



Workshop on  
“Between Regularity and Defects: Variational and Geometrical Methods in  
Materials Science”

February 20 - 24, 2023

organized by

Stefano Almi (U Napoli), Anastasia Molchanova (U of Vienna)

- **Monday, February 20th, 2023**

09:00 – 09:30 **Registration**

09:30 – 09:40 **Welcome**

09:40 – 10:20 **Pekka Koskela (JYU, Jyväskylä)**

*Homeomorphic Sobolev extensions of parametrizations of Jordan curves*

10:20 – 10:50 **Coffee Break**

10:50 – 11:30 **Carolin Kreisbeck (KU Eichstätt)**

*Variational analysis of auxetic metamaterials of checkerboard type*

11:30 – 12:10 **Sebastian Schwarzacher (Uppsala U)**

*Variational methods for hyperbolic evolutions and fluid-structure interactions*

12:15 – 12:30 **Group picture**

12:30 – 14:00 **Lunch Break**

14:00 – 14:40 **Marco Morandotti (Politecnico, Torino)**

*Semi-discrete modeling of systems of disclinations and dislocations*

14:40 – 15:20 **Tomáš Roskovec (U of South Bohemia)**

*Modern trends in Gagliardo-Nirenberg inequality*

15:20 – 15:50 **Coffee Break**

15:50 – 16:30 **Filip Soudský (TU of Liberec)**

*An elementary proof of classical result of calculus of variations*

- **Tuesday, February 21st, 2023**

09:00 – 09:40 **Manuel Friedrich (FAU Erlangen-Nürnberg)**

*Finite crystallization via stratification*

09:40 – 10:20 **Francesco Solombrino (U Napoli)**

*Integral representation and  $\Gamma$ -convergence for free-discontinuity problems with  $p(\cdot)$ -growth*

10:20 – 10:50 **Coffee Break**

10:50 – 11:30 **Lucia Scardia (Heriot-Watt U, Edinburgh)**

*Minimisers of anisotropic Coulomb energies in 3d*

11:30 – 12:10 **Aldo Pratelli (U Pisa)**

*Existence and non-existence of optimal sets for non-local energies.*

12:10 – 14:00 **Lunch Break**

14:00 – 14:40 **Stanislav Hencl (Charles U, Prague)**

*Weak limit of homeomorphisms in  $W^{1,n-1}$ : invertibility and lower semicontinuity of energy*

14:40 – 15:20 **Anna Doležalová (Charles U, Prague)**

*Weak limit of homeomorphisms in  $W^{1,n-1}$  and (INV) condition: 2*

15:20 – 15:50 **Coffee Break**

15:50 – 16:30 **Viktor Shcherbakov (U Kassel)**

*Fully discrete approximation schemes for rate-independent crack propagation*

• **Wednesday, February 22nd, 2023**

09:00 – 09:40 **Stefan Krömer (Czech Academy of Sciences, Prague)**

*Thin film asymptotics in a model related to single-crystal plasticity*

09:40 – 10:20 **Barbora Benešová (Charles U, Prague)**

*Non-interpenetration in thin-film models*

10:20 – 10:50 **Coffee Break**

10:50 – 11:30 **Jani Onninen (Syracuse U)**

*Quasiregular values*

11:30 – 12:10 **Aleksis Koski (U Helsinki)**

*Sobolev Homeomorphic Extensions*

12:10 – 12:50 **Pekka Pankka (U Helsinki)**

*De Rham algebras of closed quasiregularly elliptic manifolds are Euclidean*

18:00 – **Social Dinner**

• **Thursday, February 23rd, 2023**

09:40 – 10:20 **Barbara Zwicknagl (HU Berlin)**

*Pattern formation in helimagnets*

10:20 – 10:50 **Coffee Break**

10:50 – 11:30 **Carlos Mora Corral (U Autonoma de Madrid)**

*Regularity, cavitation and harmonic dipoles in Nonlinear Elasticity*

11:30 – 12:10 **Marco Barchiesi (U Trieste)**

*Minimization problems for the axisymmetric neo-Hookean energy*

12:10 – 14:00 **Lunch Break**

14:00 – 14:40 **Daniel Campbell (Charles U, Prague)**

*Injectivity in second-gradient Nonlinear Elasticity*

14:40 – 15:20 **Emanuela Radici (U L'Aquila)**

*Characterisation of area-strict limits of planar BV homeomorphisms*

15:20 – 15:50 **Coffee Break**

15:50 – 16:30 **Flaviana Iurlano (CNRS, Paris)**

*Existence of solutions for the 2d Signorini-Coulomb problem with arbitrarily large friction coefficient*

- **Friday, February 24th, 2023**

09:40 – 10:20 **Marcello Ponsiglione (U Roma 1)**

*Two slope functions minimizing fractional seminorms and applications to misfit dislocations*

10:20 – 10:50 **Coffee Break**

10:50 – 11:30 **Jean-Francois Babadjian (Paris-Saclay U)**

*Characteristic flow and partial uniqueness for a non strictly convex problem with linear growth in the calculus of variations*

11:30 – 12:10 **Marco Cicalese (TU Munich)**

*From crystals to Wulff shapes*

12:10 – 12:50 **Martin Kružík (Czech Academy of Sciences, Prague)**

*Minimal Energy for Geometrically Nonlinear Elastic Inclusions in Two Dimensions*

**All talks take place at ESI Boltzmann Lecture Hall! Wearing an FFP2 mask is strongly recommended!**