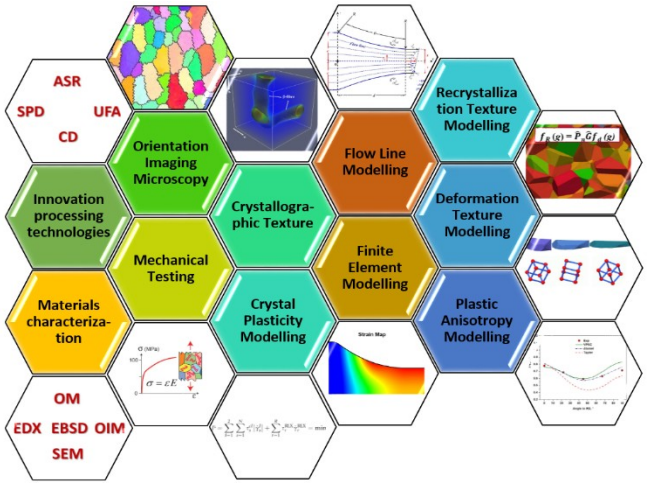
Microstructural engineering of metals

- Analysis of local kinematical features (slide-roll) of the human knee joint by means of multi-body modelling
- Investigation of microstructural changes in metallic materials produced by innovation processing technologies: severe plastic deformation (SPD), asymmetric rolling (ASR), ultra-fast annealing (UFA), cryo-deformation (CD), accumulative roll bonding (ARB).
- Materials characterization by means of Orientation Imaging Microscopy (OIM): Electron Backscattering Diffraction Technique (EBSD).
- Mechanical Testing of Material's performance: Hardness, Tensile, Impact test.
- Investigation of mesoscopic changes in metals during thermomechanical processing: Optical Microscopy (OM), Scanning Electron Microscopy (SEM), EBSD, EDX.
- Modelling the deformation flow during rolling: Finite Element Models (FEM) and Flow Line Method (FLM).
- Modelling the texture evolution during deformation employing Taylor-type crystal plasticity homogenization schemes: Full Constraints Taylor model, Visco-Plastic Self-Consistent model, Advanced Lamel model, Cluster V model.
- Prediction of crystallographic changes in metals during recrystallization by principles of continuum mechanics and crystal plasticity theory: REX model.



Selected publications on the topic:

· **Sidor, J.** – Decroos, K. - Petrov, R.H. - Kestens, L.A.I. "Evolution of recrystallization textures in particle containing Al alloys after various rolling reductions: experimental study and modeling" *International Journal of Plasticity*. Vol. 66, 2015, 119–137. **(IF=5.971).**

· **Sidor, J.** - Petrov, R. - Kestens, L.A.I. "Modeling the Crystallographic Changes in Aluminum Alloys During Recrystallization" *Acta Materialia* Vol. 59, 2011, pp. 5735–5748. **(IF=3.755).**

· **Sidor, J.** - Miroux, A. - Petrov, R. - Kestens, L. "Microstructural and crystallographic aspects of conventional and asymmetric rolling processes" *Acta Materialia*. Vol. 56, 2008, pp. 2495–2507. **(IF=3.729)**