

EUROPEAN  
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Colloquium 626

# ***Mechanics of High-Contrast Elastic Composites***

September 06 – 08, 2021

Keele, UK

<http://626.euromech.org/>



## ***Program***

**All times are given in Central European Summer Time format (CEST=UTC+2)**

**Monday, 06 September**

**Opening**

10.55-11.00

**Morning session**

Chair: A. Nobili

- 11.00-11.20. A.Pandolfi. Metaconcrete: Engineered aggregates for enhanced dynamic performance.
- 11.20-11.40. V. Slesarenko, K. Volokh, J. Aboudi, S. Rudykh. Understanding the strength of bioinspired composites
- 11.40-12.00. H. Altenbach. On some methods analyzing reinforced materials and structures.
- 12.00-12.20. I. Elishakoff, T. Fang, C. Jiang. Free, forced, and random vibrations of a beam composed of highly contrasting materials.
- 12.20-12.40. V. Balbi, M. Destrade, A. Goriely. Growth and remodelling in the mechanics of human brain organoids.
- 12.40-13.00. J. Li, R. Bao, W. Chen. Manipulation of deformation and bandgaps in soft porous phononic crystals by integrating with rigid inclusions.

Lunch break

**Afternoon session I**

Chair: D. Prikazchikov

- 14.00-14.20 M. Nieves, V. Maz'ya, A. Movchan. Approximations for vibration modes of membranes with clusters of small inertial inclusions.
- 14.20-14.40 V. Bratov. Simulation of interaction of Rayleigh waves with complex shape near-surface barriers utilizing linear and nonlinear material models.
- 14.40-15.00 O. Sahin. Asymptotic analysis of the influence of the end conditions on the lowest vibrations of composite beams.
- 15.00-15.20 A.K. Farhat, Z. Chen, L. Morini, M. Gei. Frequency spectra and stop-band optimisation of generalised canonical quasicrystalline phononic waveguides.
- 15.20-15.40 C. Boutin, K. Viverge, S. Hans. Dynamics of bi-laminated plates with soft viscoelastic core.

Coffee break

## **Afternoon session II**

Chair: M. Nieves

- 16.40-17.00 K. Jose, N. Ferguson, A. Bhaskar. Branched flow of flexural waves in random elastic plates.
- 17.00-17.20 L. Aghalovyan, L. Ghulghazaryan, P. Hambardzumyan. On a class of three-dimensional dynamic problems of layered shells with incomplete contact between some layers.
- 17.20-17.40 S. Rudykh, N. Arora, J. Li. Elastic instabilities in heterogeneous materials under finite strains.
- 17.40-18.00 M. Shirani, D. Steigmann. A Cosserat model of elastic solids reinforced by a family of curved and twisted fibres.

## **Tuesday, 07 September**

## **Morning session**

Chair: K. Cherednichenko

- 11.00-11.20 M. Cherdantsev, K. Cherednichenko, I. Velčić. Stochastic homogenisation of high-contrast media.
- 11.20-11.40 K. Cherednichenko, I. Velčić. Sharp operator-norm asymptotics for thin e-lastic plates with rapidly oscillating periodic properties.
- 11.40-12.00 I. Kamotski, S. Cooper, V. Smyshlyaev. Uniform asymptotics for a family of degenerating variational problems with applications to error estimates in high-contrast homogenisation problems.
- 12.00-12.20 A. Kiselev. Norm-resolvent convergence to zero-range models with internal structure in models with strong inhomogeneities
- 12.20-12.40 G. Panasenko, R. Stavre. High contrast asymptotic expansion for fluid-structure interaction.
- 12.40-13.00 V. Smyshlyaev. High-contrast dynamic homogenisation of periodic micro-resonances with random properties.

Lunch break

## **Afternoon session I**

Chair: Y. Fu

- 14.00-14.20 A. Nobili, C. Signorini. Reduced asymptotically consistent model of microstructured plates.
- 14.20-14.40 F. Dal Corso, D. Giarola, D. Capuani, D. Bigoni. Shear band patterns arising from rigid line inclusion distributions via boundary element technique.
- 14.40-15.00 I. Andrianov, G. Starushenko, S. Kvitka. Homogenization of transport properties of densely packed, high-contrast fibre composites: analytical solution of cell problem
- 15.00-15.20 G. Da Fies, D. Peck, M. Dutko, G. Mishuris. Can one use averaging when modelling toughness heterogeneity in hydraulic fracture?
- 15.20-15.40 V. Mityushev. Exact and approximate formulas for the effective properties of 2D high contrast composites.

Coffee break

## **Afternoon session II**

Chair: L. Prikazchikova

- 16.40-17.00 S. Kuznetsov. Attenuation of acoustic waves in a composite rod.
- 17.00-17.20 A. Nikonov, B. Zupančič. Dispersive elastic waves in high-contrast layered structures studied by FEM analysis.
- 17.20-17.40 G. Ghulghazaryan, L. Ghulghazaryan. Free vibrations of thin elastic composed cylindrical panel with free edges and with longitudinal section of material properties.
- 17.40-18.00 V. Yanes, Y. Espinosa-Almeyda, R. Rodríguez-Ramos, F. J. Sabina, J. A. Otero. Asymptotic homogenization method applied to three-dimensional micropolar heterogeneous media.

## **Wednesday, 08 September**

### **Morning session**

Chair: D. Prikazchikov

- 11.00-11.20 A.R. Askari, P.D. Folkow, J. Awrejcewicz. Free vibrations of bi-stable pressurized FG plate-type MEMS.
- 11.20-11.40 Yuxin Fu, Yue-Sheng Wang, Yibin Fu. Pattern formation on an elastic half-space coated by a periodic hard layer.
- 11.40-12.00 E. Nunez del Prado, N. Challamel, V. Picandet. Nonlocal diffusion in higher-order thermal lattices.
- 12.00-12.20 S. Sorokin, S. Avetisov, F. Gautier, A. Pelat, A. Peyrou, T. Boyer. Wave propagation in fluid-filled periodic shells composed of high-contrast cells.
- 12.20-12.40 L. Lanzoni, E. Radi, I. Sevostianov. Thermal conductivity of solids with coalescing spherical pores
- 12.40-13.00 K. Madine, D. Colquitt. Green's functions in discrete flexural and elastic systems.

Lunch break

### **Afternoon session**

Chair: C. Signorini

- 14.00-14.20 K. R. Rajagopal, M. Myneni and C. Benjamin. Stress concentration due to a hole in a body with two family of fibers.
- 14.20-14.40 A. Pim. The prediction of defect strengths in nematic shells.
- 14.40-15.00 M. Amato, I. Elishakoff, J.N. Reddy. Free vibration and flutter of a multi-component beam in a supersonic flow
- 15.00-15.20 G. Saccomandi. Nonlinear elasticity may be helpful in elastography?
- 15.20-15.40 D. Bigoni, G. Bordiga, A. Piccolroaz. Metamaterials for applications at extreme deformation.
- 15.40-16.00 J. Kaplunov, D. Prikazchikov, L. Prikazchikova. Asymptotic analysis of boundary value problems for high-contrast thin elastic laminates

### **Closure**

16.00-16.05.