

IMAGE PROCESSING ALGORITHM FOR CELI FORCE SENSOR WITH A MICROPILLAR PATTERNED SUBSTRATE

Waldemar T. Smolik¹, Wojciech Świąszkowski¹, Krzysztof J. Kurzydłowski¹,
Arie Bruinink², Norbert Danz³

¹ *Warsaw University of Technology, Warsaw, Poland*

² *Empa. Swiss Federal Laboratories for Materials Testing and Research, St. Gallen,
Switzerland*

³ *Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany*

Abstract

The paper presents an image analysis for cell force measurement using a patterned substrate surface. The cell forces are transduced to a hexagonal lattice of microcantilevers in the shape of cylindrical pillars installed on a substrate surface. The magnitude and direction of pillars deflection is measured optically by an analysis of transmission images of the substrate. The template matching is used for identification of the position of pillars. The hexagonal lattice of pillars is identified automatically and used as information about the reference rest position of the pillars. The elaborated algorithm was tested using simulated data. The first results using real images are presented.

Keywords: cell forces, cell motility, cell imaging, micro-patterned substrate, micropost array, image processing