
H. Tobushi and S. Hayashi**

Estimation of Shape Fixity and Shape Recovery – Crucial Parameters  
for Shape Memory Polymer Applications

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## Room B

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### **Computational Aspects of Solid Mechanics III**

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Chairmen: **P. Kowalczyk & J. Rojek**

10:00 (P069)

**J. Tabin and B. Skoczeń**

Slip Bands Evolution during Discontinuous Plastic Flow in 304 Austenitic Stainless Steels at Liquid Helium Temperature (4.2 K)

10:20 (P041)

**Z. Więckowski and E. Misztalska**

Stress-Based Finite Element Method for Nearly Incompressible and Incompressible Materials

10:40 (P122)

**D. Dębski and P. Żach**

Review of Hyperelastic Material Use in Damper at Sub-Zero Temperatures

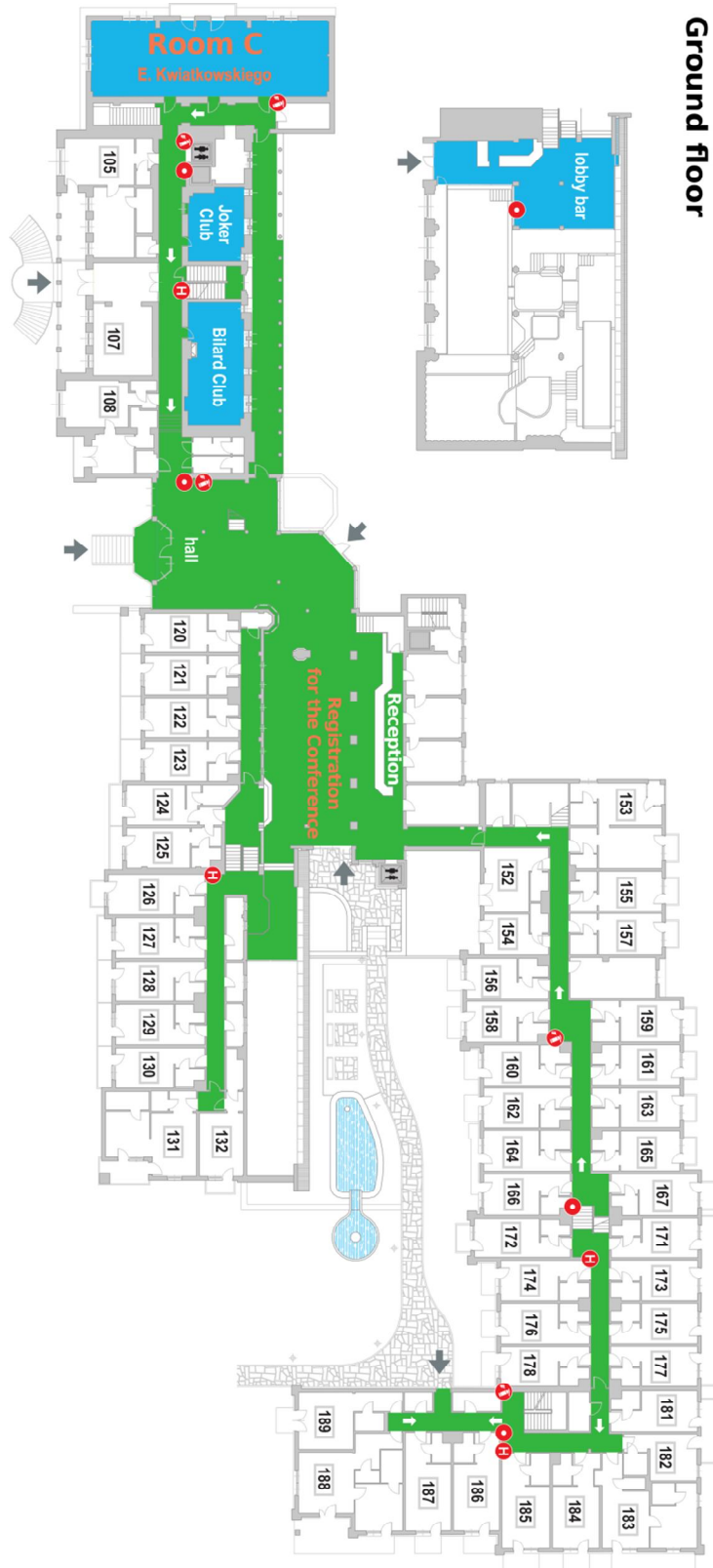
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Coffee break

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# PLAN OF THE BELVEDERE HOTEL - VENUE OF THE SOLMECH2014

Ground floor

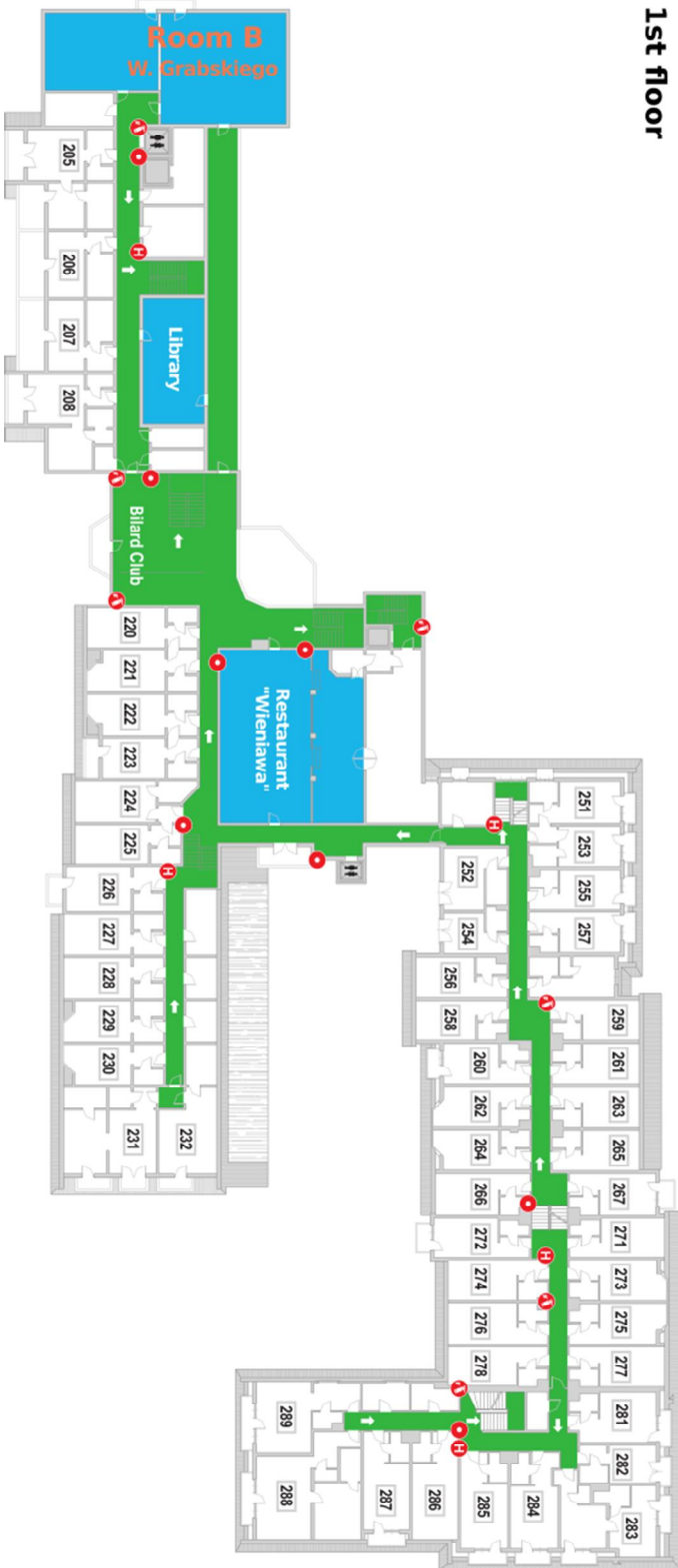


Ground floor



# PLAN OF THE BELVEDERE HOTEL - VENUE OF THE SOLMECH2014

First floor



PLAN OF THE BELVEDERE HOTEL - VENUE OF THE SOLMECH2014

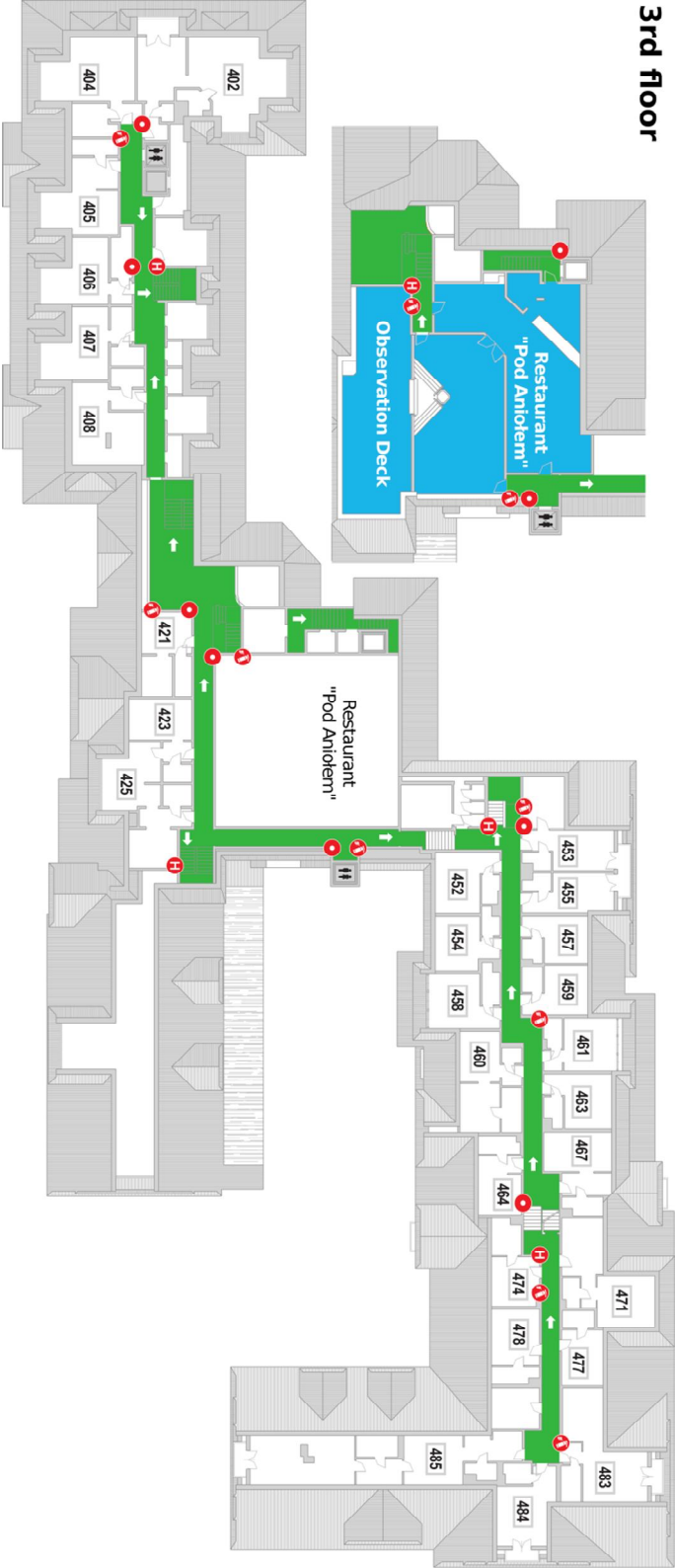
Second floor



2nd floor

PLAN OF THE BELVEDERE HOTEL - VENUE OF THE SOLMECH2014

Third floor



3rd floor

# NOTES