Advanced Course on "Image-based Mechanics: an Overview of Experimental and Numerical Approaches", October 6-10, 2025

	MONDAY	*TUESDAY*	*WEDNESDAY*	*THURSDAY*	*FRIDAY*
	October 6	*October 7*	*October 8*	*October 9*	*October 10*
9:00-9:45	*Famaey* (1) Basics of mechanical characterization & parameter fitting: uniaxial, biaxial and unconfined compression testing	*Xavier* (4) Image-based approaches in high-strain rate testing analysis: composites and wood materials	*Passieux* (1) Theory and implementation of (FE-)DIC (2D, 2.5D & 3D): functional, solvers and a priori error estimate	*Blaysat* (3) Advanced LSA	*Passieux* (6) Overview of image-based models
9:45-10:30	*Famaey* (2) Basics of mechanical characterization & parameter fitting: uniaxial, biaxial and unconfined compression testing	*Famaey* (6) Micro-CT based multiscale modelling	*Passieux* (2) Hands-on on FE-DIC/DVC	*Blaysat* (4) Hands-on on LSA	*Réthoré* (6) An overview of voxel-based FE approaches
11:00-11:45	*Famaey* (3) Image-based analysis for test methods described in (1-2) – homogenization, boundary effects & uncertainty - part 1	*Réthoré* (1) Theory and implementation of FEMU: cost-function, boundary conditions, a priori error estimates	*Passieux* (3) Theory and implementation of (FE-)DIC/DVC: regularisation	*Blaysat* (5) Assessment of the metrological performances of full-field measurement methods (DIC/LSA, from images to kinematic fields)	*Réthoré* (3) Data-driven mechanics: theoretical background
11:45-12:30	*Xavier* *(1) 2D and stereo digital image correlation: guidance and practical concepts*	*Réthoré* (2) Hands-on on FEMU	*Passieux* (4) Hands-on on FE-DIC/DVC	*Blaysat* *(6) Patterning Techniques (2D, 2.5D)*	*Réthoré* (4) Formulation and implementation of DDI
14:00-14:45	*Xavier* *(2) The virtual fields method: extracting material parameters from heterogeneous fields*	*Xavier* (5) Image-based material testing: design and implementation	*Redenbach* *(1) Image processing: Segmentation*	*Redenbach* (4) Image analysis for cracks, including motion estimation by optical flow	*Réthoré* (5) Hands-on
14:45-15:30	*Famaey* (4) Bulge-inflation testing & the virtual fields method	*Xavier* (6) Hands-on with Jupyter Notebooks: Virtual Fields Method for Material Identification	*Redenbach* *(2) Image processing: Mathematical morphology*	*Redenbach* (3) Geometric microstructure characteristics	
16:00-16:45	*Xavier* (3) Image-based approaches in fracture mechanics: composites, wood and bone materials	*Blaysat* (1) Spectral measurement methods: From gray levels to phase modulations	*Redenbach* (3) Synthetic data for deep learning and method validation	*Redenbach* (4) Quantitative image analysis: analysis and modelling of foam structures	
16:45-17-30	*Famaey* (5) Image-based analysis for test methods described in (1-2) – homogenization, boundary effects & uncertainty - part 2	*Blaysat* (2) LSA (theory, implementation & examples)	*Poster session / Workshop*	*Passieux* (5) Optimisation of identification tests setups	