Keynote Speaker----Prof. Takayuki Kitamura

Prof. Takayuki Kitamura, Graduate School of Engineering, Department of Mechanical Engineering and Science, Kyoto University, Japan

Professor Takayuki Kitamura is the Executive Vice-Director of Kyoto University, Dean of Graduate School of Engineering, Dean of Faculty of Engineering, and Professor of Mechanical Engineering and Science at Kyoto University. He has continuously contributed to Kyoto University through scientific investigation and education as well as administration works and served as a Vice-President of Kyoto University from 2007 to 2008. He was a council member of Science Council of Japan (SCJ) in 2008-2014 and is a member of SCJ in 2005-2008 and 2014-now. He successively held director positions in scientific societies such as the Society of Materials Science Japan (JSMS) and the Japan Society of Mechanical Engineers (JSME) including the President of JSMS from 2014 to 2016 and a Fellow of JSME in 2003-now. He is elected as a member of the Engineering Academy Japan. He leads an internationally recognised research team in the fields of fracture mechanics in nano-meter scale and multi-physics in nanomaterials. He has been pioneering new fields in the solid mechanics and has made significant contributions resulting in numerous refereed publications, substantial funding, invitations to visit and collaborate with world class institutions both nationally and internationally, invitations for invited/special lectures in various international conferences.

Speech Title: Fatigue in Nano-Metals-- Fatigue of Copper Thin-layer in Nanoscale Components

Abstract: In order to investigate fatigue behaviour of a nano-scale metals under fully-reversed and high-cycle loading, resonant fatigue experiments are performed for nano-cantilever specimen. This abstract describes fatigue damage behaviour of only a nano-polycrystalline Cu thin layer sandwiched by Si and SiN though we present the results obtained in fatigue of single crystal metals as well in the talk. The high-cycle fatigue loading brings about crystallographic slip bands associated with extrusion/intrusion of about 30 nm width on the Cu surface. The slip bands form only in a particular grain though other grains possess slip systems with a higher Schmid factor (Figure). Stress analysis, taking into account the Cu grains and dissimilar surrounding materials, indicates that the grain where the slip bands form possesses a slip system with the highest resolved shear stress in all grains.

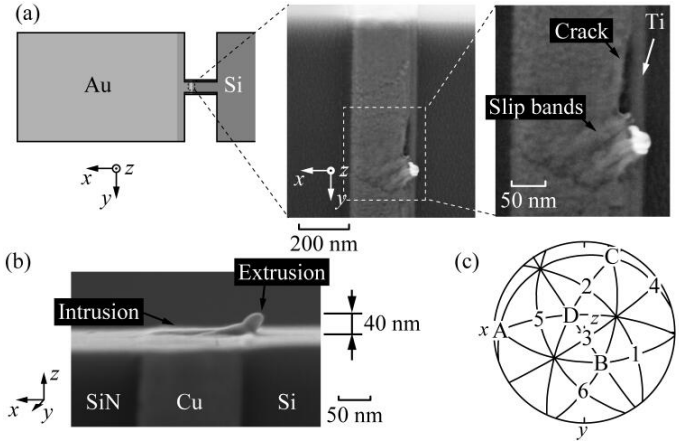

Figure (a) Magnified view of Grain 3, (b) SEM image of the upper surface tilted at 80 degrees, and (c) stereographic projection of Grain 3.

Conference Secretary: Yoko Ye
Email: msam@msamconf.org Tel: +86-18154309082