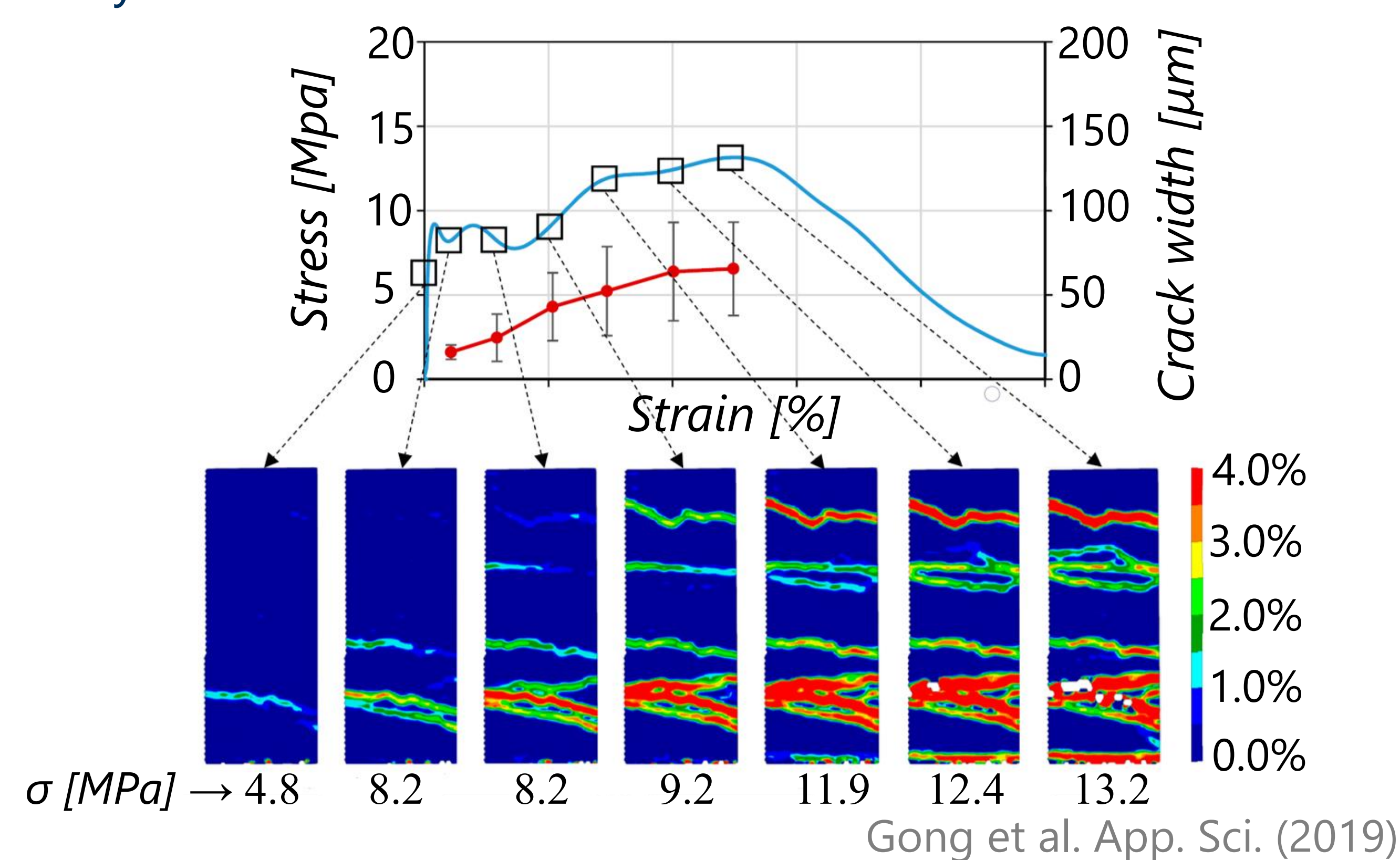


Laura Camila DURAN VERGARA – Doctoral Project C1/II

MODEL-BASED PHOTOGRAMMETRIC 3D MEASUREMENTS IN HIGHLY DYNAMIC PROCESSES

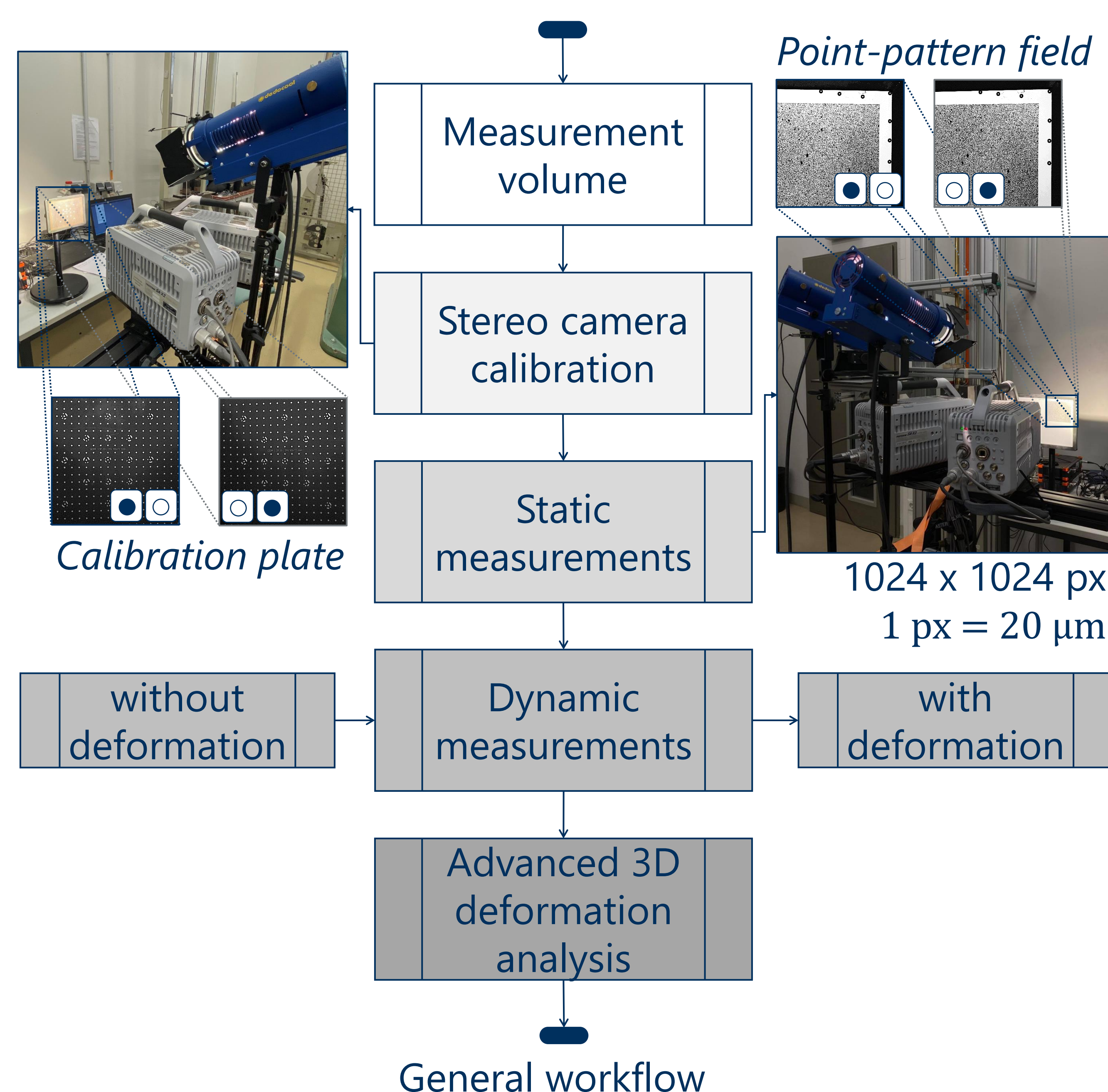
1 STATE OF THE ART

- First cohort: DIC measurements of strain sequences and crack widths
- Second cohort: Spatio-temporal analyses of impact-induced deformations using a stereo high-speed camera system



2 OBJECTIVES

- Use stereo high-speed camera system for deformation analyses at very high spatial and temporal resolution
- Fusion of the geometric model of photogrammetry and mechanical deformation models for the 3D analysis of dynamic processes
- 1. Step: Analysis of the accuracy potential of a stereo high-speed camera system in various configurations depending on the specimen and test system



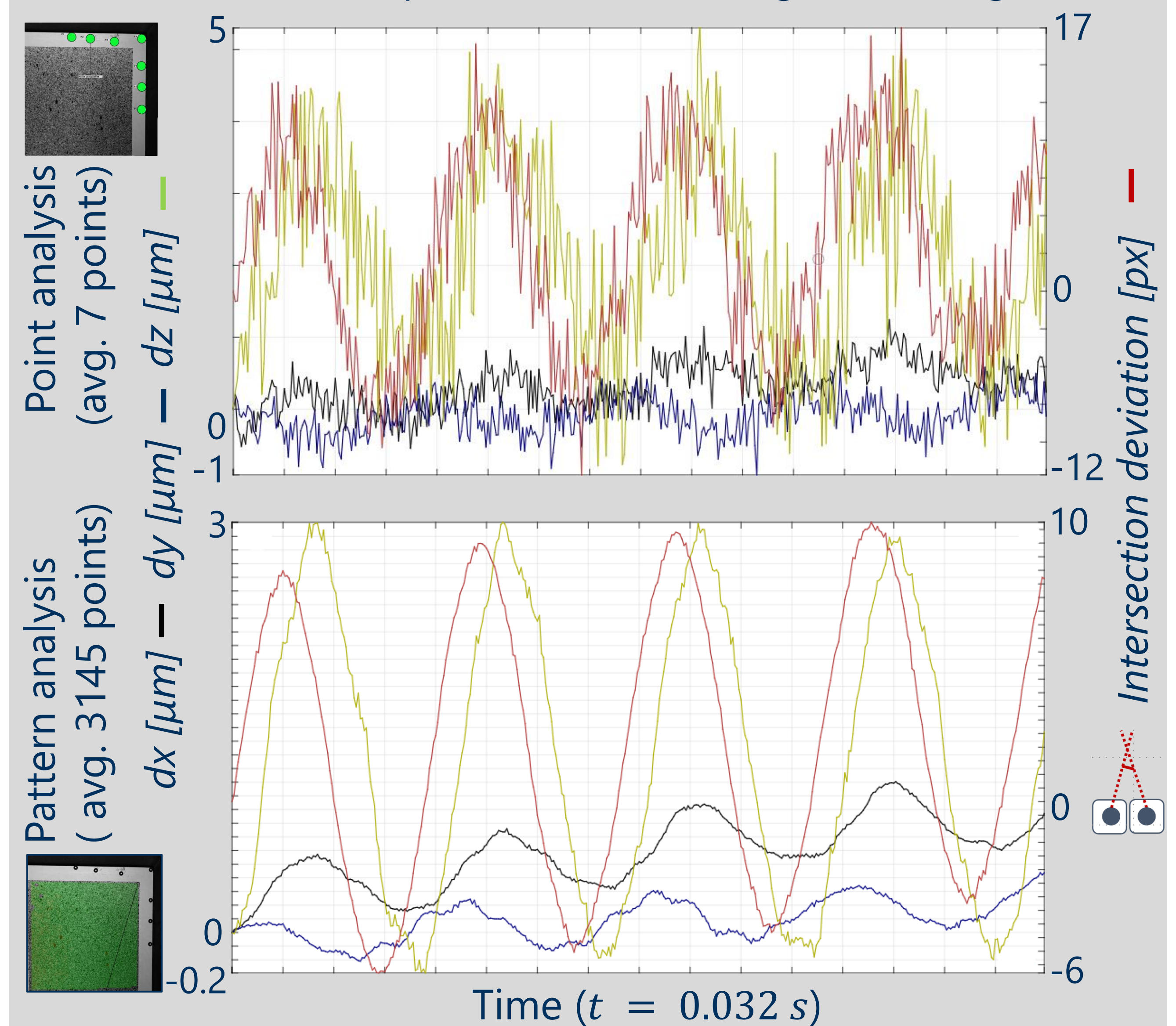
3 RESULTS

Stereo camera calibration

- Smaller calibration error with a highly controlled proceeding

Static measurements

- Apparent displacement of a fixed-point component and a fixed-surface component in multi-image recording



- Insignificant influence of measured calibration errors for the apparent displacements
- Influence on the apparent displacement assuming rigid body motion:

$$\overline{dx}_{t=1...n} = \overline{dy}_{t=1...n} = \overline{dz}_{t=1...n} = 0$$

4 PLANNED COLLABORATIONS

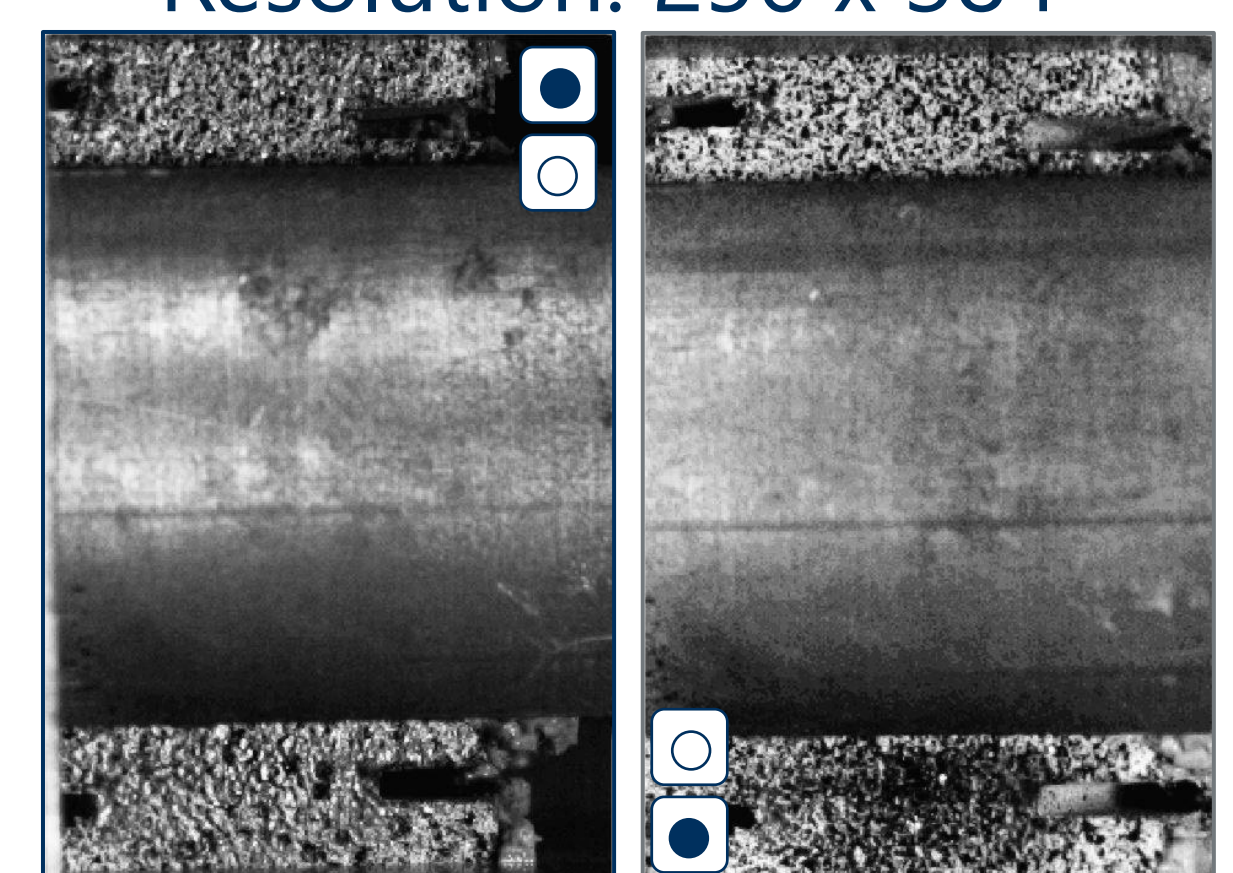
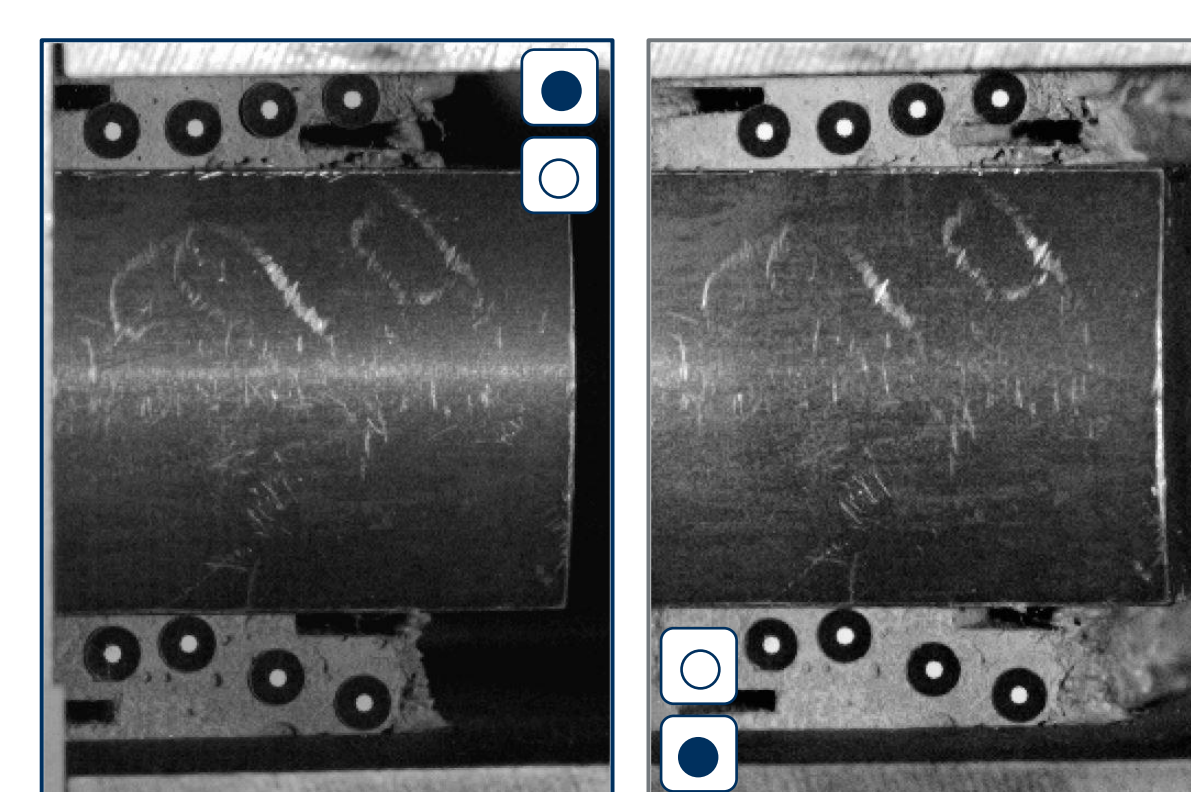
- A. TAWFIK (A4/II): Impact shear testing

Point analysis

Frame rate: 100.000 fps
Shutter Speed: 1/119337 s
Resolution: 256 x 344

Pattern analysis

Frame rate: 90.000 fps
Shutter Speed: 1/105366 s
Resolution: 256 x 384



- F. BRACKLOW (A5/II): Impact on the backside of the specimen
- L. LEICHT (A6/II): Strain on the impactor and on the front surface of the specimen