

# Preface

The 11th International Workshop on Bifurcation and Degradation in Geomaterials (IWBDG 2017) was held in Limassol, Cyprus, during the period May 21–May 25, 2017. Interests on localization and instabilities in the field of geomechanics date back to the early 1980s when the first International Workshop on Localization of Soils was organized in Karlsruhe, Germany, in February 1988. The first event created such enthusiasm and interest in the fundamental aspects of bifurcation theory to soils, that a second workshop followed suit in Gdansk, Poland, in September 1989. The topic later extended to rock mechanics at the third international workshop in Aussois, France, in September 1993. The interest grew steadily, and the scope was expanded to instabilities and degradations in geomaterials at the workshops that were held in Gifu, Japan, September 1997; Perth, Australia, November 1999; Minneapolis, USA, June 2002; Crete, Greece, June 2005; Lake Louise, Canada, May 2008; Porquerolles Island, France, May 2011; and Hong Kong, May 2014.

The IWBDGs have grown in size and scope, since their inception, covering more and wider areas of geomaterials and geomechanics including modern trends. The scientific program of the IWBDG 2017 includes 11 keynote lectures and 66 oral communications. The lectures cover a wide range of topics including advances in instabilities, localized and diffuse failure, multiscale phenomena, multiphysics, micromechanical modeling, and other related topics. A major goal was to promote the link between theoretical and applied mechanics with engineering applications in traditional and in emerging fields, such as geomechanics for the energy and the environment. The quality of the contributed papers has benefited greatly from the expertise of numerous colleagues who served as referees and to whom we are very grateful.

The IWBDG 2017 is dedicated to Prof. Hans Muhlhaus, on the occasion of his 70th birthday, in recognition of his contributions and his achievements in the field of Bifurcation and Degradation in Geomaterials. The papers presented in special session in honor of Prof. Muhlhaus are included in these proceedings.

Hans shaped the world of Geomechanics, introducing the theory of bifurcations, localisations and instabilities and higher order theories. He brought and drummed in

the mathematical rigor and ‘objectivity’ into the engineering community. His paper “The thickness of shear bands in granular media”, *Geotechnique*, 1987, co-authored by the late Prof. Ioannis Vardoulakis, is the second-most cited paper since 1970 of this journal. It has a significant impact on the development of constitutive theories for granular materials. Such theories are crucial for a fundamental understanding of the origins of failure of geo-structures-natural or man-made-and the dynamic properties of earthquakes. More recent contributions to the field include his papers on shear banding, discrete element simulations of granular assemblies and his theoretical and computational work on instabilities in sand erosion and fluid-solid interactions. With more than 300 journal and conference papers and more than 8000 citations Professor Mühlhaus is a leading researcher in the area who determined its shape and direction for years to come.

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