

NOTICE: All the lectures will be presented in the lecture room C, unless explicitly stated otherwise.

## Monday, 2<sup>nd</sup> Sept.

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### Session I

Chairman: K. W. Wojciechowski

**15:00 – 15:40**

*Opening*

**15:40 – 16:05 Sung Youb Kim**

*An atomic study on mechanical properties of graphene Miura-ori structures*

**16:10 – 16:35 Szymon Winczewski**

*From nano- to macro-auxetics: a simple three-parameter model of macroscopic auxetic structure inspired by penta-graphene*

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**Coffee break 16:40 – 17:00**

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### Session II

Chairman: A. C. Brańka

**17:00 – 17:25 David Heyes**

*Single trajectory viscosities of model simple liquids by Molecular Dynamics simulations*

**17:30 – 17:55 Hajime Kimizuka**

*Undulation instability and kink formation of layered block copolymers: a coarse-grained molecular dynamics study*

**18:00 – 18:25 Yuanlong Wang**

*Applications of auxetic structures in automobile*

**18:30 – 18:45 Yajie Gao**

*Engineering design and characterisation of helical auxetic yarns*

**18:50 – 19:05 Oliver Duncan instead of Todd Shepherd**

*Finite element modelling of oblique impacts on auxetic structures for potential use in sports safety devices*

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**Welcome party at 19:10**

## Tuesday, 3<sup>rd</sup> Sept.

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### Session I      Chairman: M. Kadic

**9:00 – 9:55 Martin Wegener**  
*Chiral mechanical metamaterials*

**10:00 – 10:25 Alessandro Airoidi**  
*Response and energy absorption capabilities of chiral topologies in plastic range*

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**Coffee break 10:30 – 10:45**

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### Session II      Chairman: M. Wegener

**10:45 – 11:10 Fengwen Wang**  
*Design of materials with enhanced mechanical properties*

**11:15 – 11:40 Xin Ren**  
*Numerical investigation of tubular structures generated by cutting method and pattern scale factor (PSF) method*

**11:45 – 12:00 Antonina Trippel**  
*Analysis of 3D metallic auxetic structures at high rates of strain using finite element DIC*

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**Coffee break 12:05 – 12:20**

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### Session III      Chairman: T. Stręk

**12:20 – 12:45 Yun-Che Wang**  
*Thermoelastoplastic analysis of reentrant cell formation*

**12:50 – 13:15 Peter V. Pikhitsa**  
*Entangled straight lines and auxetics*

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**Lunch 13:20 – 15:00**

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**Session IV**            Chairman: **Y.-C. Wang**

**15:00 – 15:25 Tomasz Stręk**

*Heat exchanger with auxetic material*

**15:30 – 15:55 Krzysztof K. Dudek**

*Impact resistance of mechanical metamaterials with magnetic and nonmagnetic inclusions*

**16:00 – 16:15 Tomas Fila**

*Strain-rate sensitivity of 316L-0407 steel selective laser sintered auxetic lattices*

**16:20 – 16:35 Michaela Neuhäuserová**

*Numerical modelling of SLS printed auxetic lattices subjected to compressive loading using SHPB*

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**Coffee break 16:40 – 17:00**

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**Session V**            Chairman: **J. N. Grima**

**17:00 – 17:55 Roderick S. Lakes**

*Nonclassical properties in heterogeneous solids*

**18:00 – 18:15 James N. Grima-Cornish** (lecture room A)

*Boron arsenate: an old material with newly discovered 'negative' properties*

**18:20 – 18:35 Jakub Michalski** (lecture room A)

*The use of XFEM in the analysis of fracture resistance of auxetic re-entrant cell*

**18:40 – 18:55 Bartłomiej Burlaga** (lecture room A)

*Behaviour of topology optimized auxetic structures under static loading*

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**Music concert 19:00 – 20:00**

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**Dinner at 20:00**

## Wednesday, 4<sup>th</sup> Sept.

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### Session I

Chairman: S. Y. Kim

**9:00 – 9:25 Mirosław R. Dudek**

*Magnetic properties of dense systems of magnetic nanoparticles prepared in non-magnetic auxetic matrices*

**9:30 – 9:55 Yilin Zhu**

*Enhanced hexa-missing rib auxetics with tunable isotropic negative Poisson's ratios for large deformations*

**10:00 – 10:25 James Ren instead of Cong Tang**

*Data based approach for analysing negative Poisson's ratio systems with different scales*

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**Coffee break 10:30 – 10:45**

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### Session II

Chairman: M. R. Dudek

**10:45 – 11:10 Muamer Kadic**

*From Cauchy to Willis continuum*

**11:15 – 11:40 Dmitry Lisoenko**

*Tension of thin two-layered plates and nano/microtubes of hexagonal crystals*

**11:45 – 12:00 Mikhail Volkov**

*Extension of cylindrically anisotropic chiral tubes of the cubic crystals obtained by rolling up the crystal planes (110) and (111)*

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**Coffee break 12:05 – 12:20**

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### Session III

Chairman: A. V. Dyskin

**12:20 – 12:45 Angus P. Wilkinson**

*Controlling the negative thermal expansion of  $ReO_3$ -type fluorides by the deliberate introduction of excess fluoride*

**12:50 – 13:15 Carl P. Romao**

*Chiral phonons and anomalous thermal expansion in  $BiB_3O_6$*

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**Lunch 13:20 – 15:00**

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## Session IV

Chairman: **A. P. Wilkinson**

**15:00 – 15:25 Arcady V. Dyskin**

*Structures and auxetic material with negative stiffness*

**15:30 – 15:55 Nejc Novak**

*Towards the stiffer and cheaper auxetic cellular materials*

**16:00 – 16:15 Branko Nečemer**

*Computational and experimental investigation of fatigue behaviour in re-entrant auxetic cellular structures*

**16:20 – 16:35 Igor Berinskii**

*Discrete modelling and simulation of auxetic lattice materials*

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**Coffee break 16:40 – 17:00**

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## Session V

Chairman: **A. Alderson**

**17:00 – 17:25 Hong Hu**

*Deformation behaviour of warp knitted fabric made with re-entrant hexagonal geometry*

**17:30 – 17:55 Piotr Surówka**

*Odd elasticity*

**18:00 – 18:25 Joseph N. Grima**

*Negative mechanical behaviour*

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**Poster Session 18:30 – 19:30**

Chairman: **H. Kimizuka** (room B)

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**Bonfire at 19:30**

# Thursday, 5<sup>th</sup> Sept.

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## Session I      Chairman: H. Hu

**9:00 – 9:25 Andrew Alderson**

*Enhanced stiffness composite laminates through Poisson's ratio mis-match*

**9:30 – 9:45 Oliver Duncan**

*Auxetic closed cell foam by steam processing, a parametric study*

**9:50 – 10:05 Shruti Mandhani**

*Analytical and Finite Element modelling of crystalline cellulose  $I_\beta$*

**10:10 – 10:25 Darryl Gambin instead of Ruben Gatt**

*The mechanical properties of high pressure ice polymorphs with particular emphasis on their auxetic potential*

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**Coffee break 10:30 – 10:45**

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## Session II      Chairman: T.-C. Lim

**10:45 – 11:10 Anselm C Griffin**

*X-ray scattering from LC polymers: implications for auxetic response*

**11:15 – 11:40 Pierre-Sandre Farrugia**

*Designing new auxetic structures based on known 2D systems*

**11:45 – 12:00 Hubert Jopek**

*Double-negative metamaterial structures analysis*

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**Lunch 12:05 – 12:55**

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**Excursion to Gniezno 13:00 – 18:15**

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**Round Table Discussion 18:20 – 19:00**

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**Banquet at 19:00**

## Friday, 6<sup>th</sup> Sept.

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### Session I            Chairman: A. C. Griffin

**9:00 – 9:25 Teik-Cheng Lim**  
*Auxetikos (αυξητικός) systems*

**9:30 – 9:55 Sławomir Czarnecki**  
*Recovery of the underlying microstructures appearing in two- and three-dimensional least compliant elastic bodies*

**10:00 – 10:25 Fabrizio Scarpa**  
*Gradient and discontinuous architectures in Kirigami and tessellated perforations: mechanics and applications in flexible electronics, energy harvesters and foams*

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**Coffee break 10:30 – 10:45**

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### Session II            Chairman: D. M. Heyes

**10:45 – 11:10 Konstantin V. Tretiakov**  
*Elastic properties of two-dimensional systems of hard cyclic tetramers*

**11:15 – 11:30 Jakub W. Narojczyk**  
*Recent progress in modelling of nano auxetics by hard body systems*

**11:35 – 11:50 Arkadiusz C. Brańka**  
*On the auxetic properties of anisotropic 2D crystalline media*

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**Coffee break 11:55 – 12:10**

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### Session III            Chairman: K. V. Tretiakov

**12:10 – 12:25 Michał Maslej**  
*Experimental testing of elastic properties of laywood pyramidal cores*

**12:30 – 12:45 Krzysztof Peliński**  
*Usability of wood based auxetic sandwich panels to form synclastic shapes*

**12:50 – 13:15 Krzysztof W. Wojciechowski**  
*Simple models with unusual properties*

**13:20 Closing**

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**Lunch 13:30**