



Detailed Program

The following contains the detailed technical ICF13 program. It has been formatted by topic which contains the day, date, time and the abstract reference number to the Abstract Book. The asterisk after the author's name indicates the presenting author and his/her affiliation.

Opening Honour Lecture

Monday June 17



Fracture and fatigue: From macro to nano scales and from engineered materials to biological systems

Professor **Subra Suresh** (Carnegie Mellon University, USA)

Professor Subra Suresh is the Vannevar Bush Professor of Engineering (on leave) at the Massachusetts Institute of Technology. Since October 2010, he has been serving as the 13th director of the National Science Foundation (NSF) for a six-year term. Prior to assuming this position, Professor Suresh was MIT's dean of engineering. As a mechanical engineer who later became interested in materials science and biology, Suresh has done pioneering work in the biomechanics of blood cells under the influence of diseases such as malaria. From 2000 to 2006, Suresh served as the head of the MIT Department of Materials Science and Engineering. He joined MIT in 1993 as the R.P. Simmons Professor of Materials Science and Engineering and held joint faculty appointments in the Departments of Mechanical Engineering and Biological Engineering, as well as the Division of Health Sciences and Technology. Suresh holds a bachelor's degree from the Indian Institute of Technology in Madras, a master's degree from Iowa State University, and earned his ScD from MIT in 1981.

Presidential Honour Lecture

Wednesday June 19



Piezonuclear fission reactions produced by fracture and earthquakes: From the chemical evolution of our planet to the so-called cold fusion

Professor **Alberto Carpinteri** (Politecnico di Torino, Department of Structural, Geotechnical and Building Engineering, Italy)

Professor Alberto Carpinteri has been the Chair of Structural Mechanics, and the Director of the Fracture Mechanics Laboratory at the Politecnico di Torino (Italy), since 1986. During this period, he has held different positions of responsibility, among which: Head of the Department of Structural Engineering (1989-1995), and Founding Member and Director of the Post-graduate School in Structural Engineering (1990-). He has also been the President of the National Research Institute of Metrology in Italy, INRIM (2011-2013). He was a Visiting Scientist at Lehigh University, Pennsylvania, USA (1982-1983), and is a Fellow of different Academies and Institutions. Prof. Carpinteri is the President of the International Congress on Fracture, ICF (2009-2013), and was the President of the European Structural Integrity Society, ESIS (2002-2006), the International Association of Fracture Mechanics for Concrete and Concrete Structures, IA-FraMCoS (2004-2007), the Italian Group of Fracture, IGF (1998-2005). He was a Member of the Congress Committee of the International Union of Theoretical and Applied Mechanics, IUTAM (2004-2012), and is a Member of the Executive Board of the Society for Experimental Mechanics, SEM (2012-2014), a Member of the Editorial Board of thirteen international journals, the Editor-in-Chief of the journal "Meccanica", and the author or the editor of over 750 publications, of which more than 300 are papers in refereed international journals and 43 are books. Prof. Carpinteri received numerous Honours and Awards, among which: the Robert L'Hermite Medal from RILEM (1982), the Griffith Medal from ESIS (2008), the Swedlow Memorial Lecture Award from ASTM (2011), and the Paul Paris Gold Medal from ICF (2013).

Closing Honour Lecture

Friday June 21



On the nano-toughening of polymers and fibre composites

Professor **Yiu-Wing Mai** (The University of Sydney, Australia)

Professor Yiu-Wing Mai obtained his undergraduate education and postgraduate research training in mechanical engineering at the University of Hong Kong, China. He previously worked in the US (University of Michigan and NIST), the UK (Imperial College) and Hong Kong (HKUST, CityU, HKU and PolyU). He holds a University Chair in Mechanical Engineering at the University of Sydney. Prof Mai's major current research interest is on polymer nanocomposites. His published work has contributed to the development of asbestos-free fibre cements, testing protocols for fracture toughness of polymer films and improved composites manufacturing processes with global impact. Professor Mai is Fellow of the Royal Society and the Royal Academy of Engineering.

Plenary Lectures

PL-01: Monday June 17

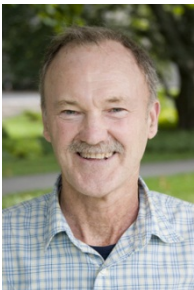


Control of the width of antarctic ice streams by near-crack-tip processes in a creeping and partially melting medium

Professor **James R. Rice** (Harvard University, USA)

James R. Rice is Mallinckrodt Professor of Engineering Sciences and Geophysics at Harvard University, appointed jointly in the School of Engineering and Applied Sciences and the Department of Earth and Planetary Sciences. Rice was previously on the faculty of Brown University (1965-1981) and was educated in mechanics at Lehigh University (1958-1964). His focus in recent years is on mechanics and fracture theory directed to earth and environmental problems, including fault zone processes, earthquake nucleation, dynamic rupture propagation, tsunami generation, meltwater interactions with glacier dynamics, landslide processes, and general hydrologic phenomena involving fluid interactions in deformation, flow and failure of earth materials. His earlier work focused more on inelastic deformation and fracture in mechanical and materials engineering, including elastic-plastic crack propagation in ductile metals, path-independent integral methodology, microscopic mechanisms of deformation and failure, deformation localization into shear zones, and finite-element and spectral numerical methodology in solid mechanics.

PL-02: Monday June 17



Recent developments in ductile fracture

Professor **John W. Hutchinson** (Harvard University, USA)

John Hutchinson received his undergraduate education in engineering mechanics at Lehigh University and his graduate education at Harvard University. He is currently the Abbott and James Lawrence Research Professor of Engineering at Harvard. Hutchinson and his collaborators work on problems in solid mechanics concerned with engineering materials and structures. Examples of ongoing research activities are: (1) Efforts to extend plasticity theory to small scales, (2) Development of a mechanics framework for assessing the durability of thermal barrier coatings for gas turbine engines, (3) Micro-mechanics and computation mechanics of ductile fracture, and (4) Mechanics of delamination and fracture of thin films, coatings and multilayers.

PL-04: Monday June 17



Deformation and fracture in nanotwinned metals and structures

Professor **Huajian Gao** (Brown University, USA)

Huajian Gao received his B.S. degree from Xian Jiaotong University of China in 1982, and his M.S. and Ph.D. degrees in Engineering Science from Harvard University in 1984 and 1988, respectively. He served on the faculty of Stanford University between 1988 and 2002, where he was promoted to Associate Professor with tenure in 1994 and to Full Professor in 2000. He served as a Director at the Max Planck Institute for Metals Research between 2001 and 2006 before joining the Faculty of Brown University in 2006. At present, he is the Walter H. Annenberg Professor of Engineering at Brown.

Professor Gao's research is focused on the understanding of basic principles that control mechanical properties and behaviors of materials in both engineering and biology. He is a Member of the National Academy of Engineering of USA and a co-editor-in-chief of the Journal of the Mechanics and Physics of Solids, the flagship journal of his field. He is also the recipient of numerous academic honors, from a John Simon Guggenheim Fellowship in 1995 to recent honors including the Alexander von Humboldt Prize from Germany and Rodney Hill Prize in Solid Mechanics from the International Union of Theoretical and Applied Mechanics in 2012.

PL-05: Tuesday June 18



Advances in extended finite element methods for fracture and heterogeneous materials

Professor **Bhushan L. Karihaloo** (Cardiff University, UK)

Professor Bhushan L. Karihaloo holds a chair at Cardiff University. Previously he has held chairs in Australia and Denmark. His research interests cover a broad spectrum of materials from nano to macro scales and fracture mechanics. He has published more than 400 papers in journals and conference proceedings. He was awarded the Griffith Medal by the European Structural Integrity Society in 2006 and DSc (honoris causa) by St Petersburg University, Russia in 2007. He is an honorary fellow of the Czech Society of Mechanics and of ICF.

Professor Karihaloo is a Member of Editorial Board of 9 International Journals and Associate Editor of the International Journal of Fracture. He was a Vice-President of the International Conference on Fracture (1997 – 2001, 2005 – 2009), the Chair of The Royal Society UK National Panel of the International Union of Theoretical and Applied Mechanics (IUTAM) (2004 – 2008), and a Member of Congress Committee of IUTAM (1994 – 96, 2000 – 2008).

PL-06: Tuesday June 18



Failure and toughening at a nano-scale

Professor **Wei Yang** (Zhejiang University, China)

Professor Wei Yang was born on February 16, 1954 in Beijing, China. He graduated from Northwestern Polytechnic University in 1976, and received his MS degree from Tsinghua University in 1981 and Ph.D. degree from Brown University, USA in 1985. He is a Member of Chinese Academy of Sciences (CAS) and a Fellow of the Academy of Sciences for the Developing World (TWAS).

From May 1978 to August 2004 he worked as a faculty member in the Department of Mechanical Engineering and Engineering Mechanics of Tsinghua University. He served as the Head of the Department of Engineering Mechanics from 1997 to 2004. From 2004 to 2006, he chaired the Academic Committee of Tsinghua University. From September 2004 to July 2006, he served as Director of the Office of Academic Degrees Committee under State Council of China and Head of the Division of Degree Management and Graduate Education in Ministry of Education of China. Since August 2006, he has been serving as the President of Zhejiang University. He was elected as the Interim Chair of Association of Pacific Rim Universities (APRU) in 2009.

He is the President of National Natural Science Foundation of China (NSFC).

Prof. Yang has made important achievements in fracture mechanics, meso and nano mechanics. He is a Bureau member of IUTAM.

PL-07: Tuesday June 18



Spatio-temporal nature of scales in the fracture process

Professor **Yuri V. Petrov** (St. Petersburg State University, Russia)

Academician (corr.) of the Russian Academy of Sciences (RAS), PhD, D.Sci. in Mathematics and Physics, Professor

Graduated from Saint-Petersburg State University in 1980

1995 – Professor of the St.-Petersburg State University

1999 – Director of the Research Centre of Dynamics at the St.-Petersburg State University

2004 – Head of the Dept for Extreme States of Materials and Structures at the Inst Probl Mech Engng of the RAS

Research interests in theories of elasticity and plasticity, optimization problems, impact mechanics, dynamic fracture and deformation, structural transformations in a continuous medium, general problems of solid mechanics and physics

PL-08: Tuesday June 18



Nonlinear, non-equilibrium and coupling in cyclic phase transition of solid

Professor **Qingping Sun** (The Hong Kong University of Science and Technology, Hong Kong, China)

Qingping SUN got his PhD in solid mechanics from Tsinghua University, Beijing in 1989. He is currently the Professor and Director of the Institute of Integrated Microsystems at the Hong Kong University of Science & Technology. His research activity in the past five years has focused on the experiment and modeling of the nonlinear, non-equilibrium and multi-physics coupled process in solid-solid phase transitions of shape memory alloys, including the thermal and mechanical behaviors during cyclic phase transitions and the resulting spatial-temporal structures. He was a visiting professor at several french universities and CNRS labs such as Ecole Polytechnique and ENS-Cachan. He also served as member of editorial board for several international journals and member of scientific committee for many international conferences.

PL-03: Monday June 17



Fracture surface contact in fatigue

Professor **Reinhard Pippan** (University of Leoben, Austria)

Prof. Dr. Reinhard Pippan was born on October 29, 1954 in Klagenfurt, Austria. From 1974-1980 he studied Physics at the Technical University Graz. In 1982 he received his PhD from the University of Leoben. In 1991 he received his habilitation for "Solid State Physics". He is the temporary director and group leader at the Erich Schmid Institute of Materials Science, a part of the Austrian Academy of Sciences. Pippan's research activities are focused on mechanical properties of metals, alloys and composites. The improvement of the basic understanding of the relations between the mechanical behaviour, the deformation processes, the fracture processes, fatigue behaviour and the micro- and nano-structure of the materials are in focus of his group. In his career he has received numerous grants and several awards, supervised about 40 diploma and 25 PhD-students. He has more than 300 publications and contributed to several text books.

PL-10: Thursday June 20



Simulation of fracture processes from atoms to snow slab avalanches

Professor **Peter Gumbsch** (Karlsruhe Institute of Technology, Germany)

Peter Gumbsch received the diploma degree in physics in 1988 and his PhD degree in 1991 from the University of Stuttgart. After extended visits at the Sandia National Laboratories in Livermore, postdoctoral work at the Imperial College, London and the University of Oxford he returned to the Max-Planck-Institut in Stuttgart as a group leader and established the group *Modeling and Simulation of Thin Film Phenomena*. In 2001 he took the chair for Mechanics of Materials at Karlsruhe Institute of Technology KIT and the position as head of Fraunhofer Institute for Mechanics of Materials IWM in Freiburg and Halle and.

His research activities focus on modeling and simulation of materials, in particular multiscale modelling approaches. His activities cover atomistic simulation, mesoscopic modeling as well as macroscopic materials descriptions. Central research topics are deformation and fracture processes as well as interface properties in metals and ceramics. He has recently started new activities in the area of tribology.

Amongst other recognitions he was awarded the Masing Memorial Award (1998) and the Gottfried Wilhelm Leibniz Prize (2007). He is chairman of the section Engineering Sciences of the German Academy of Sciences Leopoldina. In 2011 he was appointed as Advisory Professor of Shanghai Jiao Tong University, China.

PL-11: Thursday June 20



Hydrogen embrittlement mechanism from the viewpoint of mechanics-microstructure-environment interactions

Professor **Y. Murakami** (Kyushu University, Japan)

Vice Director, International Institute for Carbon-Neutral Energy Research(WPI-I2CNER), Kyushu University

Director, Research Center for Hydrogen Industrial Use and Storage(HYDROGENIUS), National Institute of Advanced Industrial Science and Technology (AIST)

PL-12: Friday June 21



Prognostics for high temperature component reliability

Professor **Ashok Saxena** (University of Arkansas, USA)

Since July of 2012, Dr. Ashok Saxena has served as the Vice-Chancellor of Galgotias University in Greater Noida in India. He served as the Dean of the College of Engineering, Distinguished Professor, and Irma and Raymond Giffels' Chair at the University of Arkansas in Fayetteville during 2003-2012 and on the faculty at the Georgia Institute of Technology, Atlanta, Georgia, USA for 18 years where he last held the title of Regents' Professor.

Dr. Saxena is a Fellow of ASTM International and ASM International and an Academician of ICF-WASI, the World Academy of Structural Integrity. He is also a winner of the George Irwin Medal and the Fracture Mechanics Medal from ASTM and the Wohler Fatigue Medal from the European Structural Integrity Society, and more than a dozen other awards for his research in the area of Mechanical Behavior of Materials. He has published 175 papers and authored two textbooks.

PL-13: Friday June 21



Size effects on deformation behaviors of metallic single crystals

Professor **Jun Sun** (Xi'an Jiaotong University, China)

Jun Sun, received his Ph.D degree in Material Science from Xi'an Jiaotong University (XJTU) in 1989. After more than two years research in Queen's University as an International Research Fellow of NSERC Canada he joined into the faculty of MSE of XJTU as a full professor in 1995. He is now the director of State Key Laboratory for Mechanical Behavior of Materials and the head of School of MSE of XJTU. He was awarded the National Outstanding Young Investigator Grant of China in 1999, and is also the Cheung Kong Chair Professor of Material Science since 1999, as well as the Chief Scientist for a 973 project of China since 2004. His research interests are currently focusing on the mechanical behavior of materials at small length scale. He has published over 170 research articles in international journals. He has been invited as plenary speaker to several prestigious international conferences.

S01 Advanced Manufacture and Processing (Including Welding, Cutting, Surface Treatment, etc.)

S01-S1

Monday June 17, 16:00–17:40

Room: 213B

Co-Chair: Daolun Chen (Canada), Qihong Fang (China)

- 16:00 S01-002 **Keynote Presentation**
Fracture mechanical investigations on selective laser melting materials
Hans Albert Richard*, Andre Riemer
University of Paderborn, Germany
- 16:30 S01-001 **Keynote Presentation**
Solidification cracking of IN718 TIG welds
Myriam Brochu*, Rafael Navalon-Cabanes, Alexis Chiocca
Ecole Polytechnique de Montreal, Mechanical Engineering, Canada
- 17:00 S01-005 **Mechanical properties of lattice truss structures made of a selective laser melted superalloy**
Jonas Saarimaki*, Hakan Brodin
Linköping University, Sweden
- 17:20 S01-003 **Mechanical behavior of gradient nanocrystallization titanium produced by surface rolling**
Qi Wang*, Yanfei Yin, QiaoYan Sun, Lin Xiao, Jun Sun
Xi'an Jiaotong University, China

S01-S2

Tuesday June 18, 10:30–12:20

Room: 213B

Co-Chair: Manabu Enoki (Japan), Myriam Brochu (Canada)

- 10:30 S01-011 **Keynote Presentation**
Ultrasonic spot welding of lightweight alloys
Vikas Patel, Sanjeev Bhole, Daolun Chen*
Ryerson University, Canada
- 11:00 S01-006 **Evaluation of optimal condition in laser shock peening process by AE method**
Tomoki Takata*, Manabu Enoki, Akinori Matsui, Yuji Kobayashi
The University of Tokyo, Japan
- 11:20 S01-008 **Preparation of Cu₆Sn₅ anode for lithium-ion batteries by electroplating and annealing of Sn/Cu multilayered film**
Wei X. Lei*, Yi C. Zhou, Yong Pan, Juan J. Cheng, Feng W. Cao
Xiangtan University, China
- 11:40 S01-004 **Evaluation of fracture toughness and impact toughness of laser rapid manufactured Inconel-625 structures and their co-relation**
Ganesh Puppala, A. Moitra, S. Satyanarayanan, Rakesh Kaul, G. Sasikala, Prasad Ram Chandra*, Lalit Mohan Kukreja
Indian Institute of Technology Bombay, India
- 12:00 S18-008 **Evolution of the early fatigue driving force at the interior of single crystals and grains**
Gustavo M. Castelluccio*, David L. McDowell
Georgia Institute of Technology, USA

S01 Advanced Manufacture and Processing (Including Welding, Cutting, Surface Treatment, etc.)

S01-S3

Tuesday June 18, 16:00–17:30

Room: 213B

Co-Chair: Minghao Zhao (China), Xiang Zhang (UK)

- 16:00 S01-007 **Keynote Presentation**
In-situ damage monitoring of material process for reliable manufacturing
Manabu Enoki*, Kaita Ito
The University of Tokyo, Japan
- 16:30 S01-010 **Predicting mode-I fatigue crack growth behaviour in a welded cruciform joint under biaxial stresses**
Xiang Zhang*, Haiying Zhang, Rui Bao
Cranfield University, UK
- 16:50 S01-012 **Generation of subsurface defects of monocrystalline silicon under nanoscratching**
Qihong Fang*
College of Mechanical and Vehicle Engineering, China
- 17:10 S01-009 **Porosity, element loss and strength model on softening behavior of hybrid laser arc welded Al-Zn-Mg-Cu alloy**
Shengchuan Wu*
Southwest Jiaotong University, China

S02

Aeronautics and Aerospace

S02-S1

Thursday June 20, 10:30–11:40

Room: 209B

Co-Chair: Huang Yuan (Germany), Min Liao (Canada)

- 10:30 S02-003 **Keynote Presentation**
Wave propagation and scattering in elastic solid with heterogeneities or distributed damages—theoretical solutions and numerical verifications
Su Hao*
ACII, INC., USA
- 11:00 S02-005 **Effect of welding defects on plastic behaviour and fatigue lifetime of friction stir welded Al-Cu-Li alloy**
Thilo F. Morgeneyer*, Thomas Le Jolu, Anne-Francoise Gourgues
Mines Paris Tech, France
- 11:20 S02-001 **Feasibility study of human powered aircraft with low reynolds number**
Premkumar Selvadurai*
B.E.- Aeronautical Engineering, India

S02-S2

Thursday June 20, 13:30–14:40

Room: 209B

Co-Chair: Sunil Bhat (India), Su Hao (USA)

- 13:30 S02-004 **Keynote Presentation**
Analysis and residual strength prediction for multiple site damage in aircraft structures by using weight function method
Xue-Ren Wu*, Wu Xu
AVIC Beijing Institute of Aeronautical Materials, China
- 14:00 S02-007 **Short/small crack model development for aircraft structural life assessment**
Min Liao*, Guillaume Renaud, Yan Bombardier, Richard Desnoyers, Tom Benak
Aerospace Structures, National Research Council Canada (NRC), Canada
- 14:20 S02-012 **Application of multi-field coupling on multidisciplinary optimization design for turbine blade**
Zhigang Jia*, Rongqiao Wang, Dianyin Hu, Jiang Fan, Xiuli Shen
China Aviation Engine Establishment, China

S02-S3

Thursday June 20, 16:00–17:30

Room: 209B

Co-Chair: Xue-Ren Wu (China), Thilo F. Morgeneyer (France)

- 16:00 S02-006 **Keynote Presentation**
Fibre bridging and crack tip shielding in glare: Numerical and experimental validation
Sunil Bhat*
Vellore Institute of Technology, India
- 16:30 S02-008 **Material behaviour with large residual strains and computational plasticity modeling**
Gang Han*, Huang Yuan
Beijing Institute of Technology, China
- 16:50 S02-009 **The local stress concept to assess weldments with help of nanoindentation and FEM computations**
Jie Fang*, Huang Yuan
University of Wuppertal, Germany
- 17:10 S02-011 **Structure optimization and low-cycle fatigue analysis of titanium fan disk of civil aero-engine**
Miaojiao Peng*
Avic Comercial Aircraft Engine Company, China

S03

Aging

S03-S1

Thursday June 20, 13:30–14:40

Room: 210B

Co-Chair: Wenbo Luo (China), Han Jiang (China)

- 13:30 S03-001 **Keynote Presentation**
Dynamic fracture analysis of physical aged polycarbonate by the optical method of caustics
Zheng Li*, Guiyun Gao, Mehrdad Negahban
Peking University, China
- 14:00 S03-005 **Portevin-Le Châtelier plastic instabilities study by infrared pyrometry in C-Mn steels**
Weiwei Du, Nicolas Ranc, Isabelle Ranc, Danièle Wagner*
LEME Laboratory, University Paris Ouest, France
- 14:20 S03-002 **Aging effects on long-term deformation properties of asphalt mastic**
Fan Bai*, Xinhua Yang
Huazhong University of Science and Technology, China

S03-S2

Thursday June 20, 16:00–17:30

Room: 210B

Co-Chair: Zheng Li (China), Danièle Wagner (France)

- 16:00 S03-004 **Keynote Presentation**
The application of time-temperature-stress superposition principle on elastomer physical aging
Han Jiang*, Chengkai Jiang
Southwest Jiaotong University, China
- 16:30 S03-007 **Thermal aging effects on tensile and tearing fracture behavior of carbon black filled rubbers**
Xiaoling Hu, Yan Li, Wenbo Luo*
Xiangtan University, China
- 16:50 S03-008 **Effect of physical aging on the dynamic mechanical properties of PC**
Shuiping Yin*, Yingshe Luo
Institute of Rheological Mechanics & Material Engineering, China
- 17:10 S03-003 **Study on the non-Newtonian flow behavior of a Zr-based amorphous alloy by using digital image correlation technique**
Yongfa Mao, Chaogui Tan, Jianguo Lin*
Xiangtan University, China

S04

Analytical Models

S04-S1

Monday June 17, 16:00–17:40

Room: 209B

Co-Chair: Linzhi Wu (China), Yu Jun Xie (China)

- 16:00 S04-016 **Keynote Presentation**
Flat-tipped indentation fracture mechanics
Xiaozhi Hu*, Yu Jun Xie
University of Western Australia, Australia
- 16:30 S04-017 **Keynote Presentation**
A new fatigue crack growth prediction by mesh reduction methods
P.H. Wen*, M.H. Aliabadi
University of London, UK
- 17:00 S04-003 **Theoretical analysis of effects of confining pressure on the stress intensity factors for cracked Brazilian disk**
Jigang Xu, Shiming Dong*
Sichuan University, China
- 17:20 S04-002 **Stress triaxiality in the neck region of the circumferentially notched tension bars**
Lin Zhu*, Junping Shi, Xiaoshan Cao
Xi'an, University of Technology, China

S04-S2

Tuesday June 18, 10:30–12:20

Room: 209B

Co-Chair: Tianyou Fan (China), Shiming Dong (China)

- 10:30 S04-001 **Keynote Presentation**
Contact mechanics on indentation cracking induced by periodic flattipped indenters
Yu Jun Xie*, X.Z. Hu
Liaoning Shihua University, China
- 11:00 S04-004 **Separation of the energy release rate of fracture**
Tianmin Guo*
Siemens AG, Germany
- 11:20 S04-018 **Free edge coupling effect of piezoelectric cross-ply laminated plates**
Chao Han*, Zhangjian Wu
The University of Manchester, UK
- 11:40 S04-019 **Boundary integral method for nano-sized coated inhomogeneity**
P.H. Wen*, Y.G. Xu
University of London, UK
- 12:00 S04-006 **Interaction of multiple cracks in rock mass by displacement discontinuity method**
Ke Zhang, Ping Cao*
Central South University, China

S04-S3

Tuesday June 18, 16:00–17:50

Room: 209B

Co-Chair: Baolin Wang (China), Jun Luo (China)

- 16:00 S04-025 **Keynote Presentation**
Fracture analysis of piezoelectric composites using a domainindependent integral method
Linzhi Wu*, Hongjun Yu
Harbin Institute of Technology, China
- 16:30 S04-024 **Crack surface diffusion and sliding effect on the interaction between grain boundary rotational deformation and elliptical blunted crack**
Yingxin Zhao*, Qihong Fang, Youwen Liu
Hunan University, China
- 16:50 S04-030 **A method for calculating elastic deformations of cracked body with inclusion ahead of mode I crack-tip**
Yinfeng Li*, Zhonghua Li
Shanghai Jiaotong University, China
- 17:10 S04-020 **A meso-mechanical constitutive model of particle reinforced titanium matrix composites subjected to impact loadings**
Weidong Song*, Yimin Yang, Jianguo Ning
Beijing Institute of Technology, China
- 17:30 S04-011 **Effect of special rotational deformation and grain size on fracture toughness of nanocrystalline solids containing a semi-elliptical blunt**
Min Yu*, Qihong Fang, Hui Fen, Youwen Liu
Hunan University, China

S04-S4

Wednesday June 19, 10:30–12:00

Room: 209B

Co-Chair: Youwen Liu (China), Ping Cao (China)

- 10:30 S04-010 **Keynote Presentation**
Buckling analysis of a Timoshenko nano beam lying on Winkler–Pasternak elastic foundation
Jun Luo*, Tiankai Zhao
Huazhong University of Science and Technology, China
- 11:00 S04-015 **Speed effect on a fast propagating crack based on a modified cohesive zone model**
Jian Wu*, Chongqing Ru
University of Alberta, Canada
- 11:20 S04-022 **On symmetric crack formation in plates under central bending**
Ilya N. Dashevskiy*
Institute for Problems in Mechanics of the Russian Academy of Sciences, Russia
- 11:40 S04-021 **Improvement of crack-tip stress series with Padé approximants**
Gaetan Hello*, Mabrouk Ben Tahar, Jean-Marc Roelandt
Universite d'Evry Val d'Essonne, France

S04

Analytical Models

S04-S5

Wednesday June 19, 13:30–15:20

Room: 209B

Co-Chair: A. Amine Benzerga (USA), Tianmin Guo (Germany)

- 13:30 S04-007 **Keynote Presentation**
Interface crack under compression and its initiation direction
X.F. Li*
Central South University, China
- 14:00 S04-008 **Fracture analysis of particulate MEE materials using a domainindependent interaction integral method**
Hongjun Yu*, Linzhi Wu
Harbin Institute of Technology, China
- 14:20 S04-012 **Effect of thermally activated energy on dislocation emission from a blunted crack tip**
Xin Zeng*, Qi Hong Fang, You Wen Liu
Hunan University, China
- 14:40 S04-013 **Effect of cooperative grain boundary sliding and migration on grain size dependent fracture toughness of nanocrystalline materials**
Hui Feng*, Qihong Fang, Youwen Liu
Hunan University, China
- 15:00 S04-009 **Effects of three-phase circular inhomogeneity with two imperfect interfaces on a radial crack and an edge dislocation**
Yongshu Tao*, Qihong Fang, Youwen Liu
Hunan University, China

S04-S6

Wednesday June 19, 16:00–17:30

Room: 209B

Co-Chair: Xiaozhi Hu (Australia), Gaetan Hello (France)

- 16:00 S04-028 **Keynote Presentation**
A porous material plasticity model for anisotropic solids with nonspherical voids
A. Amine Benzerga*, Shyam M. Keralavarma
Texas A&M University, USA
- 16:30 S04-029 **Edge dislocation emission from nanovoid with the effect of neighboring nanovoids and surface stress**
Yingxin Zhao*, Qihong Fang, Youwen Liu, Chunzhi Jiang
Hunan University, China
- 16:50 S04-026 **Plastic zone at the mixed mode crack tip in nickel-based single crystal plate based on a modified yield criterion**
Lihong Yang*, Guangping Zou
Harbin Engineering University, China
- 17:10 S04-023 **Study on the multi-cracks propagation and transfixion mechanism of the rock mass under hydrodynamic pressure**
Yongfang Zhong*, Ping Cao, Jicheng Xu, Ruiqing Hao
Central South University, China

S05-S1

Monday June 17, 16:00–17:40

Room: 405

Co-Chair: Francois Barthelat (Canada), Shaohua Chen (China)

- 16:00 S05-001 **Keynote Presentation**
Multi-scale study of deformation and fracture in bone at physiological strain rates
Elizabeth A. Zimmermann, Bernd Gludovatz, Hrishikesh A. Bale, Robert O. Ritchie*
University of California, USA
- 16:30 S05-006 **Keynote Presentation**
Cracks fail to intensify stress in nacreous materials
Haimin Yao*, Zhigong Song, Zhiping Xu, Huajian Gao
The Hong Kong Polytechnic University, Hong Kong, China
- 17:00 S05-003 **Steered molecular dynamics simulations of unbinding the complexes formed by proteins and carbon nanotubes**
Peng Xiu*, Yuan Lin, Ruhong Zhou
Zhejiang University, China
- 17:20 S05-002 **Superelastic behavior of a β -type titanium alloy**
Jianguo Lin*, Dechuang Zhang
Xiangtan University, China

S05-S2

Tuesday June 18, 10:30–12:10

Room: 405

Co-Chair: Robert O. Ritchie (USA), Diego Ferreño (Spain)

- 10:30 S05-008 **Keynote Presentation**
Discontinuous crack-bridging model for analyzing the fracture toughness of nacre
Xi-Qiao Feng*, Yue Shao, Hongping Zhao
Tsinghua University, China
- 11:00 S05-023 **Keynote Presentation**
Investigating the neurite-extracellular matrix interactions with an atomic force-total internal reflection fluorescence microscope system
Haipei Liu, Yuan Lin*
The University of Hong Kong, Hong Kong, China
- 11:30 S05-004 **Tuning adhesive dynamics of molecular bond clusters via material design in transverse isotropy**
Jin Qian*, Wenliang Zhang, Yuan Lin, Weiqiu Chen, Huajian Gao
Zhejiang University, China
- 11:50 S05-028 **Fracture of dental bioceramics in contact cones**
Wei Li*, Zhongpu Zhang, Junning Chen, Michael Swain, Qing Li
The University of Sydney, Australia

S05-S3

Tuesday June 18, 16:00–17:50

Room: 405

Co-Chair: Yuan Lin (Hong Kong, China), Jianshan Wang (China)

- 16:00 S05-011 **Keynote Presentation**
Deformation and fracture mechanics in biological and biomimetic staggered composites
Francois Barthelat*
McGill University, Canada
- 16:30 S05-026 **Multi-scale characterization of the fracture resistance of human cortical bone and its biological degradation due to aging and disease**
Robert O. Ritchie*
University of California, USA
- 16:50 S05-021 **Comparative study of two medical treatments for developing fracture callus on pseudoarthrosis experimental models on sprague dawley rats through four point bending and ultra-micro indentation tests**
Manuel Redondo, Diego Ferreño, José A. Casado*, José A. Riancho, Ma Isabel Pérez, Estela Ruiz, Soraya Diego, Isidro A. Carrascal, Claudia Demian, Federico Gutiérrez
LADICIM, University of Cantabria, Spain
- 17:10 S05-022 **Determination of the mechanical properties of normal, calcified and degenerative human mitral chordae tendineae**
José A. Casado, Soraya Diego, Diego Ferreño*, Estela Ruiz, Isidro A. Carrascal, David Méndez, José M. Revuelta, Alejandro Pontón, José M. Icardo, Federico Gutiérrez-Solana
LADICIM, University of Cantabria, Spain
- 17:30 S05-024 **Mechanoregulation of myeloid leukemia cell lines by osmotic pressure**
Tsz H. Hui*, Zhuo L. Zhou, Yuan Lin
The University of Hong Kong, Hong Kong, China

S05-S4

Wednesday June 19, 10:30–12:00

Room: 405

Co-Chair: Yajun Yin (China), Lifeng Wang (China)

- 10:30 S05-025 **Keynote Presentation**
Micro-mechanism of fracture of a cracked biomaterial strip
Lei Chen, Shaohua Chen*, Huajian Gao
Institute of Mechanics, Chinese Academy of Sciences, China
- 11:00 S05-020 **Mechanics of chirality transfer in biomaterials**
Jianshan Wang*, Xi-Qiao Feng
Tianjin University, China
- 11:20 S05-014 **Nanocrystalline diamond for orthopedic implant coating applications**
Lei Yang*, Thomas J. Webster, Brian W. Sheldon
Soochow University, China
- 11:40 S05-013 **In-plane mechanical properties of defective hierarchical nanohoneycombs: Fracture strength and fracture toughness**
Qiang Chen*, Zhiyong Li, Nicola Pugno
Southeast University, China

S05

Biomaterials and Tissues

S05-S5

Wednesday June 19, 13:30–15:20

Room: 405

Co-Chair: Nicola M. Pugno (Italy), Jesus Rodriguez (Spain)

- 13:30 S05-017 **Keynote Presentation**
Mechanical design of a multi-layered biological exoskeleton
Lifeng Wang*
Clarkson Univeristy, USA
- 14:00 S05-015 **Multi-scale modelling and diffraction-based characterization of elastic behaviour of human enamel**
Tan Sui*, Michael A. Sandholzer, Nikolaos Baimpas, Igor Dolbnya, Gabriel Landini, Alexander M. Korsunsky
University of Oxford, UK
- 14:20 S05-016 **Fatigue crack growth and in-vivo risk assessment for plaque rupture: A comparative study between symptomatic and asymptomatic individuals**
Xuan Pei*, Zhi-Yong Li
Southeast University, China
- 14:40 S05-019 **Enhanced adhesion of human mesenchymal stem cells on grapheme during osteogenic differentiation**
Feng Du*, Zaicun Wang, Chunyang Xiong, Jianxiang Wang
Peking University, China
- 15:00 S05-010 **Fracture properties of biologically bound lunar regolith**
Michael D. Lepech*, Henning Roedel, David J. Loftus
Stanford University, USA

S05-S6

Wednesday June 19, 16:00–17:50

Room: 405

Co-Chair: Haimin Yao (Hong Kong, China), Peng Xiu (China)

- 16:00 S05-029 **Keynote Presentation**
Numerical modelling of self-healing in hierarchical composites
Nicola M. Pugno*, Federico Bosia
University of Trento, Italy
- 16:30 S05-018 **Fracture toughness measurements on bovine enamel by indentation techniques**
Jesus Rodriguez*, Miguel Angel Garrido, Laura Ceballos
Universidad Rey Juan Carlos, Spain
- 16:50 S05-009 **Fracture behavior of silkworm cocoon**
Hongping Zhao*, Huiming Huang, Xi-Qiao Feng
Tsinghua University, China
- 17:10 S05-005 **Fractal geometry and topology abstracted from hair fibers**
Fan Yang*, Yajun Yin
Tsinghua University, China
- 17:30 S05-027 **Numerical modelling of self-healing in hierarchical composites**
Federico Bosia*, Nicola Pugno
University of Torino, Italy

S06-S1

Wednesday June 19, 13:30–15:30

Room: 202A

Co-Chair: Zhiping Xu (China), Jin Qian (China)

- 13:30 S06-001 **Keynote Presentation**
Understanding backspatter due to skull fracture from a ballistic projectile
Raj Das*, Justin Fernandez, Alistair Collins, Anurag Verma, Michael Taylor
University of Auckland, New Zealand
- 14:00 S06-021 **Keynote Presentation**
Mechanics of growing pulmonary artery tissue
Hang (Jerry) Qi*, Michael Sacks
University of Colorado, USA
- 14:30 S06-002 **All-atom CSAW: An Ab initio protein folding method**
Weitao Sun*
Tsinghua University, China
- 14:50 S06-003 **High-throughput single cell mechanical characterization using dielectrophoretic stretching**
Qiong Wei*, Isabella Guido, Chunyang Xiong
Peking University, China
- 15:10 S06-014 **Measurement and biomechanical modeling of the unloading function of lower limbs orthoses**
Ilya N. Dashevskiy*, Sergey E. Nikitin
Institute for Problems in Mechanics of the Russian Academy of Sciences, Russia

S06-S2

Wednesday June 19, 16:00–17:50

Room: 202A

Co-Chair: Raj Das (New Zealand), Weitao Sun (China)

- 16:00 S06-018 **Keynote Presentation**
Multiscale mechanics of bio-inspired networked materials
Zhiping Xu*
Tsinghua University, China
- 16:30 S06-005 **A combined continuum and statistical mechanics model on semiflexible tubular polymers**
Xiaojing Liu, Jizeng Wang*, Youhe Zhou, Huajian Gao
Lanzhou University, China
- 16:50 S06-004 **The protein-driven ciliary motility in embryonic nodes: A proteinstructure computational model**
Duanduan Chen*, Kyosuke Shinohara, Hiroshi Hamada
Beijing Institute of Technology, China
- 17:10 S06-015 **Substrate stiffness regulates cellular uptake of nanoparticles**
Sulin Zhang*, Changjin Huang, Peter Butler, Gang Bao
Pennsylvania State University, USA
- 17:30 S06-019 **Effect of cytoskeleton deformation on cellular uptake of cylindrical nanoparticles**
Long Li*, Jizeng Wang
Lanzhou University, China

S06

Biomechanics

S06-S3

Thursday June 20, 10:30–12:30

Room: 202A

Co-Chair: Shou-Yi Chang (China), Hang (Jerry) Qi (USA)

- 10:30 S06-010 **Keynote Presentation**
Impact of cell shape on cell migration behaviors on elastic substrate
Yuan Zhong, Baohua Ji*
Beijing Institute of Technology, China
- 11:00 S06-024 **Keynote Presentation**
Failure mechanism of dental multilayers
Xinrui Niu*
City University of Hong Kong, Hong Kong, China
- 11:30 S06-009 **The important roles of hydrogen bond network in ligand-receptor interactions: A molecular dynamics simulation study**
Dechang Li*, Baohua Ji, Keh-Chih Hwang, Yonggang Huang
Beijing Institute of Technology, China
- 11:50 S06-023 **Large deformation and reative flow in elastomeric gels**
Pengfei Wang*, Feng Xu, Tianjian Lu, Zhigang Suo
Xi'an Jiaotong University, China
- 12:10 S06-020 **Technology in locomotion and domotic control for quadriplegic**
Mauricio Plaza, Oscar Aviles, William Aperador*
Universidad Militar Nueva Granada, Colombia

S06-S4

Thursday June 20, 13:30–15:40

Room: 202A

Co-Chair: Baohua Ji (China), Xinrui Niu (Hong Kong, China)

- 13:30 S06-006 **Keynote Presentation**
In-situ TEM nanoindentation of healthy and osteoporotic bone nanopillars
Shou-Yi Chang*, Ying-Ting Wang, Yi-Chung Huang, Tung-Chou Tsai, Chuan-Mu Chen, Chwee Teck Lim
National Chung Hsing University, Taiwan, China
- 14:00 S06-022 **The role of interfacial mechanical phenomena at the plant cell periphery in the preparation of plant cells for drought**
Shaobao Liu*, Lihong Zhou, Renate A. Weizbauer, Min Lin, Barbara G. Pickard, David A. Ehrhardt, Tianjian Lu, Guy M. Genin, Feng Xu
Xi'an Jiaotong University, China
- 14:20 S06-011 **Probing mechanical principles of cell/graphene-family nanomaterials (GFNs) interaction**
Jiuling Wang, Xinghua Shi*
Institute of Mechanics, Chinese Academy of Sciences, China
- 14:40 S06-012 **Biomechanical evaluation of the osseointegration of biologically coated open-cell titanium implants**
Teodolito Guillén, Arne Ohrndorf*, Hans-Jürgen Christ
Universität Siegen, Germany
- 15:00 S06-016 **Modeling carbon loss in dental enamel for laser assisted caries prevention**
Min Lin*, Shaobao Liu, Huihui Jiang, Guoyou Huang, Ruizhe Huang, Yongjin Zhu, Feng Xu, Tianjian Lu
Xi'an Jiaotong University, China
- 15:20 S06-007 **Hidden effects in dynamic force spectroscopy due to kinetic interaction between two serially linked molecular bonds**
Qian Jin*
Zhejiang University, China

S07-S1

Monday June 17, 16:00–17:30

Room: 206A

Co-Chair: Marcos V. Pereira (Brazil), Yi Sun (China)

- 16:00 S07-007 **Keynote Presentation**
Cracking simulation of ceramic materials under thermal shock by a non-local fracture model
Jia Li*, Fan Song, Chiping Jiang
University Paris 13, France
- 16:30 S07-001 **Analysis of strength of carbon nanotubes/cement using continuum models**
Yan-Gao Hu*, Jun Han, Zhengliang Li
Chongqing University, China
- 16:50 S07-004 **Crack characteristic and strength degradation Al₂O₃ subject to thermal shock**
Xianghong Xu*, Cheng Tian, Zhongkang Lin, Shilong Sheng, Fan Song
Institute of Mechanics, Chinese Academy of Sciences, China
- 17:10 S07-006 **Thermal shock crack patterns on ceramic surface subjected to icequenching**
Xiaofeng Wu*, Wei Shang, Chiping Jiang, Fan Song, Jia Li
Beihang University, China

S07-S2

Tuesday June 18, 10:30–11:40

Room: 206A

Co-Chair: Jia Li (France), Xianghong Xu (China)

- 10:30 S07-008 **Keynote Presentation**
Mechanical characterization of sisal fiber reinforced cement mortar
Roberto T. Fujiyama, Fathi A. Darwish, Marcos V. Pereira*
Catholic University of Rio de Janeiro, Brazil
- 11:00 S07-003 **The crack growth behavior in electrolyte membrane under mechanical-electrochemical loading**
Yun J. Chen*, Yi Sun, Yi Z. Liu, Wang Chen, Jing R. Ge
Harbin Institute of Technology, China
- 11:20 S07-005 **Mechanism of failure in porcelain-veneered sintered zirconia restorations**
Tan Sui*, Kalin Dragnevski, Tee K. Neo, Alexander M. Korsunsky
University of Oxford, UK

S08-S1

Monday June 17, 16:00–17:40

Room: 402A

Co-Chair: Min Zhou (USA), Licheng Guo (China)

- 16:00 S08-007 **Keynote Presentation**
Computational method for crack layer model
Haiying Zhang, Alexander Chudnovsky*
University of Illinois at Chicago, USA
- 16:30 S08-006 **Keynote Presentation**
Numerical simulation of multiscale deformation phenomena in Ni-based superalloy welded joints
Varvara Romanova*, Ruslan Balokhonov, Ekaterina Batuhtina, Vasily Kovalev, Nikolai Karpenko
Institute of Strength Physics and Materials Science, Russian Academy of Sciences, Russia
- 17:00 S08-001 **Analysis of stress singularity field near the cross point of inclusion and free surface by 3D element free Galerkin method (Influence of radius of curvature at vertex for stress singularity field)**
Takahiko Kurahashi*, Yasuyuki Tsukada, Hideo Koguchi
Nagaoka National College of Technology, Japan
- 17:20 S08-008 **Modelling damage in nuclear graphite**
Thorsten Becker*, Robert Bennet Tait
University of Stellenbosch, South Africa

S08-S2

Tuesday June 18, 10:30–12:00

Room: 402A

Co-Chair: Zhuo Zhuang (China), Thorsten Becker (South Africa)

- 10:30 S08-024 **Keynote Presentation**
Computational prediction of fracture toughness of polycrystalline metals
Yan Li, David McDowell, Min Zhou*
Georgia Institute of Technology, USA
- 11:00 S08-030 **Fracture analysis for concrete-like materials with a novel extended finite element method**
Chengbin Du*, Shouyan Jiang, Liguang Sun
Hohai University, China
- 11:20 S08-005 **Finite element analysis of erosive wear for offshore structure**
Zhigang Liu*
Institute of High Performance Computing, Singapore
- 11:40 S08-035 **Finite element modeling of axially loaded sandwich plates**
Hasan M. Nagiar*
University of Belgrade, Serbia

S08

Computational Mechanics

S08-S3

Tuesday June 18, 16:00–18:00

Room: 402A

Co-Chair: Varvara Romanova (Russia), Ran Guo (China)

- 16:00 S08-021 **Keynote Presentation**
T-stress evaluation in nonhomogeneous materials under thermal loading by means of interaction energy integral method
Fengnan Guo, Licheng Guo*, Hongjun Yu, Yanyan Zhang
Harbin Institute of Technology, China
- 16:30 S08-009 **Keynote Presentation**
A stabilized sequential coupling algorithm for hydro-mechanical systems using reproducing kernel particle method
Yongning Xie, Gang Wang*
Hong Kong University of Science and Technology, Hong Kong, China
- 17:00 S08-010 **Random elasto-plastic lattice modeling of damage in fibrous materials**
Keqiang Hu*, Zengtao Chen, K. C. Li, X. Frank Xu
University of New Brunswick, Canada
- 17:20 S08-036 **Improving dynamic structure behavior using a reanalysis procedures technique**
Ezedine G. Allaboudi*, Tasko Maneski, Natasa Trisovic, Hasan M. Nagjar
University of Belgrade, Serbia
- 17:40 S08-002 **Study on adaptive coupling algorithm based on discrete and finite element method**
Wei Xu*, Mengyan Zang
South China University of Technology, China

S08-S4

Wednesday June 19, 10:30–12:20

Room: 402A

Co-Chair: Jan Sladek (Slovakia), Zhigang Liu (Singapore)

- 10:30 S08-028 **Keynote Presentation**
Simulation of damage evolution in particulate reinforced composites with VCFEM
Ran Guo*, Wenyan Zhang, Benning Qu, Yongjin Chen
Kunming University of Science and Technology, China
- 11:00 S08-011 **Cohesive zone analysis of crack propagation on a hierarchical structured interf**
Xiaoru Wang*, Akihiro Nakatani
Osaka University, Japan
- 11:20 S08-012 **A numerical method for simulating deformation behavior of tensegrity structures due to elementary stress loss**
Liyuan Zhang*, Yanping Cao, Xi-Qiao Feng, Shouwen Yu
Tsinghua University, China
- 11:40 S08-039 **304 steel using cohesive zone models**
Xiao Li*, Huanj Li, Huang Yuan
University of Wuppertal, Germany
- 12:00 S08-032 **Mesh independence of numerical manifold method in treating strong singularity**
Dong Dong Xu*, Hong Zheng
Institute of Rock and Soil Mechanics, Chinese Academy of Sciences, China

S08-S5

Wednesday June 19, 13:30–15:20

Room: 402A

Co-Chair: Seyoung Im (Republic of Korea), Haifei Zhan (Australia)

- 13:30 S08-017 **Keynote Presentation**
Size effect analysis of recycled concrete fracture based on micromechanics using the base force element method
Yijiang Peng*, Nana Dang, Lijuan Zhang, Jiwei Pu
Beijing University of Technology, China
- 14:00 S08-013 **Spatial-temporal kinetics of damage accumulation under spall failure in metals**
Natalia Saveleva*, Yuriy Bayandin, Oleg Naimark
Institute of Continuous Media Mechanics Ural Branch Russian Academy of Sciences, Russia
- 14:20 S08-018 **Identification of fracture process under moisture variation in wood materials**
Frédéric Dubois*, Rostand Moutou Pitti, Eric Fournely, Jean-Francois Destrebecq
Université de Limoges, France
- 14:40 S08-031 **Advanced remeshing techniques for complex 3D crack propagation**
Vincent Chiaruttini*, Vincent Riolo, Frederic Feyel
Onera, DMSM/MNU, Chatillon, France
- 15:00 S08-003 **Evaluation of stress intensity factor of arbitrary three-dimensional planar crack using displacement discontinuity method**
Farrokh Sheibani*, Jon Olson
University of Texas, USA

S08-S6

Wednesday June 19, 16:00–17:50

Room: 402A

Co-Chair: Yijiang Peng (China), Vincent Chiaruttini (France)

- 16:00 S08-037 **Keynote Presentation**
Transient dynamic crack analysis in decagonal quasicrystals
Jan Sladek*, Vladimir Sladek, Slavomir Krauhulec, Chuanzeng Zhang, Michael Wunsche
Institute of Construction and Architecture, Slovak Academy of Sciences, Slovakia
- 16:30 S08-023 **Torsional properties of bamboo-like structured Cu nanowires**
Haifei Zhan*, Yuantong Gu, Cheng Yan, Prasad K.D.V. Yarlagadda
Queensland University of Technology, Australia
- 16:50 S08-033 **Time-domain BEM for dynamic crack problems in thin piezoelectric structures**
Hongjun Zhong*, Jun Lei, Chuanzeng Zhang
Beijing University of Technology, China
- 17:10 S08-019 **Determination of the mechanical constants of ZnS nanobelt by combining nanoindentation test and finite element method**
Yaowu Tao, Xuejun Zheng, Wei Liu*, Shutao Song, Hui Zheng
Xiangtan University, China
- 17:30 S08-014 **Modeling of cracked structures containing voids subjected to static, fatigue and dynamic loads using XFEM**
Mohamed Riad Kired, Brahim Elkhailil Hachi, Mohamed Guesmi, Said Rechak*, Mohamed Badaoui
National Polytechnic School, Algeria

S08-S7

Thursday June 20, 10:30–12:20

Room: 402A

Co-Chair: Chengbin Du (China), Farrokh Sheibani (USA)

- 10:30 S08-038 **Keynote Presentation**
Finite deformation modeling of crystalline defects in hyper-elastic material
Akihiro Nakatani*, Mitsuhiro Akita
Osaka University, Japan
- 11:00 S08-025 **Investigation of the molecular fracture mechanisms of microfilament networks in living cells**
Tong Li*, Yuantong Gu, Adekunle Oloyede, Prasad Yariagadda
Queensland University of Technology, Australia
- 11:20 S08-026 **Cutting zone temperature and specific cutting energy measurement and evaluation in machining metals**
Yitzchak Yifrach*, Uri Ben-Hanan
ORT Braude College, Israel
- 11:40 S08-020 **Singularity analysis for the notch in the piezoelectric plate under bending**
Changzheng Cheng*, Dapeng Wang, Hao Ding, Zhongrong Niu
Hefei University of Technology, China
- 12:00 S08-015 **Mixed mode computation of the dynamic stress intensity factor for cracked 2D structures with inclusion using XFEM**
Alaa Eddine Houa, Brahim Elkhailil Hachi*, Mohamed Guesmi, Mohamed Haboussi, Mohamed Badaoui
University of Djelfa, Algeria

S08-S8

Thursday June 20, 13:30–15:20

Room: 402A

Co-Chair: Akihiro Nakatani (Japan), Takahiko Kurahashi (Japan)

- 13:30 S08-040 **Keynote Presentation**
Applications of variable-node finite elements
Seyoung Im*
Korea Advanced Institute of Science and Technology, Republic of Korea
- 14:00 S08-027 **A numerical study on the design of more fracture resistant multilayers using the configurational forces concept**
Masoud Sistaninia*, Otmar Kolednik
Materials Center Leoben Forschung GmbH, Austria
- 14:20 S08-029 **A new interface element for shell structures delamination analysis**
Biao Li*, Yazhi Li, Jie Su
Northwestern Polytechnical University, China
- 14:40 S08-034 **Numerical and experimental investigation on welded tensile test specimen**
Tarek Kh. Aburuga*, Aleksandar S. Sedmak
University of Belgrade, Serbia
- 15:00 S08-004 **Inter-element stabilization for linear large-deformation elements to solve coupled CFD/CSD blast and impact problems**
Orlando Soto*, Joseph Baum, Rainald Lohner
Center for Applied Computational Sciences, USA

S09-S1

Wednesday June 19, 10:30–12:20

Room: 213B

Co-Chair: Qiang Yang (China), Zhennan Zhang (China)

- 10:30 S09-002 **Keynote Presentation**
Instability and failure of particulate materials caused by rolling of non-spherical particles
Elena Pasternak*, Arcady V. Dyskin
The University of Western Australia, Australia
- 11:00 S09-001 **Wedge splitting test on fracture behaviour of fiber reinforced and regular high performance concretes**
Kamil Hodicky*, Thomas Hulin, Jacob W. Schmidt, Henrik Stang
Technical University of Denmark, Denmark
- 11:20 S09-021 **Determination of local fracture energy distribution in compact tension specimens of concrete**
Shutong Yang*, Weiping Huang, Shuangjian Jiao
College of Engineering in Ocean University of China, China
- 11:40 S09-007 **Quantitative analysis of rockburst and zonal disintegration of surrounding rock mass in deep tunnels**
Xiaoping Zhou*
Chongqing University, China
- 12:00 S09-011 **Peridynamics study on crack propagation and failure process of concrete structures**
Dan Huang*, Feng Shen, Qing Zhang
Hohai University, China

S09-S2

Wednesday June 19, 13:30–15:40

Room: 213B

Co-Chair: Elena Pasternak (Australia), Xiaoping Zhou (China)

- 13:30 S09-005 **Keynote Presentation**
A new LEFM based description of concrete fracture and size effects
Kim R.W. Wallin*
Materials and Built Environment, VTT, Espoo, Finland
- 14:00 S09-010 **A constitutive approach to fracture simulation based on augmented virtual internal bond method**
Zhennan Zhang*, Shaofeng Yao
Shanghai Jiao Tong University, China
- 14:20 S09-004 **Simulation of damage and crack propagation in three-point bending asphalt concrete beam**
Guowei Zeng*, Xinhua Yang, Anyi Yin, Fan Bai
Huazhong University of Science and Technology, China
- 14:40 S09-016 **A new method for crack propagation simulation based on the combination of FEM and lattice model**
Qiang Chang*, Qiang Yang
State Key Laboratory of Hydrosience and Engineering, China
- 15:00 S09-030 **Residual fracture toughness and its weight function method of postfire concrete**
Kequan Yu*, Zhoudao Lu, Jiangtao Yu
College of Civil Engineering, China
- 15:20 S09-026 **Particle simulation of AE statistics and fracture in concrete threepoint bending test**
Stefano Invernizzi*, Giuseppe Lacidogna, Amedeo Manuello, Gianni Niccolini, Alberto Carpinteri
Politecnico di Torino, Italy

S09-S3

Wednesday June 19, 16:00–17:40

Room: 213B

Co-Chair: Arcady V Dyskin (Australia), Hong Zheng (China)

- 16:00 S09-015 **Keynote Presentation**
Investigation on the failure mechanisms in sandstone under uniaxial compression by digital image correlation
Ganyun Huang*, Hao Zhang, Haipeng Song, Yilan Kang
Tianjin University, China
- 16:30 S09-025 **Keynote Presentation**
Calculation of shrinkage stress in early-age concrete structures
Jun Zhang*
Tsinghua University, China
- 17:00 S09-006 **Effect of characteristic specifications on mode I and mode II fracture toughness of asphalt concrete materials**
Hamid Behbahani, Mohammad Reza Mohammad Aliha*, Hasan Fazaeli, Mohammad Reza Rezaei Far
Iran University of Science and Technology, Iran
- 17:20 S09-022 **Acoustic emission detection in concrete specimens: Experimental analysis and simulations by a lattice model**
Ignacio Iturrioz*, Giuseppe Lacidogna, Carpinteri Alberto
Federal University of Rio Grande do Sul, Brazil

S09-S4

Thursday June 20, 10:30–12:30

Room: 213B

Co-Chair: Ganyun Huang (China), Yuanxiang Sun (China)

- 10:30 S09-003 **Keynote Presentation**
Mechanism of in-plane fracture growth in particulate materials based on relative particle rotations
Arcady V. Dyskin*, Elena Pasternak
University of Western Australia, Australia
- 11:00 S09-012 **Keynote Presentation**
In-situ XCT images based mesoscale modelling of concrete
Zhenjun Yang*, Wenyuan Ren
The University of Manchester, UK
- 11:30 S09-019 **Modeling fracture processes in numerical concrete**
Zhiwei Qian*, Erik Schlangen, Guang Ye, Klaas van Breugel
Materials innovation institute (M2i), Delft University of Technology, The Netherlands
- 11:50 S09-020 **Stability and dam heel cracking analysis based on deformation reinforcement theory**
Yuanwei Pan*, Qiang Yang, Yaoru Liu
Tsinghua University, China
- 12:10 S09-029 **Effects of interfacial transition zones on the stress–strain behavior of modeled recycled aggregate concrete**
Wengui Li*, Jianzhuang Xiao, David J. Corr, Surendra P. Shah
Tongji University, China

S09-S5

Thursday June 20, 13:30–15:30

Room: 213B

Co-Chair: Lijuan Li (China), Kequan Yu (China)

- 13:30 S09-009 **Keynote Presentation**
Analysis of linear fracture with numerical manifold method
Zhijun Liu, Hong Zheng*, Xiurun Ge
Institute of Rock and Soil Mechanics, Chinese Academy of Sciences, China
- 14:00 S09-027 **Keynote Presentation**
Experimental study of mechanical and fatigue performance of rubber concrete
Lijuan Li*, Wanhu Zheng, Feng Liu, Wenxian Feng
Guangdong University of Technology, China
- 14:30 S09-013 **Modeling of crack growing, merging and intersecting in quasi brittle materials**
Baijian Wu*, Zhaoxia Li
Southeast University, China
- 14:50 S09-023 **A statistical fatigue model for concrete**
Rena C. Yu*, Luis Saucedo, Arthur Medeiros, Gonzalo Ruiz, Xiaoxin Zhang
University of Castilla-La Mancha, Spain
- 15:10 S09-028 **Cohesive zone modelling of the crack propagation analysis in concrete gravity dams under static load conditions**
María P. Zappitelli*, Claudio G. Rocco, José Fernández-Sáez, E. Ignacio Villa
Universidad Nacional de La Plata, República Argentina

S10 Corrosion, Environmentally Assisted Cracking and Corrosion Fatigue

S10-S1

Monday June 17, 16:00–17:40

Room: 407

Co-Chair: Toshifumi Kakiuchi (Japan), Y. C. Wu (China)

- 16:00 S10-012 **Keynote Presentation**
The influence of loading conditions on the corrosion behavior of carbon steel
Shuai Zhang, Xiaolu Pang, Kewei Gao*
University of Science and Technology Beijing, China
- 16:30 S10-009 **Keynote Presentation**
A review: Integrity management of a hydrogen induced cracking (HIC) and stress corrosion cracking (SCC) in linepipe steel
Mimoun Elboujdaini*
Natural Resources Canada, Canmet Materials, Canada
- 17:00 S10-002 **Analysis of hydrogen assisted fracture in martensitic steels**
Philipp Schwitter*, Alexander Hartmaier
Ruhr-University Bochum, Germany
- 17:20 S10-003 **Crystallographic texture helps reduce hydrogen induced cracking in pipeline steels**
Jose M. Hallen, Francisco Caleyó*, Victoria Venegas
Instituto Politécnico Nacional, México

S10-S2

Tuesday June 18, 10:30–11:50

Room: 407

Co-Chair: Kewei Gao (China), Mimoun Elboujdaini (Canada)

- 10:30 S10-001 **Initiation and propagation behavior of a fatigue crack of maraging steel in high humidity**
Qiang Chen*, Takanori Nagano, Yuzo Nakamura, Yoshikazu Maeda, Norio Kawagoishi
Kumamoto University, Japan
- 10:50 S10-006 **Stress corrosion cracking behavior of wrought magnesium alloy AZ31 and AZ61 under controlled cathodic potentials**
Toshifumi Kakiuchi*, Yoshihiko Uematsu, Masaki Nakajima, Yuki Nakamura, Kosuke Miyagi
Gifu University, Japan
- 11:10 S10-007 **The influence of sea water corrosion on the resistance cracking performance of carbon steel**
Limin Wang*, Donghuan Zhang, Haiying Wang, Daoping Han, Hui Geng
Qingdao Technological University, China
- 11:30 S10-015 **Developing new innovative descaling and corrosion inhibiting solutions to protect steel equipment in the oil and gas industry**
Abdulghani A. Jaralla, Muhannad M. Al-Darbi*
University of British Columbia, Canada

S10-S3

Tuesday June 18, 16:00–18:00

Room: 407

Co-Chair: Xi-Shu Wang (China), Francisco Caleyo (México)

- 16:00 S10-017 **Crack initiation: Stress-corrosion crack in X-52 pipeline steel in nearneutral pH environment**
Mimoun Elboujdaini*, Bingyan Fang, Reg Eadie
CANMET Materials, Natural Resources Canada, Canada
- 16:20 S10-011 **Modelling slow crack growth in ceramics and investigation of environmental effects**
Bassem EL Zoghbi*, Rafael Estevez
Universite Grenoble, UMR CNRS 5266, France
- 16:40 S10-014 **Performance deregulation rule of aircraft fatigue critical components in consideration of calendar environment**
Chao Gao*, Yuting He, Haiwei Zhang, Teng Zhang, Bo Hou
Airforce Engineering University, China
- 17:00 S10-016 **Slow positron beam study on corrosion-related defects and copper enrichment in aluminum and aluminium Alloy**
Y. C. Wu*, T. Zhai, P.G. Coleman
Wuhan University, China
- 17:20 S10-010 **The effects of flow on the corrosion of stainless steel**
Tie Sh. Cao*, Cong Q. Cheng, Jie Zhao
Dalian University of Technology, China
- 17:40 S03-006 **Influence of high temperature aging on the toughness of advanced heat resistant materials**
Mattias Calmunger*, Guocai Chai, Sten Johansson, Johan Moverare
Linköping University, Sweden

S11-S1

Monday June 17, 16:00–17:40

Room: 210A

Co-Chair: R. K. N. D. Rajapakse (Canada), Xinzhu Wang (China)

- 16:00 S11-004 **Keynote Presentation**
Molecular dynamics simulation of fracture of graphene
M. A. N. Dewapriya, R. K. N. D. Rajapakse*, A. Srikantha Phani
Simon Fraser University, Canada
- 16:30 S11-014 **Keynote Presentation**
Mechanisms of crack propagation in natural fibers: Innovative approach by laser μ ablation, mechanical testing under μ second camera recording and finite element simulation
Johnny Beaugrand*, Sofiane Guessasma
INRA, UMR614 FARE, France
- 17:00 S11-001 **Recent developments in brittle and quasi-brittle failure assessment of engineering materials by means of local approaches**
Filippo Berto*, Paolo Lazzarin
University of Padova, Italy
- 17:20 S11-007 **Study on the extension criterion of three-dimensional crack**
Yun-Fa Zhang*, Qing Zhang, Xiao-Zhou Xia
Hohai University, China

S11-S2

Tuesday June 18, 10:30–12:00

Room: 210A

Co-Chair: Deryugin Yevgeny (Russia), Hakan Brodin (Sweden)

- 10:30 S11-013 **Keynote Presentation**
Tensile fracture criterion of metallic glasses
Z.F. Zhang*, R.T. Qu
Institute of Metal Research, Chinese Academy of Science, China
- 11:00 S11-002 **Crack propagation in brittle crystals at the low energy regime**
Anna Gleizer*, Dov Sherman
Technion-Israel Institute of Technology, Israel
- 11:20 S11-003 **Stress state dependent failure loci of a talc-filled polypropylene material under static loading and dynamic loading**
Shaoting Lin*, Yong Xia, Qing Zhou
Tsinghua University, China
- 11:40 S11-025 **Influence of the residual stresses on the crack deflection in ceramic laminates**
Oldrich Sevecek*, Raul Bermejo, Tomas Profant, Michal Kotoul
Brno University of Technology, Czech Republic

S11-S3

Tuesday June 18, 16:00–18:00

Room: 210A

Co-Chair: Z.F. Zhang (China), Volodymyr P. Naumenko (Ukraine)

- 16:00 S11-015 **Keynote Presentation**
Criteria for semi-brittle fracture in transition metals derived from atomistic calculations
Alexander Hartmaier*, Arshad Tahir, Rebecca Janisch
ICAMS, Ruhr-Universitaet Bochum, Germany
- 16:30 S11-017 **Keynote Presentation**
Fracture toughness criteria of small-sized samples with ultrafine grain structure
Deryugin Yevgeny*, Panin Viktor
Institute of Strength Physics and Materials Science of the Russian Academy of Sciences, Russia
- 17:00 S11-011 **CTOD fracture toughness assessment method of high-strength steel based on BS7910**
Ziyu Xia*, Zhangmu Miao, Ting Miao, Sheng Peng
Wuhan University of Technology, China
- 17:20 S11-012 **Crack nucleation in phase field fracture models**
Charlotte Kuhn*, Ralf Müller
University of Kaiserslautern, Germany
- 17:40 S11-026 **Investigation on fracture toughness of Al foam**
Xinzhu Wang*, Xianghe Peng, Zaoyang Guo
Chongqing University, China

S11-S4

Wednesday June 19, 10:30–11:50

Room: 210A

Co-Chair: Alexander Hartmaier (Germany), Xing Ji (China)

- 10:30 S11-020 **A coupled stress and energy model for mixed-mode cracking**
Philipp Weißgraeber*, Wilfried Becker
Technische Universität Darmstadt, Germany
- 10:50 S11-023 **Plastic factor of front face compact tension specimen**
Kaikai Shi*, Lixun Cai, Yao Yao, Chen Bao
Southwest Jiaotong University, China
- 11:10 S11-033 **A fracture-mechanics-based non-local damage model for crack prediction in brittle materials**
Xiao-Bing Zhang*, Jia Li
University Blaise Pascal of Clermont, France
- 11:30 S11-038 **Screw fixing failure mode on particleboard surfaces**
Falah Abu*, Mansur Ahmad
Universiti Teknologi MARA, Malaysia

S11-S5

Wednesday June 19, 13:30–15:30

Room: 210A

Co-Chair: Dirk Mohr (France), Xue-Cheng Ping (China)

- 13:30 S11-022 **Keynote Presentation**
A scheme of criterion for bimaterial corners based on the stress analysis
Xing Ji*
Tongji University, China
- 14:00 S11-016 **Keynote Presentation**
Design based on transition temperature and master curve for API 5L X65 steel used for dense CO₂ transport
Guy Pluvinage*, Julien. Capelle, Jader. Furtado, Zitoune Azari, Serge Jallais
Fiabilité-Mécanique, Conseils, France
- 14:30 S11-021 **A new failure criterion for the locally distributed damages in elasticity based on the material configurational forces**
Qun Li*, Yuning Yu, Yifeng Hu, Yiheng Chen
Xi'an Jiaotong University, China
- 14:50 S11-034 **Thermal barrier coating damage characterization and life model correlation**
Hakan Brodin*, Sten Johansson, Soren Sjostrom, Robert Eriksson, Lars Ostergren, Xin-Hai Li
Linkoping University, Sweden
- 15:10 S11-018 **Diffusion of dynamic stress intensity factor calculated by finite element method using precrack charpy impact specimen**
Jianhua Pan*, Xuedong Chen
Hefei General Machinery Research Institute, China

S11-S6

Wednesday June 19, 16:00–17:50

Room: 210A

Co-Chair: Guy Pluvinage (France), Oldrich Sevecek (Czech Republic)

- 16:00 S11-036 **Keynote Presentation**
General formulation of lode angle dependent ductile fracture models
Dirk Mohr*
Ecole Polytechnique, France
- 16:30 S11-027 **Application of a novel finite element method to design of splices in a fiber metal laminate subjected to coupled thermo-mechanical loading**
Xue-cheng Ping*, Meng-cheng Chen, Bing-bing Zheng, Xian Jiang
East China Jiaotong Univeristy, China
- 16:50 S11-029 **Examination on a criterion for a debonding fracture of single lap joints from the intensity of singular stress field**
Tatsujiro Miyazaki*, Nao-Aki Noda, Rong Li, Takumi Uchikoba
University of the Ryukyus, Japan
- 17:10 S11-035 **Research on poikilothermy yield criterion of PVC sheet with defect under an uniaxial tensile load**
Yingshe Luo, Shengming Chen*
Institute of Rheological Mechanics and Material Engineering, China
- 17:30 S11-030 **Fatigue delamination growth of composite laminates with fiber bridging: Theory and simulation**
Lei Peng*, Jifeng Xu
Beijing Aeronautical Science and Technology Research Institute, China

S12

Damage and Micromechanics

S12-S1

Monday June 17, 16:00–17:50

Room: 402B

Co-Chair: Tie-Jun Wang (China), Li Xie (China)

- 16:00 S12-023 **Keynote Presentation**
New strategy for identification parameters of a micromechanical model coupled with ductile damage
Jean-Claude Rakotoarisoa, Donné Razafindramary, Akrum Abdul-Latif*
IUT de Tremblay, Université Paris 8, France
- 16:30 S12-001 **Ferritic-pearlitic ductile cast irons: Is K a useful parameter?**
Francesco Iacoviello*, Vittorio Di Cocco, Mauro Cavallini
DICeM, Università di Cassino e del Lazio Meridionale, Italy
- 16:50 S12-002 **Modeling of strain localization and failure in vanadium under quasistatic loading**
Anastasia A. Kostina*, Oleg A. Plekhov, Yuriy V. Bayandin
Institute of Continuous Media Mechanics, Ural Branch Russian Academy of Science, Russia
- 17:10 S12-045 **On the effect of microstructural morphology on ductile failure in multi-phase materials**
Tom W.J. de Geus*, Ron H.J. Peerlings, Marc G.D. Geers
Eindhoven University of Technology, The Netherlands
- 17:30 S12-005 **Shear banding behaviors of metallic glasses**
Rui Tao Qu, Zhe Feng Zhang*
Institute of Metal Research, Chinese Academy of Sciences, China

S12-S2

Tuesday June 18, 10:30–12:20

Room: 402B

Co-Chair: Akrum Abdul-Latif (France), Hongping Zhao (China)

- 10:30 S12-033 **Keynote Presentation**
Void linkage in magnesium using x-ray computed tomography
Michael J. Nemcko, David S. Wilkinson*
Materials Science and Engineering, McMaster University, Canada
- 11:00 S12-003 **Electrification of glass by fracture**
Dewen Sun, Jun Zhou, Li Xie*
Department of Mechanics, Lanzhou University, China
- 11:20 S12-004 **Influence of microstructure on fatigue crack propagation and fracture toughness of large Ti-6Al-4V cast structure**
Xin Feng*, Anqi Wang, Yingjie Ma, Xinhua Wu, Jiafeng Lei, Yuyou Cui, Rui Yang
Institute of Metal Research, Chinese Academy of Sciences, China
- 11:40 S12-036 **General laws of multiple fracture at static, cyclic and dynamic loading**
Liudmila Botvina*
A.A.Baikov Institute of Metallurgy and Material Sciences, Russian Academy of Sciences, Russia
- 12:00 S12-052 **Deformation and damage of flexible graphite o-ring seals and seal packs under their exploitation in stop valves**
Alexey Vyacheslavovich Zaitsev*, Oleg Yurievich Isaev, Dmitriy Mikhaylovich Karavaev, Dmitriy Veniaminovich Smirnov, Almaz Mullayanovich Khanov
Perm National Research Polytechnic University, Russia

S12

Damage and Micromechanics

S12-S3

Tuesday June 18, 16:00–17:50

Room: 402B

Co-Chair: David S Wilkinson (Canada), Francesco Iacoviello (Italy)

- 16:00 S12-007 **Keynote Presentation**
Rolling contact fatigue damage of bearing steel with surface defect
Hongping Zhao*, Linyuan Kuang, Xi-Qiao Feng, Huiji Shi
Tsinghua University, China
- 16:30 S12-006 **A new damage identification strategy for SHM based on FBGs and Bayesian model updating method**
Yanhui Zhang*, Wenyu Yang
Huazhong University of Science and Technology, China
- 16:50 S12-009 **Modeling of effective elastic constants and fracture toughness in metal-ceramic composites with interpenetrating microstructure**
Zuzanna Poniznik*, Michal Basista, Zdzislaw Nowak
Institute of Fundamental Technological Research, Polish Academy of Sciences, Poland
- 17:10 S12-038 **In-situ SEM/EBSD study of deformation and fracture behaviour of flake cast iron**
Mattias Lundberg*, Mattias Calmunger, Ru Lin Peng
Linköping University, Sweden
- 17:30 S12-048 **Experimental study on damage of rock under high pressure waterjet**
Hu Si*, Jialiang Liu, Wei Zhou
Chongqing University, China

S12-S4

Wednesday June 19, 10:30–12:20

Room: 402B

Co-Chair: Oleg Naimark (Russia), Meng-Cheng Chen (China)

- 10:30 S12-020 **Keynote Presentation**
A mechanism-based approach for predicting ductile fracture of metallic alloys
Xiaosheng Gao*
The University of Akron, USA
- 11:00 S12-010 **Life prediction model based on the growth of TGO and infiltration of CMAS for thermal barrier coating systems**
Wen-Zhang Tang*, Yi-Chun Zhou, Li Yang, Shasha Qi
Xiangtan University, China
- 11:20 S12-012 **Dynamic fracture of metals in wide range of strain rates**
Alexander E. Mayer*
Chelyabinsk State University, Russia
- 11:40 S12-037 **Propagation of long fatigue cracks under remote mode II, III and II+III in metals**
Tomas Vojtek*, Jaroslav Pokluda, Anton Hohenwarter, Reinhard Pippan
Brno University of Technology, Czech Republic
- 12:00 S12-019 **Simulation of particle erosion to thermal barrier coatings with columnar and lamellar microstructure**
Yuan Yan*, Tiejun Wang, Xi Chen, Weixu Zhang
Xi'an Jiaotong University, China

S12

Damage and Micromechanics

S12-S5

Wednesday June 19, 13:30–15:40

Room: 402B

Co-Chair: Xiaosheng Gao (USA), Guido Borino (Italy)

- 13:30 S12-008 **Keynote Presentation**
Criticality of damage-failure transitions under dynamic and fatigue loading
Oleg Naimark*
Institute of Continuous Media Mechanics UB RAS, Russia
- 14:00 S12-014 **Damage evolution of a thin-film/sub-strate system under thermalmechanical loads**
Ze Jing*, Youhe Zhou
Lanzhou University, China
- 14:20 S12-016 **An equivalent stress gradient theory for evolvement of damage in porous material**
Hong Zuo*, Teng Hou
Xi'an Jiaotong University, China
- 14:40 S12-050 **Evaluation of delamination mechanisms from Charpy impact test in API-X70 steel**
Hudson L. Haskee, Ederson Pauletti, Juliana P. Martins, André L. M. Carvalho*
Ponta Grossa State University, Brazil
- 15:00 S12-018 **Singular thermo-elastic stress analysis of an irregular shaped inclusion**
Meng-Cheng Chen*, Xue-Cheng Ping
East China Jiaotong University, China
- 15:20 S12-034 **A new macroscopic model based on non-local interactions to predict damage and failure in quasibrittle materials**
Laura B. Rojas-Solano, David Grégoire*, Gilles Pijaudier-Cabot
University of Pau, France

S12-S6

Wednesday June 19, 16:00–17:50

Room: 402B

Co-Chair: Sören Sjöström (Sweden), Alexander Chudnovsky (USA)

- 16:00 S12-039 **Keynote Presentation**
An advanced damage percolation model of ductile fracture
Cliff Butcher, Zengtao Chen*, Michael Worswick
University of New Brunswick, Canada
- 16:30 S12-017 **Electric field gradient effect and strain gradient effect in an anti-plane circular nano-inclusion problem**
Shasha Yang*, Shuling Hu, Shengping Shen
Xi'an Jiaotong University, China
- 16:50 S12-021 **The effect of pre-existing microcracks on the displacement instability in thermal barrier coating systems**
Luochuan Su*, Weixu Zhang, Tiejun Wang
Xi'an Jiaotong University, China
- 17:10 S12-046 **Crack initiation and growth in an Zn-Cu-Al PE alloy**
Vittorio Di Cocco*, Francesco Iacoviello, Stefano Natali, Valerio Volpe
University of Cassino and Southern Lazio, Italy
- 17:30 S12-044 **Subgrain martensite mechanics in multi-phase steels**
Francesco Maresca*, Varvara G. Kouznetsova, Marc G. D. Geers
Eindhoven University of Technology, The Netherlands

S12

Damage and Micromechanics

S12-S7

Thursday June 20, 10:30–12:20

Room: 402B

Co-Chair: Zengtao Chen (Canada), André L.M. Carvalho (Brazil)

- 10:30 S12-035 **Keynote Presentation**
Thermomechanical fatigue life of a TBC—comparison of computed and measured behaviour of delamination cracks
Sören Sjöström*, Håkan Brodin
Linköping University, Sweden
- 11:00 S12-024 **Advanced assessment of ductile tearing in nuclear reactor pressure vessel steel using X-ray tomography**
Michael A.J. Daly*, Andrew H Sherry, John K. Sharples
The University of Manchester, UK
- 11:20 S12-025 **Experimental study of multiscale shear instability under dynamic loading**
Natalia Saveleva*, Catherine Froustey, Ivan Panteleev, Oleg Naimark
Institute of Continuous Media Mechanics Ural Branch Russian Academy of Sciences, Russia
- 11:40 S12-040 **Strength properties of a Drucker–Prager porous medium reinforced by rigid particles**
Zheng He*, Luc Dormieux, Djimedo Kondo
E.N.P.C., Institut Navier, France
- 12:00 S12-047 **A multiscale cohesive-frictional interface model**
Guido Borino*, Francesco Parrinello
University of Palermo, Italy

S12-S8

Thursday June 20, 13:30–15:30

Room: 402B

Co-Chair: Xiaodong Wang (Canada), Hu Si (China)

- 13:30 S12-028 **Keynote Presentation**
Distributed damage creates flaw tolerance
Roberto Ballarini*
University of Minnesota, USA
- 14:00 S12-029 **Keynote Presentation**
Study on empirical damage models to ductile fracture of a metal during forging process
Rahmatollah Ghajar*, Iman Yazdani
K.N. Toosi University of Technology Pardis St., Iran
- 14:30 S12-026 **3D synchrotron tomography and laminography assessment of damage evolution in as received and blanked dual phase steels**
Mouhcine Kahziz*, Thilo Morgeneyer, Matthieu Mazière, Lukas Helfen, Eric Maire, Olivier Bouaziz
UMR CNRS 7633, BP87, France
- 14:50 S12-027 **In-situ assessment of strain and damage interactions using digital volume correlation based on synchrotron laminography data**
Thilo F. Morgeneyer*, Thibault Taillandier-Thomas, Francois Hild, Lukas Helfen
Mines ParisTech, UMR CNRS 7633, BP 87, France
- 15:10 S12-051 **Influence of delamination on microtexture and J-R curve in API X60 steel**
Ederson Pauletti*, Hudson L. Haskel, Juliana P. Martins, André L. M. Carvalho*
Ponta Grossa State University, Brazil

S12-S9

Thursday June 20, 16:00–17:50

Room: 402B

Co-Chair: Rahmatollah Ghajar (Iran), Thilo F. Morgeneyer (France)

- 16:00 S12-042 **Keynote Presentation**
Elasto-dynamic behaviour of interacting inhomogeneities and cracks
Shaker Meguid, Xiaodong Wang*
University of Alberta, Canada
- 16:30 S12-032 **Experimental examination of slow crack growth and constitutive equations of fracture processes**
Alexander Chudnovsky*, Zhenwen Zhou, Haiying Zhang
University of Illinois at Chicago, USA
- 16:50 S12-030 **Numerical simulation method of radiation damage effects in platetype dispersion nuclear fuel elements**
Yunmei Zhao*, Shurong Ding, Xin Gong, Yongzhong Huo
Fudan University, China
- 17:10 S12-031 **The effect of interfacial delamination on the surface crack behavior of thermal barrier coating**
Rong Xu*, Weixu Zhang, T. J. Wang
Xi'an Jiaotong University, China
- 17:30 S12-043 **Fracture behavior in timber element under climatic variations**
Frédéric Lamy*, Frédéric Dubois, Octavian Pop, Mokhfi Takarli, Nicolas Angelier, Nicolas Larcher
Université de Limoges, France

S13

Dislocations and Defects

S13-S1

Wednesday June 19, 16:00–17:30

Room: 203A

Co-Chair: Ya-Fang Guo (China), Minsheng Huang (China)

- 16:00 S13-007 **Keynote Presentation**
Gradient in dislocation and cracks
Elias C. Aifantis*
Aristotle University, Greece
- 16:30 S13-004 **Atomistic simulation of microstructure evolution at a crack tip in magnesium single crystal**
Ya-Fang Guo*, Hai-Guang Wang, Xiao-Zhi Tang, Shuang Xu
Beijing Jiaotong University, China
- 16:50 S13-010 **Continuum models for dislocation arrays and dislocation structure of low angle grain boundaries**
Yang Xiang*
Hong Kong University of Science and Technology, Hong Kong, China
- 17:10 S13-002 **Atomistic investigation of defect formation under single slip and its influence on fracture**
Hao Wang*, Dongsheng Xu, David Rodney, Patrick Veyssi re, Rui Yang
Institute of Metal Research, Chinese Academy of Sciences, China

S13-S2

Thursday June 20, 10:30–12:20

Room: 203A

Co-Chair: Mohammed Zikry (USA), Yang Xiang (China)

- 10:30 S13-003 **Keynote Presentation**
Microstructural modeling of dynamic intergranular and transgranular failure modes in crystalline materials
Qifeng Wu, Mohammed Zikry*
North Carolina State University, USA
- 11:00 S13-005 **Fundamental principle of dislocation evolution in fatigued fcc single crystals**
Peng Li*, Shouxin Li, Zhongguang Wang, Zhefeng Zhang
Institute of Metal Research, Chinese Academy of Sciences, China
- 11:20 S13-009 **Discrete dislocation simulation on the compression of low-SFE micropillars with consideration of dislocation dissociation**
Minsheng Huang*, Zhenhuan Li
Huazhong University of Science & Technology, China
- 11:40 S13-001 **Anti-plane problem of a lip-shape crack in one-dimensional hexagonal quasicrystal materials**
Jing Yu*, Junhong Guo, Yongming Xing
Inner Mongolia University of Technology, China
- 12:00 S13-008 **Numerical investigation of overbending induced residual stress effects on dented pipelines combined with cracks through XFEM**
Zhijiang Jin*, Sunting Yan, Guorong Zhu
Zhejiang University, China

S15-S1

Wednesday June 19, 10:30–12:30

Room: 202A

Co-Chair: Xu Chen (China), Fei Fang (China)

- 10:30 S15-003 **Keynote Presentation**
Effect of electric current on the tensile creep of tin
Fuqian Yang*, Guangfeng Zhang
University of Kentucky, USA
- 11:00 S15-001 **Keynote Presentation**
Polarization rotation and mechatronic reliability for Pb (Mg_{1/3}Nb_{2/3}) O₃- PbTiO₃ ferroelectric single crystals at the morphotropic phase boundary
Fei Fang*, Xu Luo, Fangcheng Zhang, Hai Qing, Wei Yang
Tsinghua University, China
- 11:30 S15-004 **Keynote Presentation**
High temperature fatigue and creep-fatigue behaviors of nano-silver sintered lap-shear joints
Yansong Tan, Xin Li, Gang Chen, Xu Chen*
Tianjin University, China
- 12:00 S15-002 **Keynote Presentation**
Mesoscopic modelling of electronic textiles for reliability
Ron H.J. Peerlings*, Lars A.A. Beex, Edward S.C. de Boer, Cyriel W. Verberne, Koen van Os, Marc G.D. Geers
Eindhoven University of Technology, The Netherlands

S16

Embrittlement

S16-S1

Wednesday June 19, 10:30–12:10

Room: 407

Co-Chair: Jesus Toribio (Spain), Alexander Balitskii (Ukraine)

- 10:30 S16-003 **Keynote Presentation**
Fretting fatigue properties under the effect of hydrogen and the mechanisms that cause the reduction in fretting fatigue strength
Jader Furtado, Ryosuke Komoda, Masanobu Kubota*
Kyushu University, Japan
- 11:00 S16-019 **Keynote Presentation**
Small crack effect on threshold stress intensity K_{TH} for high strength steel with internal hydrogen
Yukitaka Murakami*, Hisao Matsunaga, Arezou, Abyazi, Yoshihiro Fukushima
Kyushu University, Japan
- 11:30 S16-010 **Cu grain boundary embrittlement by liquid Hg: An ab-initio modeling**
Julien Colombeau*, Thierry Auger, Duane Johnson, Linlin Wang
MSSMAT/Ecole Centrale Paris, UMR CNRS 8579, France
- 11:50 S16-002 **The effect of work hardening coefficient on hydrogen dislocation and concentration around a crack tip under fatigue condition**
Toshihito Ohmi*, Toshimitsu Yokobori, Takuya Odake
Tohoku University, Japan

S16-S2

Wednesday June 19, 13:30–15:20

Room: 407

Co-Chair: Masanobu Kubota (Japan), Toshihito Ohmi (Japan)

- 13:30 S16-007 **Keynote Presentation**
Recovery of ductility observed in liquid gallium induced embrittlement of polycrystalline silver
Kohei Arakawa, Kohdai Yamamoto, Hirokazu Koizumi*
Meiji University, Japan
- 14:00 S16-004 **Hydrogen effect on fatigue crack initiation behavior of structural materials**
Ryuichiro Ebara*
Fukuoka University, Japan
- 14:20 S16-005 **Sensitivity to hydrogen embrittlement of a pipe steel**
Guy Pluvinage*, Julien Capelle
Fiabilité Mécanique, Conseils Sully sur Nied 57530, France
- 14:40 S16-016 **Hydrogen embrittlement in metals: Analysis of directionality of hydrogen diffusion assisted by stress and strain**
Jesus Toribio*, Viktor Kharin, Diego Vergara, Miguel Lorenzo
University of Salamanca, EPS, Spain
- 15:00 S16-011 **The effects of hydrogen on mechanical properties of Ni-base alloys under the static and cyclic loading**
Alexander Balitskii*, Lubomyr Ivaskevich, Volodymyr Mochulskyi
Karpenko Physico-Mechanical Institute, Ukraine

S16

Embrittlement

S16-S3

Wednesday June 19, 16:00–17:40

Room: 407

Co-Chair: San-Qiang Shi (Hong Kong, China), Yuzo Nakamura (Japan)

- 16:00 S16-015 **Keynote Presentation**
Review of hydrogen diffusion models for the analysis of hydrogen embrittlement of materials
Jesus Toribio*, Viktor Kharin
University of Salamanca, EPS, Spain
- 16:30 S16-018 **Keynote Presentation**
Ductility loss in hydrogen-charged ductile cast iron
Hisao Matsunaga*, Teruki Usuda, Keiji Yanase, Masahiro Endo
Kyushu University, Japan
- 17:00 S16-008 **Influence of liquid sodium on the mechanical behavior of mod. 9Cr-1Mo steel**
Samuel Hemery*, Thierry Auger, Jean-Louis Courouau, Fanny Balbaud-Celerier
MSSMAT UMR CNRS 8579, CNRS, France
- 17:20 S16-009 **An electronic criterion for assessing the intrinsic plasticity or brittleness of metallic glasses**
X. F. Wang*, Y. Wu, S. Halas, T. Pienkos, T. Durakiewicz, W. Li, Z.P. Lv
Xiangtan University, China

S16-S4

Thursday June 20, 10:30–12:00

Room: 407

Co-Chair: Hisao Matsunaga (Japan), Kewei Gao (China)

- 10:30 S16-012 **Keynote Presentation**
Hydride blister in Zr alloys
San-Qiang Shi*
Hong Kong Polytechnic University, Hong Kong, China
- 11:00 S16-001 **Hydrogen induced stress cracking behavior in duplex stainless steels**
Guocai Chai*, Lin Peng Ru, Sten Johansson, Ulf Kivisäkk
Sandvik Materials Technology, Sweden
- 11:20 S16-017 **Effect of second-step-aging on the fatigue properties of maraging steel**
Norio Kawagoishi, Kohji Kariya, Takanori Nagano, Yuzo Nakamura*
Kagoshima University, Japan
- 11:40 S16-006 **The tensile properties of NiCrMo1 steel under conditions of hydrogen charging were studied using the linearly increasing stress test**
Qian Liu*, Bartolomeus Irwanto, Andrej Atrens
The University of Queensland, Australia

S17-S1

Monday June 17, 16:00–17:30

Room: 403

Co-Chair: Donato Firrao (Italy), Lamine Hattali (France)

- 16:00 S17-034 **Keynote Presentation**
The fracture analysis of the SENB specimen
Kejiang Han, Jian Shuai*, Lingzhen Kong, Michael Sutton
China University of Petroleum, China
- 16:30 S17-001 **Study on damage tolerance properties of fiber-metal laminates**
Zhongchun Xia*, Yu E. Ma
Northwestern Polytechnical University, China
- 16:50 S17-035 **Dedicated loop antenna for electromagnetic emission analysis in rocks under compression**
Gianni Niccolini*, Oscar Borla, Giuseppe Lacidogna, Alberto Carpinteri
INRIM, National Research Institute of Metrology, Italy
- 17:10 S17-002 **Fracture mechanism of the mismatched welding in the safe end of reactor pressure vessel from nuclear power plant**
Zhao-Xi Wang*, Bao-Ping Qu, Xiao-Liang Zhang, Guo-Dong Zhang, Fei Xue, Hui-Ji Shi
Suzhou Nuclear Power Research Institute, China

S17-S2

Tuesday June 18, 10:30–12:20

Room: 403

Co-Chair: Abdel-Monem M. El-Batahgy (Egypt), Xudong Qian (Singapore)

- 10:30 S17-005 **Keynote Presentation**
Fatigue surface morphologies in cast Al-Si hypoeutectic alloys
Donato Firrao*, Paolo Matteis
DISAT, Politecnico di Torino, Italy
- 11:00 S17-007 **Simulating the bluntness of TBM Disc cutters in rocks using displacement discontinuity method**
Hadi Haeri*, Kourosh Shahriar, Mohammad Fatehi Marji, Parviz Moaref Vand
Islamic Azad University, Iran
- 11:20 S17-009 **The shading width influence on glass crack behavior under thermal radiation effect**
Qingsong Wang*, Haodong Chen, Yu Wang, Yi Zhang, Jinhua Sun, Linghui He
University of Science and Technology of China, China
- 11:40 S17-010 **Evaluation using digital image correlation and finite element method of stress intensity factors and T-stress in wedge splitting test**
Lamine Hattali*, Harold Auradou, Francois Marc, Véronique Lazarus
Laboratoire Fluides, Automatique et Systèmes Thermiques, France
- 12:00 S17-011 **A strain based criterion for creep crack initiation**
Alexander Hobt*, Andreas Klenk, Karl Maile
Materialprüfungsanstalt University Stuttgart, Germany

S17-S3

Tuesday June 18, 16:00–17:50

Room: 403

Co-Chair: Deju Zhu (China), Yazhi Li (China)

- 16:00 S17-041 **Keynote Presentation**
Fatigue failure of outlet pipe work from blow down valve at natural gas processing plant
Abdel-Monem M. El-Batahgy*, Martin F. Wheeler
Central Metallurgical R&D Institute, Egypt
- 16:30 S17-037 **Research progress of (de)lithiation fracture mechanism in silicon anode of lithium-ion battery**
Yichun Zhou*, Zengsheng Ma, Jun Liu
Xiangtan University, China
- 16:50 S17-012 **Compliance based J-integral measurement for surface cracked specimens**
Ya Li, Xudong Qian*
National University of Singapore, Singapore
- 17:10 S17-008 **Modeling the propagation mechanism of two random micro cracks in rock samples under uniform tensile loading**
Hadi Haeri*, Kourosh Shahriar, Mohammad Fatehi Marji, Parviz Moarefvand
Islamic Azad University, Iran
- 17:30 S17-006 **Investigation of bearing strength of single-bolt double-lap joints in composite laminate**
Linan Cheng*, Xitao Zheng, Chunyang Tan
Northwestern Polytechnical University, China

S17-S4

Wednesday June 19, 10:30–12:20

Room: 403

Co-Chair: Emmanuel Gdoutos (Greece), Zhao-Xi Wang (China)

- 10:30 S17-031 **Keynote Presentation**
The effect of changing state of stress around the crack tip on the determination of stress intensity factors by the method of caustics
Emmanuel Gdoutos*
Civil Engineering, Domocritus University of Thrace, Greece
- 11:00 S17-014 **Acoustic emission technique (AET) for failure analysis in wood materials**
Frédéric Lamy*, Mokhfi Takarli, Nicolas Angellier, Octavian Pop, Frédéric Dubois
Université de Limoges, France
- 11:20 S17-015 **Analysis of metallic plasticity and ductile fracture using a mechanismbased approach**
Wei Jiang, Yazhi Li*, Zhengxing Fan, Yixiu Shu
Northwestern Polytechnical University, China
- 11:40 S17-036 **Structure responses in the riveted and the friction stir welded stringer panel under the tensile and compressive loading**
Zhenqiang Zhao*
Northwestern Polytechnical University, China
- 12:00 S17-019 **Creep failure analysis of pre-stressed anchor cable structures for rock excavation slope**
Rubin Wang*, Weiya Xu
Hohai University, China

S17-S5

Wednesday June 19, 13:30–15:30

Room: 403

Co-Chair: Liyun Li (China), Jian Shuai (China)

- 13:30 S17-017 **Strain rate effect on the failure behavior of raphe 49 fabric and single yarn**
Deju Zhu*, Barzin Mobasher, Subramaniam D. Rajan
Hunan University, China
- 13:50 S17-018 **Three-dimension dynamic simulation of thin epoxy-resin plate and comparison with experiment**
Hao Chen*, Tomoo Okinaka
Institute of Engineering Mechanics, CEA, China
- 14:10 S17-020 **Calculation of bearing loads for fractured specimens by FRASTA simulation**
Yuguang Cao*, Shihua Zhang, Xiaoyu Sun, Kiyoshi Tanaka
China University of Petroleum, China
- 14:30 S17-042 **Ductile to brittle transition concept on fracture behavior of poly(vinylidene fluoride) / poly(methyl methacrylate) blends**
Lucien Laiarinandrasana*, Yannick Nziakou, Jean Louis Halary
Mines PariTech Centre des Matériaux – CNRS, France
- 14:50 S17-043 **Fracture of metallic ring samples under static and dynamic loading**
Viktor A. Morozov, Yuri V. Petrov, Anton A. Lukin, Viktor M. Kats, Svetlana A. Atroshenko, Georgii D. Fedorovskii*, Denis A. Gribanov, Olga K. Zaichenko
St. Petersburg State University, Russia
- 15:10 S17-033 **Experiments and numerical rapheme of creep fracture behaviour of polyethylene PE100**
Ivica Skozrit*, Zdenko Tonkovic, Ante Bakic, Janos Kodvanj
University of Zagreb, Croatia

S17-S6

Wednesday June 19, 16:00–18:10

Room: 403

Co-Chair: Yichun Zhou (China), Lucien Lairinandrasana (France)

- 16:00 S17-025 **Keynote Presentation**
A experimental study of I-II-III mixed mode crack fracture of rock under different temperature
Liyun Li*, Mingxiu Li, Zhiqiang Xu, Tiewu Tang, Qingjun Fang
China University of Mining and Technology Beijing, China
- 16:30 S17-022 **The master failure curve of pipe steels and crack paths in connection with hydrogen embrittlement**
Mohammed Hadj Meliani, El Hussein akram, Zitouni Azari, Guy Pluvinage, El Houd Abderezek, Yury Matvienko, Toufik Boukharouba*
Laboratoire de Mécanique Avancée, LMA, USTHB, Algeria
- 16:50 S17-023 **Research on the mechanical properties of the CNT composites**
Luodan Su*, Qingsheng Yang
Beijing University of Technology, China
- 17:10 S17-044 **Evaluation of ductile fracture models in high velocity impact problems**
Ying Li*, Xiao-bin Li, Xiang-shao Kong
Wuhan University of Technology, China
- 17:30 S17-038 **Modeling of deformation and fracture behavior of dissimilar resistance spot welded joints under shear, axial and combined loading conditions**
Sebastian A. Burget*, Silke Sommer
Fraunhofer Institute for Mechanics of Materials IWM, Germany
- 17:50 S17-021 **Failure process analysis of welded joints incorporating damage accumulation**
Aihui Wu*, Xianzhong Zhao, Wenkai Yang, Zuyan Shen
Tongji University, China

S17-S7

Thursday June 20, 10:30–12:20

Room: 403

Co-Chair: Guozheng Kang (China), Teng Li (USA)

- 10:30 S17-046 **Keynote Presentation**
Study on the mechanisms and quantitative law of mode I supersonic crack propagation
Bin Liu*, Yanjie Jia, Wenpeng Zhu, Teng Li
Tsinghua University, China
- 11:00 S17-024 **Fracture analysis for nanostructured Li-ion batteries**
Zuyao Wang*
Shanghai University, China
- 11:20 S17-039 **Comparative study on fatigue properties of friction stir welding joint and lap joint**
Teng Zhang*, Yuting He, Qing Shao, Haiwei Zhang, Liming Wu
Air Force Engineering University, China
- 11:40 S17-040 **Effects of loading rate and temperature on crack arrest behavior of stiffened plate structure of the hull**
Chunhuan Guo*, Yanmei Song, Fengchun Jiang, Ruitang Liu
Harbin Engineering University, China
- 12:00 S17-026 **Effect of the EDM discharge pits on the mechanical and failure properties of the structures**
Xiao-Liang Zhang*, Zhao-Xi Wang
Beijing Polytechnic College, China

S17-S8

Thursday June 20, 13:30–15:40

Room: 403

Co-Chair: Bin Liu (China), Chunhuan Guo (China)

- 13:30 S17-047 **Keynote Presentation**
A non-cracking beaded-string silicon anode for lithium ion battery
Zheng Jia, Teng Li*
University of Maryland, USA
- 14:00 S17-013 **Determination of crack surface displacements for a radial crack emanating from a semi-circular notch using weight function method**
Di Hua Tong*, Xue Ren Wu
AVIC Beijing Institute of Aeronautical Materials, China
- 14:20 S17-029 **Numerical study of the deformations of two coplanar circular cracks during their coalescence**
Laurène Legrand*, Véronique Lazarus
UPMC Univ Paris 6, UMR 7190, Institut Jean Le Rond d'Alembert, France
- 14:40 S17-030 **Fracture failure analysis of metallic wire drawing**
Lihua Liu, Jie Sun*, Huan Wang
Fasten Hopesun Group Co. Ltd, China
- 15:00 S17-032 **Transition of ductile and brittle fracture during DWTT tests**
Hailiang Yu*, Cheng Lu, Kiet Tieu
University of Wollongong, Australia
- 15:20 S17-045 **Several kinds of calculation methods on the crack growth rates for elastic-plastic steels**
Yangui Yu*
Zhejiang Guangxin New Technology Application Academy of Electromechanical and Chemical Engineering, China

S18-S1

Monday June 17, 16:00–17:50

Room: Hall B

Co-Chair: Hiroshi Matsuno (Japan), Yuzo Nakamura (Japan)

- 16:00 S18-011 **Keynote Presentation**
Variational characteristics of strain energy diagram for characterizing fatigue behavior
Zihai Shi*, Masaaki Nakano, Yukari Nakamura
R&D Center, Nippon Koei Co., Ltd., Tsukuba-shi, Japan
- 16:30 S18-001 **Effect of corrosion pits on fatigue life and crack initiation**
Shu-Xin Li*, Xin-Yan Zhang, R. Akid, Rui Liang
Lanzhou University of Technology, China
- 16:50 S18-002 **Using triaxiality dependent cohesive zone model in low cycle fatigue**
Xuan Cao*, Michael Vormwald
Technical University of Darmstadt, Germany
- 17:10 S18-003 **Healing of fatigue crack by controlling high-density electric current with surface-activated pre-coating**
Atsushi Hosoi*, Tomoya Kishi, Yang Ju
Nagoya University, Japan
- 17:30 S18-004 **Study on fatigue life of COG assembly under mechanical and hygrothermal loads**
Lilan Gao*, Hong Gao, Xu Chen
Tianjin University, China

S18-S2

Monday June 17, 16:00–17:50

Room: 406

Co-Chair: Tongguang Zhai (USA), Xiaogui Wang (China)

- 16:00 S18-023 **Keynote Presentation**
Fatigue crack growth in a metastable austenitic stainless steel
David Martelo, Mirco Chapetti*
National University of Mar del Plata-CONICET, Argentina
- 16:30 S18-007 **Fatigue life prediction of microstructures under multiaxial loading conditions**
Gustavo M. Castelluccio*, David L. McDowell
Georgia Institute of Technology, USA
- 16:50 S18-013 **Measurement of effective stress intensity factor range of mode II fatigue crack growth using hysteresis loop**
Shigeru Hamada*, Minjian Liu, Naoki Fukumura
Kyushu University, Japan
- 17:10 S18-014 **On the tolerance to short cracks departing from notch roots**
Hao Wu*, Jaime Tupiassú Pinho de Castro, Zheng Zhong
Tongji University, China
- 17:30 S18-029 **Fatigue endurance of new high-strength car-body steels**
Paolo Matteis, Giorgio Scavino, Raffaella Sesana, Fabio D'Aiuto, Donato Firrao*
DISAT, Politecnico di Torino, Italy

S18-S3

Tuesday June 18, 10:30–12:00

Room: Hall B

Co-Chair: Zihai Shi (Japan), Atsushi Hosoi (Japan)

- 10:30 S18-009 **Keynote Presentation**
Fatigue crack growth rate tests of high performance steel HPS485W
Chun-Sheng Wang*, Lan Duan, Shi-Chao Wang
Chang'an University, China
- 11:00 S18-012 **Dissipated energy measurements in high-cycle fatigue tests of metal material**
Yuan Li*, François Maquin, Fabrice Pierron, Xu Han
National University of Defense and Technology, China
- 11:20 S18-084 **A model allowing for the influence of geometry and stress in the assessment of fatigue data**
Constanze Przybilla*, Roland Koller, Alfonso Fernández-Canteli, Enrique Castillo
University of Oviedo, Spain
- 11:40 S18-006 **Effects of loading history and crack closure on fatigue crack propagation behaviour under high-low sequence loading**
Xiaogui Wang*, Zengliang Gao, Zhiwei Yao
Zhejiang University of Technology, China

S18-S4

Tuesday June 18, 10:30–12:20

Room: 406

Co-Chair: Mirco Chapetti (Argentina), Shigeru Hamada (Japan)

- 10:30 S18-033 **Keynote Presentation**
A microstructure-based model for simulation of short fatigue crack growth in three dimensions
Tongguang Zhai*, Wei Wen, Yichu Wu, Yuanbin Zhang, Bin Xu
University of Kentucky, USA
- 11:00 S18-015 **Some microstructural aspects on humidity-enhanced deterioration in the fatigue strength of age-hardened 7075 Al alloy**
Yuzo Nakamura*, Kohji Kariya, Norio Kawagoishi
Kagoshima University, Japan
- 11:20 S18-017 **An energy-equilibrium fatigue model and its application on fatigue life assessment for notched specimens with gradient surface layer**
Sicong Zhao, Jijia Xie*, Ping Jiang, Xiaolei Wu
Institute of Mechanics, Chinese Academy of Sciences, China
- 11:40 S18-018 **Influence of surface rolling time on short fatigue crack behavior for LZ50 axle steel**
Bing Yang*, Yongxiang Zhao
Southwest Jiaotong University, China
- 12:00 S18-047 **Probabilistic model for fatigue crack initiation life analysis**
Jinyu Zhou*, Liyang Xie, Fuxian Zhu, Wenqin Han, Kuizhou Sun
Jiangsu Teachers University of Technology, China

S18-S5

Tuesday June 18, 16:00–17:50

Room: Hall B

Co-Chair: Chun-Sheng Wang (China), Oleg Plekhov (Russia)

- 16:00 S18-032 **Keynote Presentation**
Formulation and characterization of fatigue strength diagrams of notched specimens based on equivalent cyclic stress ratio, attending especially to material dependence and notch size effects
Hiroshi Matsuno*
Sojo University, Japan
- 16:30 S18-019 **Effect of humidity on fracture mechanism of age-hardened Al alloys under ultrasonic loading**
Norio Kawagoishi*, K. Kariya, H. Matsusako, Y. Nakamura, Xi-Shu Wang, Qing-Yuan Wang
Daiichi Institute of Technology, Japan
- 16:50 S18-021 **Experimental investigation of mode I fatigue crack growth behavior of titanium foils**
Liu Liu*, Chang-woo Lee, Young-mok Rhy, John Holmes
Beijing Institute of Technology, China
- 17:10 S18-022 **Determination of statistical secured residual lifetime based on sensitivity analysis and stochastic crack propagation simulation**
Jens Lebahn*, Manuela Sander
University of Rostock, Institute of structural mechanics, Germany
- 17:30 S18-053 **Life prediction of DS nickel based superalloy under complex fatigue loading at high temperature**
Xiaoan Hu*, Xiaoguang Yang, Duoqi Shi
Beihang University, China

S18-S6

Tuesday June 18, 16:00–17:30

Room: 406

Co-Chair: Jie Chen (Canada), Donato Firrao (Italy)

- 16:00 S18-045 **Keynote Presentation**
Fracture mechanisms during intergranular hold time fatigue crack growth in inconel 718 superalloy
Sten Johansson*, Leif Viskari, Magnus Hornqvist, Krystina M. Stiller
Linköping University, Sweden
- 16:30 S18-024 **Creep-fatigue interaction model for crack growth of nickel-based superalloys with high temperature dwell time**
Hongqin Yang*, Rui Bao, Jiazhen Zhang
Beijing Aeronautical Science and Technology Research Institute of COMAC, China
- 16:50 S18-025 **Residual stress effects on the propagation of fatigue cracks in the weld of a CA6NM stainless steel**
Alexandre Trudel*, Myriam Brochu, Martin Lévesque
École Polytechnique de Montréal, Canada
- 17:10 S18-026 **Analysis of the transition from flat to slanted fatigue crack growth in thin metallic sheets**
Véronique Doquet*, Jean-Baptiste Esnault, Patrick Massin
CNRS, Laboratory of Solids Mechanics, Ecole Polytechnique, France

S18-S7

Wednesday June 19, 10:30–12:20

Room: Hall B

Co-Chair: Gang Wang (Hong Kong, China), Norio Kawagoishi (Japan)

- 10:30 S18-075 **Keynote Presentation**
Thermal mechanical fatigue of coke drum materials
Zihui Xia, Jie Chen*
University of Alberta, Edmonton, Canada
- 11:00 S18-027 **Evaluation of resistance to fatigue due to thermal shock in ceramic facade coating system**
Yina F. Munoz Moscoso*, Anderson da Silva Barbosa, Joao Carlos Barleta Uchoa,
Luciano Mendes Bezerra
Universidade De Brasilia, Brazil
- 11:20 S18-028 **About the strengthening effect of microstructural barriers against fatigue**
Michael Marx*, Wolfgang Schaef, Alain F. Knorr, Tao Qian
Saarland University, Germany
- 11:40 S18-030 **Statistical description of defect evolution under cyclic loading**
Oleg Plekhov*, Oleg Naimark
Institute of Continuous Media Mechanics RAS, Russia
- 12:00 S18-035 **An influence of varying mean stress on fatigue behaviour of Ti-6Al-4Mo alloy in very high cycle fatigue regime**
Alexander Nikitin*, Andrey Shanyavskiy, Palin-Luc Thierry, Claude Bathias
LEME, Paris University X OUEST Nanterre La Defense, France

S18-S8

Wednesday June 19, 10:30–12:20

Room: 406

Co-Chair: Yajun Zhang (China), Liu Liu (China)

- 10:30 S18-044 **Keynote Presentation**
Thermo-mechanical low cycle fatigue and design of welded structures
Aurelie Benoit, Luc Remy*, Alain Koster, Habibou Maitournam, Frederic Oger
Mines ParisTech, Centre des Materiaux, France
- 11:00 S18-034 **Crack growth rate in friction stir welded nugget of 2198-T8 Al-Li Alloy**
Yu E. Ma, Baoqi Liu*, Zhenqiang Zhao
Northwestern Polytechnical University, China
- 11:20 S18-036 **Effect of loading frequency on fatigue properties and micro-plasticity behavior of JIS S15C low carbon steel**
Benjamin Guennec*, Akira Ueno, Tatsuo Sakai, Masahiro Takanashi, Yu Itabashi
Ritsumeikan University, Japan
- 11:40 S18-037 **On the effect of fatigue crack plastic dissipation on the stress intensity factor**
Nicolas Ranc*, Palin-Luc Thierry, Paul C. Paris
Arts et Metiers ParisTech, CNRS, PIMM, France
- 12:00 S18-062 **Analysis of probabilistic lifetime of crack propagation in a powder metallurgy turbine disk**
Xuecheng Ding*
Energy and Jet Propulsion Institute, China

S18-S9

Wednesday June 19, 13:30–15:40

Room: 208B

Co-Chair: Luc Remy (France), Véronique Doquet (France)

- 13:30 S18-063 **Keynote Presentation**
A prediction model of crack initiation for low cycle fatigue under axial loading
Yajun Zhang*, Lingqing Gao, Chunfen Wang
Luoyang Ship Material Research Institute, China
- 14:00 S18-039 **Study of stored energy evolution at fatigue crack tip based on infrared data**
Anastasia Yu. Fedorova*, Michael V. Bannikov, Oleg A. Plekhov
Ural Branch Russian Academy of Science, Russia
- 14:20 S18-041 **Fatigue cracking at twin boundaries: Effects of crystallographic orientation and stacking fault energy**
Zhenjun Zhang*, Peng Zhang, Linlin Li, Zhefeng Zhang
Institute of Metal Research, China
- 14:40 S18-042 **The ultra-high cycle fatigue failure behaviors of superalloy DZ125**
Yu-Li Gu*, Chang-Kui Liu, Chun-Hu Tao
Beijing Institute of Aeronautical Materials, China
- 15:00 S18-056 **Comparing surface properties and fatigue behavior of aircraft alloy Ti-6Al-4V after UNSM treatment with existing techniques.**
Ravil R. Kayumov*
IMST, Mechanical Engineering, South Korea
- 15:20 S18-048 **Effect of ultrasonic nanocrystal surface modification to the fatigue properties of S45C with different surface hardness**
Bo Wu*, Jianxun Zhang, Young-Shik Pyoun, Ri-ichi Murakami
Xi'an Jiaotong University, China

S18-S10

Wednesday June 19, 13:30–15:40

Room: 406

Co-Chair: Masahiro Endo (Japan), Michael Marx (Germany)

- 13:30 S18-070 **Keynote Presentation**
Strengthening of Ti-6Al-4V alloy by short-time duplex heat treatment
Satoshi Tanaka*, Tatsuro Morita, Kosuke Shinoda
Kyoto Institute of Technology, Japan
- 14:00 S18-043 **Fatigue behavior investigation and micro-analysis of X80 high-strain line pipe**
Yang Li*, Jiming Zhang, Weiwei Zhang, He Li, Haitao Wang, Linggang Ji, Qingren Xiong, Yaorong Feng, Chunyong Huo, Qiang Chi
Tubular Goods Research Institute of CNPC, China
- 14:20 S18-046 **Fatigue life and initiation mechanisms in wrought inconel 718 DA for different microstructures**
Meriem Abikchi*, Jerome Crepin, Arnaud Longuet, Caroline Mary, Thilo F. Morgeneyer
Mines ParisTech, Centre des Matériaux Pierre, France
- 14:40 S18-051 **Growth of micro-cracks at multiple holes under high temperature low cycle fatigue**
Flora Salgado, Luc Remy*, Alain Koster, Vincent Maurel
Mines ParisTech, Centre des Matériaux, France
- 15:00 S18-055 **Research on low cycle fatigue of deep sea structure**
Li-ming Geng*, Ren-jun Yan, Yu-hua Yang, Xin-yu Zhang
China Ship Development and Design Center, China
- 15:20 S18-050 **Fatigue crack growth simulation of surface cracks under arbitrary crack face loading**
Xiaobin Lin*
HBM-nCode United Kingdom Limited, UK

S18-S11

Wednesday June 19, 16:00–18:10

Room: 406

Co-Chair: Xi-Shu Wang (China), Meriem Abikchi (France)

- 16:00 S18-059 **Keynote Presentation**
Small-notch effect in Ti-6Al-4V
Masahiro Endo*, Dietmar Eifler, Frank Balle, Keiji Yanase, Hisao Matsunaga
Fukuoka University, Japan
- 16:30 S18-052 **Characterization of the fatigue behavior of brazed steel joints by digital image correlation (DIC)**
Michael Koster*, Christoph Kenel, Christian Leinenbach
Laboratory for Joining Technologies and Corrosion, Switzerland
- 16:50 S18-054 **Study on delamination behavior and crack opening contour of advanced hybrid laminates during fatigue crack propagation process**
Xiao Huang*, Jianzhong Liu
Beijing Institute of Aeronautical Materials, China
- 17:10 S18-057 **Subcycle fatigue crack growth mechanism investigation for aluminum alloys and steels**
Jian Yang, Wei Zhang, Yongming Liu*
Mechanical Engineering, Arizona State University, USA
- 17:30 S18-068 **Molecular dynamics simulation of fatigue crack propagation in nickel-aluminum alloy under cyclic loads**
Chao Wang*, Xinhua Yang, Xiaoqiao He
Huazhong University of Science and Technology, China
- 17:50 S18-060 **Evaluation of fatigue strength of notched specimens by the point method with high stress ratios in the low cycle regime**
Mukundan Srinivasan*, Giorgio Chiandussi, Massimo Rossetto
IMDEA Materials, Spain

S18-S12

Thursday June 20, 10:30–12:20

Room: Hall B

Co-Chair: Yongzhong Huo (China), Jinyu Zhou (China)

- 10:30 S18-071 **Keynote Presentation**
Effect of micro-arc oxygen coating layer types on fatigue life of 2024-T4 alloy
Xi-Shu Wang*, Xin-Wu Guo, Norio Kawagoishi
Tsinghua University, China
- 11:00 S18-064 **Application of crystal plasticity to cyclic loading and comparison to conventional plasticity**
Martin Boeff*, Anxin Ma, Alexander Hartmaier
Micromechanical and Macroscopic Modelling/ICAMS, Germany
- 11:20 S18-087 **Development and several additional performances of dual-spindle rotating bending fatigue testing machine GIGA QUAD**
Taizoh Yamamoto*, Akio Kokubu, Tatsuo Sakai, Yuki Nakamura
Yamamoto Metal Technos Co., Ltd. Japan
- 11:40 S18-088 **Influence of heat treatment on the fatigue behaviour of 22MnB5 sheet steel**
Benjamin Abrivard*, Franck Morel, Etienne Pessard, Philippe Delhayé
Arts et Métiers ParisTech, France
- 12:00 S18-067 **Study on organization and performance of warm compaction Fe-Cu-Mn-C sintered material**
Yuheng Lu*, Lei Hu, Wenchao Fu, Xuan Ye, Zhiyu Xiao
South China University of Technology, China

S18-S13

Thursday June 20, 10:30–12:20

Room: 406

Co-Chair: Hans-Juergen Christ (Switzerland), Rongguo Zhao (China)

- 10:30 S18-066 **Keynote Presentation**
Effect of proof testing on distribution of fatigue life in glass coated with ceramic thin film
Toshihiko Hoshide*, Shohei Shimizu, Motoki Tanaka
Kyoto University, Japan
- 11:00 S18-069 **J-integral and crack driving force in elastic-plastic materials during cyclic loading**
Walter Ochensberger*, Otmar Kolednik
Austrian Academy of Sciences, Austria
- 11:20 S18-061 **Application of weakest link probabilistic framework for fatigue notch factor to turbine engine materials**
Oluwamayowa A. Okeyoyin*, Gbadebo M. Owolabi
Howard University, USA
- 11:40 S18-072 **Three-dimensional fatigue crack growth simulation under nonproportional mixed-mode loading**
Ying Yang*, Michael Vormwald
Technical University of Darmstadt, Germany
- 12:00 S18-073 **Effect of levels of residual stress at notch on fatigue crack growth**
Mustapha Benachour*, Mourad Dahaoui, Nadja Benachour, Mohamed Benguediab
IS2M Laboratory, University of Tlemcen, Algeria

S18-S14

Thursday June 20, 13:30–15:40

Room: 202B

Co-Chair: Toshihiko Hoshide (Japan), Yongming Liu (USA)

- 13:30 S18-083 **Keynote Presentation**
Fretting fatigue analysis of Zr-4 tube specimens
Lichen Tang*, Yongzhong Huo, Shurong Ding
Fudan University, China
- 14:00 S18-090 **Study on the fatigue crack growth behavior of 30CrMnSiA straight attachment lugs**
Liming Wu*, Yuting He, Haiwei Zhang, Teng Zhang, Qing Shao
Air Force Engineering University, China
- 14:20 S18-091 **Fatigue damage indicators based on the infrared thermographic method**
Pei J. Hou*, Xing L. Guo, Fang Han, Qiang Guo
Dalian University of Technology, China
- 14:40 S18-092 **The experimental study of 15CrMo steel fatigue performance**
Meng-Yuan Gu*, Xiao-Yang Li, Jian-Ming Zhai
Beijing University of Technology, Engineering Mechanics Institution, China
- 15:00 S18-076 **Investigation of installing stitching pins on repair of a cracked gas turbine casing**
Khashayar Vaezi*, Esmaeil Poursaeidi, Amin Kavandi
University of Zanjan, Iran
- 15:20 S18-080 **Analysis of the microstructure sensitivity on multiaxial fatigue strength using crystal plasticity and extreme value statistics**
Anis Hor*, Nicolas Saintier, Camille Robert, Palin-Luc Thierry, Franck Morel
Arts et Métiers ParisTech, I2M – CNRS, France

S18-S15

Thursday June 20, 13:30–15:40

Room: 406

Co-Chair: Dong Qian (USA), Siegfried Fouvry (France)

- 13:30 S18-040 **Keynote Presentation**
Fatigue life prediction based on a mechanism-based simulation of crack initiation and short crack growth in forged Ti-6Al-4V
Hans-Jürgen Christ*, Helge Knobbe, Philipp Koester, Claus-Peter Fritzen, Martin Riedler
Universitaet Siegen, Germany
- 14:00 S18-095 **Role of surface defects in the initiation of fatigue cracks in pearlitic steel**
Jesus Toribio*, Juan-Carlos Matos, Beatriz Gonzalez
University of Salamanca, Spain
- 14:20 S18-096 **Impact fatigue life prediction of the wind tunnel balance**
Ding Chen*, Junhui Bu, Fengjing Shen, Peng Liu, Yan Zhang
China Academy of Aerospace Aerodynamics, China
- 14:40 S18-097 **Fatigue performance analysis of frictional type high strength bolts of overlapped joints**
Huili Wang*, Hongjian Yin, Kang Liu
Dalian University of Technology, China
- 15:00 S14-001 **Introduction of a reverse simulation approach to identify the fatigue SIF crack arrest threshold from fretting cracking experiments**
Alix de Pannemaecker*, Siegfried Fouvry, Jean-Yves Buffère
LTDS, Ecole Centrale Lyon, France
- 15:20 S18-049 **Research on fatigue damage and crack propagation of GH4133B superalloy used in turbine disk of aero-engine**
Rongguo Zhao*, Dunhou Tan, Xiyan Luo, Hongchao Li, Junfei Li, Wei Li, Xuehui Liu
Xiangtan University, China

S18-S16

Thursday June 20, 16:00–17:50

Room: 203B

Co-Chair: Huiji Shi (China), Liming Wu (China)

- 16:00 S18-089 **Keynote Presentation**
High cycle fatigue simulation using multi-temporal scale method coupled with continuum damage mechanics
Dong Qian*
University of Texas at Dallas, USA
- 16:30 S18-094 **Fatigue cracking paths and compliance analysis in round bars under tension and bending**
Jesus Toribio*, Juan-Carlos Matos, Beatriz Gonzalez, Jose Escudra
University of Salamanca, Spain
- 16:50 S14-003 **The model and application of fatigue life based on fracture mechanics and fuzzy theory**
Xing-liang Ma, Hui-li Wang*, Si-feng Qin
Dalian University of Technology, China
- 17:10 S18-093 **Finite element analysis on the crack tip residual stress under single overload**
Lina Zhang*, Jianzhong Liu, Shaojun Ma
Beijing Institute of Aeronautical Materials, China
- 17:30 S18-082 **Effect of microstructure on fatigue crack propagation behavior in narrow gap welds of 20Cr2NiMo rotor steel**
Zhaohui Yu*, Wanghua Wang, Congping Zhang, Jianxun Zhang, Jing Niu
Xi'an Jiaotong University, China

S18-S17

Thursday June 20, 16:00–17:50

Room: 406

Co-Chair: Xueren Wu (China), Anis Hor (France)

- 16:00 S18-074 **Keynote Presentation**
Determination of fatigue crack propagation limit curves for high strength steels, and their applicability for structural elements having crack like defects
Janos Lukacs*
University of Miskolc, Hungary
- 16:30 S18-077 **Introduction of a non local stress gradient volume averaging approach to predict the crack nucleation risk induced by fretting fatigue loading**
Siegfried Fouvry*, Hervé Gallien
LTDS, Ecole Centrale Lyon, France
- 16:50 S18-079 **Fatigue life design of titanium alloy laminate by crack-isolation technique**
Shan Xiao, Yongcun Zhang, Shutian Liu, Yang Liu*
Dalian University of Technology, China
- 17:10 S18-086 **Property for fatigue crack propagation of friction stir welded 2024-T3 aluminum alloy**
Masakazu Hirose*, Motoo Asakawa, Takao Okada, Shigeru Machida, Toshiya Nakamura, Shuji Kishishita, Kazuya Kuwayama, Shinya Fujita, Takuya Noguchi
The Graduate School of Waseda University, Japan
- 17:30 S14-002 **Fatigue and fracture education for bridge engineering at Chang'an University**
Chun Sheng Wang*, Lan Duan
Chang'an University, China

S19-S1

Thursday June 20, 10:30–12:10

Room: 209A

Co-Chair: Yao Dai (China), Zheng Zhong (China)

- 10:30 S19-005 **Keynote Presentation**
A periodic array of parallel edge cracks in a functionally graded plate subjected to finite cooling rates
 Yuezhong Feng, Thomas Siegmund, Zhihe Jin*
University of Maine, USA
- 11:00 S19-010 **Keynote Presentation**
The thermal effect of an anti-plane crack in a functionally graded piezoelectric strip under electric shock
 Xing Li*, Yongyi Long, Pengpeng Shi
Ningxia University, China
- 11:30 S19-001 **Elastodynamic analysis of a finite crack at an arbitrary angle in the functionally graded material under in-plane impact loading**
 Sheng-Hu Ding*, Xing Li
Ningxia University, China
- 11:50 S19-006 **Dynamics thermal fracture parameters in functionally graded materials by an interaction integral in conjunction with higher order extended finite element method**
 Mohammad Bagher Nazari*
Shahrood University, Iran

S19-S2

Thursday June 20, 13:30–15:20

Room: 209A

Co-Chair: Zhihe Jin (USA), Sami El-Borgi (Qatar)

- 13:30 S19-007 **Keynote Presentation**
The higher order crack tip fields for FGMs spherical shell with Reissner's effect
 Yao Dai*, Xiao Chong, Lei Zhang
Academy of Armored Forces Engineering, China
- 14:00 S19-002 **Hybrid-Trefftz finite element method for steady and transient heat conduction in functionally graded materials**
 Leilei Cao*, Xuemin Zhang, Qiong Liu
Chang'an University, China
- 14:20 S19-012 **The static stress intensity factor around the anti-plane crack in an orthotropic functionally graded material**
 Xuexia Zhang*, Zhixin Hu
Taiyuan University of Science and Technology, China
- 14:40 S19-004 **Study of parameters affecting fracture of titanium nitride films (TiN)**
 Marcos F. Odorczyk*, José D. Bressan, Luis C. Fontana
PGCEM, UDESC, Brazil
- 15:00 S19-008 **A moving interface crack between two dissimilar functionally graded strips under plane deformation with integral equation methods**
 Zhanqi Cheng*
Zhengzhou University, China

S19-S3

Thursday June 20, 16:00–17:30

Room: 209A

Co-Chair: Xing Li (China), Leilei Cao (China)

- 16:00 S19-013 **Keynote Presentation**
A partially permeable mixed-mode crack embedded in a functionally graded magneto electro elastic layer
Mongi Rekik, Sami El-Borgi*, Zoubeida Ounaies
Texas A&M University at Qatar, Qatar
- 16:30 S19-003 **Buckling and post-buckling of a stiff film resting on an elastic graded substrate**
Yan Zhao*, Yanping Cao, Fei Jia, Xi-Qiao Feng, Shouwen Yu
Tsinghua University, China
- 16:50 S19-011 **Experimental investigations on the crack growth behavior in graded ferritic martensitic steel**
Tobias Stein*, Frank Zeismann, Angelika Brückner-Foit
University of Kassel, Germany
- 17:10 S19-009 **Three dimensional crack analysis in functionally graded material under thermal loading**
Parya Aghasafari, Vahid Arabzadeh*, Ali Daraei, Mahmoud Salimi
Mechanical Engineering, International Petroleum Structure Company, Tehran, Iran

S20-S1

Thursday June 20, 13:30–15:20

Room: 203A

Co-Chair: Antony P. Selvadurai (Canada), Thierry J. Massart (Belgium)

- 13:30 S20-004 **Keynote Presentation**
Effects of a newly incorporated stress-weakening term in a revised RSF on earthquake nucleation
Nobuki Kame*, Satoshi Fujita, Masao Nakatani, Tetsuya Kusakabe
The University of Tokyo, Japan
- 14:00 S20-002 **Subcritical crack propagation and coalescence induced by the oil-gas transformation**
Zhiqiang Fan, Zhihe Jin*, Scott E. Johnson
University of Maine, USA
- 14:20 S20-003 **On incorrectness in elastic rebound theory for cause of earthquakes**
Quentin Z.Q. Yue*
The University of Hong Kong, HongKong, China
- 14:40 S20-009 **Acoustic, electromagnetic and nuclear emissions as precursor phenomena for earthquakes forecasting**
Oscar Borla*, Giuseppe Lacidogna, Alberto Carpinteri
INRIM-National Research Institute of Metrology, Italy
- 15:00 S20-011 **The unacknowledged risk of avalanche triggering in the rapheme**
Nicola Pugno*
Università di Trento, Italy

S20-S2

Thursday June 20, 16:00–17:30

Room: 203A

Co-Chair: Nobuki Kame (Japan), Quentin Z.Q. Yue (China)

- 16:00 S20-007 **Keynote Presentation**
In-situ characterization of geomechanical properties using load tests
Antony P. Selvadurai*
McGill University, Montreal H3A 0C3, Canada
- 16:30 S20-006 **XFEM rapheme of degradation-permeability coupling in complex geomaterials**
Bernard Sonon, Bertrand François, Antony P.S. Selvadurai, Thierry J. Massart*
Université Libre de Bruxelles (ULB), Belgium
- 16:50 S20-008 **Some applications of fracture theory to instability problems of earthquake faults**
Tianyou Fan, Zhufeng Sun, Bojing Zhu*, Yaolin Shi
Key Laboratory of Computational Geodynamics, Chinese Academy of Science, China
- 17:10 S20-010 **Dynamic fracture associated with shallow dip-slip seismic faulting**
Koji Uenishi, Keisho Yamagami*, Ishida Fukutaro, Koji Fujimoto
The University of Tokyo, Japan

S21-S1

Monday June 17, 16:00–17:50

Room: 206B

Co-Chair: Sergey Panin (Russia), Yuling Zhang (China)

- 16:00 S21-009 **Keynote Presentation**
In-situ monitoring of fatigue of meta-stable austenitic steels with electromagnetic acoustic transducers (EMATs)
Dietmar Eifler*, Andreas Sorich, Marek Smaga, Iris Altpeter, Gerd Dobmann
University of Kaiserslautern, Germany
- 16:30 S21-001 **Fracture damage identification of pile using element strain energy method based on sensitive modals**
Wenjuan Yao, Xiaozhong Zhang*
Shanghai University, China
- 16:50 S21-002 **Theoretical and numerical study of symmetric, in-plane, free vibration of timoshenko portal frame with open crack**
Nikam Mangesh Satyavan, Kumar Sandeep, Murigendrappa S. M.*
National Institute of Technology Karnataka Surathkal, India
- 17:10 S21-003 **Accuracy of acoustic emission localization for monitoring masonry structures**
Jie Xu*, Qinghua Han, Giuseppe Lacidogna, Alberto Carpinteri
School of Civil Engineering, Tianjin University, China
- 17:30 S21-008 **A validation study for a new SHM technology called ICM under operational environment**
Zhi Wang*, Jingshan Li, Jiakun Cai
Beijing Aeronautical Technology Research Center, China

S21-S2

Tuesday June 18, 10:30–12:20

Room: 206B

Co-Chair: Dietmar Eifler (Germany), Murigendrappa S.M. (India)

- 10:30 S21-004 **Keynote Presentation**
Structural levels of deformation and fracture of carbon fiber reinforced composite: Analysis by optical and acoustic methods
Sergey Panin*, Mikhail Burkov, Anton Byakov, Pavel Lyubutin, Vladimir Titkov, Yurii Altukhov, Alexander Eremin
Lab of PCM, Russia
- 11:00 S21-005 **Dynamic monitoring of fatigue crack process of orthotropic steel bridge structure with acoustic emission**
Yuling Zhang*, Rong Qiao, Delian Kong, Wenyong Wang, Fengjing Xu, Weiping Dong
Railway Engineering Research Institute, China Academy of Railway Sciences, China
- 11:20 S21-006 **Development of a wireless sensor for simultaneous measurement of fatigue and corrosion**
Fang Yuan*, Takayuki Shiraiwa, Manabu Enoki, Tadashi Shinohara
The University of Tokyo, Japan
- 11:40 S21-007 **Near-threshold fatigue crack behavior of thin copper sheet and its application for structural health monitoring**
Takayuki Shiraiwa*, Manabu Enoki
The University of Tokyo, Japan
- 12:00 S21-010 **Correlation between acoustic emission and seismicity in the sacred mountain of varallo renaissance complex in Italy**
Alberto Carpinteri, Giuseppe Lacidogna, Amedeo Manuello, Gianni Niccolini, Federico Accornero*
Politecnico di Torino, Italy

S22-S1

Monday June 17, 16:00–17:50

Room: 205A

Co-Chair: Hui-Ji Shi (China), Vladimir I. Astafyev (Russia)

- 16:00 S22-008 **Keynote Presentation**
Effect of notch severity on thermomechanical fatigue life of a directionally-solidified Ni-base superalloy
Patxi Fernandez-Zelaia, Richard W. Neu*
Georgia Institute of Technology, USA
- 16:30 S22-001 **Measurement of internal stress and internal resistance resulting from creep of type 316H stainless steel**
Bo Chen*, David J. Smith, Peter E.J. Flewitt, Shu Yan Zhang
University of Bristol, UK
- 16:50 S22-002 **Creep fracture mechanism of polycrystalline Ni-based superalloy with diffusion coatings**
Kang Yuan*, Ru Lin Peng, Xin-Hai Li, Lennart Johansson, Sten Johansson, Yan-dong Wang
Linköping University, Sweden
- 17:10 S22-014 **Intrinsic factors controlling interfacial stability of thermal barrier coatings**
Rudder T. Wu*
National Institute for Materials Science, Tsukuba Science City, Japan
- 17:30 S22-019 **Creep-fatigue crack growth prediction in a gas turbine casing**
Esmaeil Poursaeidi, Amin Kavandi*, Khashayar Vaezi
University of Zanjan, Iran

S22-S2

Tuesday June 18, 10:30–12:20

Room: 205A

Co-Chair: Richard W. Neu (USA), Bo Chen (China)

- 10:30 S22-011 **Keynote Presentation**
Effects of MnS inclusions on creep damage of 2.25Cr-1Mo low alloy steel
Huiji Shi*, Hao Yang, Tao Yu
Tsinghua University, China
- 11:00 S22-003 **Creep and low cycle fatigue behaviors of an advanced heat resistant austenitic stainless steel**
Guocai Chai*
Sandvik Materials Technology, Sweden
- 11:20 S22-004 **Damage and fracture behaviors in advanced heat resistant materials during slow strain rate test at high temperature**
Mattias Calmunger*, Guocai Chai, Sten Johansson, Johan Moverare
Linköping University, Sweden
- 11:40 S22-005 **High temperature stress relaxation of a Ni-based single-crystal superalloy**
Mikael Segersäll*, Johan J. Moverare
Linköping University, Sweden
- 12:00 S22-006 **Modeling of inclined crack growth under creep conditions**
Vladimir I. Astafyev*, Alexey N. Krutov
Samara State University, Russia

S22-S3

Tuesday June 18, 16:00–17:30

Room: 205A

Co-Chair: Masaaki Tabuchi (Japan), Rudder T. Wu (Japan)

- 16:00 S22-013 **Keynote Presentation**
Mechanical behavior of polycrystals with heterogeneous grainboundary diffusion and sliding
Yujie Wei*, Allan Bower, Huajian Gao
Institute of Mechanics, Chinese Academy of Sciences, China
- 16:30 S22-009 **Tensile mechanical behavior of as-cast AA7050 alloy in the supersolidus temperature range**
Tungky Subroto*, Alexis Miroux, Dmitry G. Eskin, Andrew Marson, Kjerstin Ellingsen, Laurens Katgerman
Materials innovation institute (M2i), Delft University of Technology, The Netherlands
- 16:50 S22-010 **Orientation and temperature dependences on fatigue crack growth behavior of a Ni-base superalloy**
Yangyang Zhang*, Huiji Shi, Jialin Gu, Changpeng Li, Kai Kadau, Oliver Luesebrink
Tsinghua University, China
- 17:10 S22-024 **EPRI initiatives related to flexible operation of high temperature power plant**
Jonathan D. Parker*, John P. Shingledecker
EPRI, Charlotte NC 28262, USA

S22-S4

Wednesday June 19, 10:30–12:10

Room: 205A

Co-Chair: Yujie Wei (China), Jonathan D. Parker (USA)

- 10:30 S22-015 **Keynote Presentation**
Analysis of creep crack growth in surface cracked specimens: Comparisons between approaches of fracture mechanics and continuum damage mechanics
Jian-Feng Wen, Shan-Tung Tu*
East China University of Science and Technology, China
- 11:00 S22-022 **Keynote Presentation**
Creep-fatigue crack growth using digital image correlation
Jeffrey L. Evans*
University of Alabama in Huntsville, USA
- 11:30 S22-017 **Mechanical testing of a selective laser melted superalloy**
Hakan Brodin*, Olov Andersson, Sten Johansson
Linköping University, Sweden
- 11:50 S22-018 **Creep-fatigue interactions in P91 steel**
Magdalena Speicher*, Andreas Klenk, Kent Coleman
Materialpruefungsanstalt Universitaet Stuttgart, Germany

S22-S5

Wednesday June 19, 13:30–15:00

Room: 205A

Co-Chair: Jeffrey L. Evans (USA), Hakan Brodin (Sweden)

- 13:30 S22-023 **Keynote Presentation**
Creep strength of dissimilar welds for advanced USC boiler materials
Masaaki Tabuchi*, Hiromichi Hongo, Fujio Abe
Materials Reliability Unit, National Institute for Materials Science, Japan
- 14:00 S22-020 **A new method of introducing long range residual stresses to study creep crack initiation**
Anilkumar M. Shirahatti*, Yiqiang Wang, Christopher E. Truman, David J. Smith
University of Bristol, UK
- 14:20 S22-021 **Prediction of creep crack initiation under the interaction between long range residual stress and applied load**
Yiqiang Wang*, Anilkumar M. Shirahatti, Christopher Truman, David J. Smith
University of Bristol, UK
- 14:40 S22-025 **High-temperature corrosion of EB-PVD thermal barrier coatings with CMAS deposits**
Can Y. Cai*, Yi C. Zhou, Sheng Chang, Xiao X. Nie
Xiangtan University, China

S24-S1

Monday June 17, 16:00–17:50

Room: 209A

Co-Chair: Han Zhao (France), Peifeng Li (Singapore)

- 16:00 S24-007 **Keynote Presentation**
Strain rate concentration factor for double-edge-notched specimens subjected to high speed tensile loads
Nao-Aki Noda*, Yoshikazu Sano, Makoto Ando, Yoshihito Kuroshima, Takahiro Shinozaki, Hayato O-Tsuka, Wenhai Guan
Kyushu Institute of Technology, Japan
- 16:30 S24-001 **Experimental requirements of small and large scale dynamic fracture mechanics testing**
Wolfram Baer*
BAM Federal Institute for Materials Research and Testing, Germany
- 16:50 S24-003 **Metallic melt fracture and fragmentation under the high-current electron irradiation**
Polina N. Mayer*, Alexander E. Dudorov, Alexander E. Mayer
Chelyabinsk State University, Russia
- 17:10 S24-004 **Dynamics of fragmentation of fused quartz rods and plates**
Sergey Uvarov*, Marina Davydova, Oleg Naimark
Institute of Continuous Media Mechanics of Oral Branch of UB RAS, Russia
- 17:30 S24-009 **Analytical and numerical models for impact crater formation and penetration**
Vladimir Bratov*, Yuri Petrov
IPME RAS, Russia

S24-S2

Tuesday June 18, 10:30–12:00

Room: 209A

Co-Chair: Nao-Aki Noda (Japan), Sergey Uvarov (Russia)

- 10:30 S24-010 **Keynote Presentation**
Experimental observation of phase transformation front of SMA under impact loading
He Huang, Dominique Saletti, Stephane Patoffatto, Feifei Shi, Han Zhao*
ENS Cachan, France
- 11:00 S24-005 **Threshold fracture energy for differently shaped particles impacting halfspace (erosion-type fracture)**
Grigory A. Volkov*, Nikolay A. Gorbushin, Yuri V. Petrov
Institute of Problems of Mechanical Engineering RAS, Russia
- 11:20 S24-006 **Quantitative analysis of microcracks ensemble induced by shock-wave loading of metallic targets (vanadium and armko-iron)**
Elena A. Lyapunova*, Oleg B. Naimark, Sergey V. Uvarov
Institute of Continuous Media Mechanics of Ural Branch of RAS, Russia
- 11:40 S24-030 **Thermal-mechanical numerical simulation of explosive-charged projectile penetrating concrete targets**
Yan Q. Wu, Zhong Y. Zhang, Feng L. Huang, Hai J. Wu, Xin J. Wang*
Beijing Institute of Technology, China

S24-S3

Tuesday June 18, 16:00–17:50

Room: 209A

Co-Chair: Hualin Fan (China), Ying Liu (China)

- 16:00 S24-018 **Keynote Presentation**
Equivalent dynamic mechanical properties of grid cylindrical structure
Xiao Hu Lin, Qing Sheng Yang*
Beijing University of Technology, China
- 16:30 S24-012 **Pre-kinking analysis of a cracked piezoelectric strip under impact loadings**
Zengtao Chen*, Keqiang Hu
University of New Brunswick, Canada
- 16:50 S24-008 **Deformation and failure mechanisms in metallic microlattice structures manufactured by selective laser melting at various strain rates**
Peifeng Li*, Nik Petrinic, Clive R. Siviour
Nanyang Technological University, Singapore
- 17:10 S24-017 **Crack propagation in PMMA plates under various loading conditions**
Ivan V. Smirnov*, Yuri V. Sudenkov
St.Petersburg State University, Russia
- 17:30 S24-024 **Dynamic behavior of crumb rubber concrete subjected to repeated impacts**
Feng Liu*, Guixuan Chen, Lijuan Li
Guangdong University of Technology, China

S24-S4

Wednesday June 19, 10:30–12:00

Room: 209A

Co-Chair: Zengtao Chen (Canada), Chen-Wu Wu (China)

- 10:30 S24-028 **Keynote Presentation**
Energy absorption of hierarchical lattice truss materials
Hualin Fan*
Hohai University, China
- 11:00 S24-022 **Numerical simulations on the perforation of metal plates under normal impact by conical-nosed projectiles**
Qiaoguo Wu*, Heming Wen, Xuedong Chen
Hefei General Machinery Research Institute, China
- 11:20 S24-023 **Dynamic fracture of advanced ceramics under impact loading conditions using a miniaturized Kolsky bar**
Declan McNamara*, Patricia Alveen, Declan Carolan, Neal Murphy, Alojz Ivankovic
University College Dublin, Ireland
- 11:40 S24-029 **Analysis of the synergetic effects of blast wave and fragment on concrete bridge**
Haiqing Zhu*, Xiedong Zhang, Ying Li
Wuhan University of Technology, China

S24-S5

Wednesday June 19, 13:30–15:20

Room: 209A

Co-Chair: Michael N. Osipov (Russia), Zihai Shi (Japan)

- 13:30 S24-013 **Keynote Presentation**
Effect of strain rate on ductile fracture of advanced high strength steels
Matthieu Dunand, Christian C. Roth, Dirk Mohr*
Ecole Polytechnique, France
- 14:00 S24-019 **Mode I fracture toughness of nanorubber modified epoxy under high loading rate**
Ying-Gang Miao*, Hong-Yuan Liu, Hsiu-Hsien Wu, Yu-Long Li, Yiu-Wing Mai
Northwestern Polytechnical University, China
- 14:20 S24-020 **Low velocity perforation of an aluminum alloy: Experiments and simulations**
Léonard Antoinat*, Régis Kubler, Laurent Barrallier, Guillaume Achard, Jean-Luc Barou, Philippe Viot
Arts et Métier Paris Tech, Laboratoire MécaSurf, France
- 14:40 S24-021 **Penetration simulation of concrete targets by explosive-charged projectile for analyzing thermal-mechanical damage in explosives**
Yanqing Wu*, Fenglei Huang
Beijing Institute of Technology, China
- 15:00 S24-011 **Impact failure analysis of solder joint based on explicit dynamic method**
Yangjian Xu*, Chaochao Jin, Lihua Liang, Xiaogui Wang
Zhejiang University of Technology, China

S24-S6

Wednesday June 19, 16:00–17:50

Room: 209A

Co-Chair: Qingsheng Yang (China), Vladimir Bratov (Russia)

- 16:00 S24-016 **Keynote Presentation**
Digital speckle interferometry method for research of dynamic processes
Michael N. Osipov*, Anton N. Chekmenev, Yuriy D. Sheglov
Samara State University, Russia
- 16:30 S24-027 **Discrete crack analysis of concrete dams based on the time history of inertia force distributions of linear response analysis**
Masaaki Nakano, Yukari Nakamura, Zihai Shi*
R&D Center, Nippon Koei Co., Ltd., Japan
- 16:50 S24-014 **New investigation of dynamic lateral compression of ring by two rigid plates**
Ying Liu*, He-xiang Wu
Beijing Jiaotong University, China
- 17:10 S24-025 **Behavior of interface crack in layered structure under actions of both stress wave and residual stress**
Chenwu Wu*, Xinxin Cheng, Yuchen Yuan
Institute of Mechanics, Chinese Academy of Sciences, China
- 17:30 S24-026 **Experimental and numerical investigation of fibre-metal laminates during low-velocity impact loading**
Yu E. Ma, Haiwei Hu*
Northwestern Polytechnical University, China

S25-S1

Monday June 17, 16:00–17:10

Room: 205B

Co-Chair: Rui Huang (USA), Hao Chen (China)

- 16:00 S25-002 **Keynote Presentation**
Towards a quantitatively understanding of the effects of substrate inplane compression on the wrinkling mode transition in hyperelastic film/substrate bilayers
Yanping Cao*, Yan Zhao, Yi Jiang
Tsinghua University, China
- 16:30 S25-003 **Surface wrinkling phenomenon of a functionally graded cylinder**
Yanping Cao, Fei Jia*, Yan Zhao, Xi-Qiao Feng
Tsinghua University, China
- 16:50 S25-004 **Effect of higher order modes on creep buckling of viscoelastic plate**
Yuanxiang Sun*, Qihong Zhao, Lin Xu, Baoshan Huang, Cheng Wang
Beijing Institute of Technology, China

S25-S2

Tuesday June 18, 10:30–11:40

Room: 205B

Co-Chair: Yanping Cao (China), Yuanxiang Sun (China)

- 10:30 S25-007 **Keynote Presentation**
Wrinkling and delamination of thin films on compliant substrates
Rui Huang*
University of Texas at Austin, USA
- 11:00 S25-005 **Effect of plastic anisotropy on shear localization and fracture in automotive sheets**
Jidong Kang*, Raja K. Mishra, David S. Wilkinson
Canmet Materials, National Resources Canada, Canada
- 11:20 S25-006 **Crack growth stability analysis with respect to boundary disturbance**
Hao Chen*
Institute of Engineering Mechanics, China

S27

Inverse Problems

S27-S1

Thursday June 20, 13:30–14:30

Room: 407

Co-Chair: Weitao Sun (China), Zhihai Xiang (China)

- 13:30 S27-005 **Estimation of wheel/rail contact forces based on an inverse technique**
Tao Zhu*, Shoune Xiao, Guangwu Yang, Weihua Ma
Southwest Jiaotong University, China
- 13:50 S27-006 **Seismic inversion using full wavefield data**
Xiaoliang Duan*, Yibo Wang, Huizhu Yang
Tsinghua University, China
- 14:10 S27-002 **Full wave inversion realization in the mixed domain**
Cai Zhang*, Huizhu Yang, Yongke Han, Ying Hu
Tsinghua University, China

S27-S2

Thursday June 20, 16:00–17:10

Room: 407

Co-Chair: Giulio Maier (Italy), Lin Ye (Australia)

- 16:00 S27-004 **Keynote Presentation**
Study of multiscale global optimization based on parameter space partition
Weitao Sun*
Tsinghua University, China
- 16:30 S27-008 **Identification of female pelvic muscles' elastic moduli in vivo by inverse analysis**
R.W. Yao*, L. Du, L. Zhu, Z.H. Xiang, C. Chen, B. Hou, F. Feng
Tsinghua University, China
- 16:50 S27-009 **The attenuation and dispersion analyses in porous and fractured medium with arbitrary fracture fill**
Liyun Kong*, Boris Gurevich, Tobias M. Müller, Yibo Wang, Huizhu Yang
Tsinghua University, China

S28-S1

Wednesday June 19, 13:30–15:50

Room: 206B

Co-Chair: Dragos Apostol (Romania), Yi-Qi Wang (Korea)

- 13:30 S28-001 **Keynote Presentation**
Compressive behavior of honeycomb sandwich structure after impact
Fei Xu*, Yage Liu, Zhe Ji, Yi Wang
Northwestern Polytechnical University, China
- 14:00 S28-013 **Keynote Presentation**
New trends in the fracture of lightweight structures
Efsthathios E. Theotokoglou*
Department of Mechanics National Technical University of Athens Zographou Campus, Greece
- 14:30 S28-002 **Analyses of dynamic response and sound radiation of sandwich plate subjected to acoustic excitation under thermal environment**
Yuan Liu*, Yueming Li
Xi'an Jiaotong University, China
- 14:50 S28-011 **Thermal stability of microstructure and mechanical properties in ultrafined pure titanium**
Shankun Chen*, Qiaoyan Sun, Lin Xiao, Jun Sun
Xi'an Jiaotong University, China
- 15:10 S28-018 **Experimental and numerical study of failure mechanisms of syntactic foams under compression**
Ruoxuan Huang*, Peifeng Li, Zhiyong Wang
Nanyang Technological University, Singapore
- 15:30 S28-010 **Blast experiment on asymmetric metal hexagonal honeycomb sandwich plates**
Tao Wang*, Qinghua Qin, Wenli Yu, Jianxun Zhang, Tiejun Wang
Xi'an Jiaotong University, China

S28-S2

Wednesday June 19, 16:00–17:50

Room: 206B

Co-Chair: Fei Xu (China), Daolun Chen (Canada)

- 16:00 S28-003 **Keynote Presentation**
Characterization of mechanical and physical properties of silica aerogels using molecular dynamics simulation
Zishun Liu*, Jingjie Yeo, Jincheng Lei, Teng Yong Ng
Xi'an Jiaotong University, China
- 16:30 S28-022 **Low velocity impact behavior of aluminum and glass-fiber honeycomb structure**
Jinwoo Kim, Yi-Qi Wang*, Jung-II Song
Changwon National University, Korea
- 16:50 S28-017 **Fracture behavior and durability of lightweight high strength cementbased composites**
Liping Guo*, Bo Chen, Qingli Yang, Wei Huang, Junjiang Fan, Wenxiao Zhang
Southeast University, China
- 17:10 S28-012 **Size effects on compressive properties of aluminum hexagonal honeycombs**
Zhengjin Wang*, Qinghua Qin, Huimin Li, T.J. Wang
Xi'an Jiaotong University, China
- 17:30 S28-019 **Mechanism investigation of gas porosity induced fatigue damage on the fusion welded high strength aluminum alloy**
Shengchuan Wu*, Weihua Zhang
Southwest Jiaotong University, China

S28-S3

Thursday June 20, 10:30–12:20

Room: 206B

Co-Chair: Efstathios E. Theotokoglou (Greece), Tiejun Wang (China)

- 10:30 S28-004 **Keynote Presentation**
Effects of macro and micro-defects on the mechanical properties of porous metal fiber sintered sheets
Minzhao Jin, Changqing Chen*
Tsinghua University, China
- 11:00 S28-020 **Performance of sandwich components with chiral topology cores**
Marin Sandu, Adriana Sandu, Dan M. Constantinescu*, Sorohan Stefan, Dragos A. Apostol
University Politehnica of Bucharest, Romania
- 11:20 S28-021 **Design considerations for shape memory polymer composites with microvascular structures**
Kai Yu, Hang (Jerry) Qi*
University of Colorado, USA
- 11:40 S28-009 **Mechanical properties of natural fiber polyester composite sandwich panels**
Jie Lu*, Bing Yang, Nandika D'Souza, Sheldon Q. Shi
Harbin Engineering University, China
- 12:00 S28-006 **The effect of inner gas pressure on deformation of porous materials under multiaxial loading conditions**
Zhimin Xu*, Weixu Zhang, Tiejun Wang
Xi'an Jiaotong University, China

S28-S4

Thursday June 20, 13:30–15:40

Room: 206B

Co-Chair: Changqing Chen (China), Liping Guo (China)

- 13:30 S28-005 **Keynote Presentation**
Damage identification and influence on mechanical properties of closed cell rigid foams
Liviu Marsavina, Dan M. Constantinescu, Emanoil Linul, Tudor Voiconi, Dragos Apostol*
University Politehnica of Bucharest, Romania
- 14:00 S28-015 **Fatigue of dissimilar titanium alloy joints welded by electron beam**
Shiqing Wang, Daolun Chen*, Jinhe Liu
Ryerson University, Canada
- 14:20 S28-014 **Deformation mode maps of aluminum foam-filled corrugated sandwich panels under out-of-plane compression**
Bin Han*, Qiancheng Zhang, Tianjian Lu
Xi'an Jiaotong University, China
- 14:40 S28-016 **Simplified dynamic analysis of metal sandwich beams subjected to impulsive loadings**
Qinghua Qin*, Jianxun Zhang, Chao Yuan, Wang Tao, T. J. Wang
Xi'an Jiaotong University, China
- 15:00 S28-008 **Evaluation of microstructure effect on anisotropic mechanical properties of hot rolled AZ31 by AE analysis**
Kousuke Matsumoto*, Takashi Yasutomi, Manabu Enoki
The University of Tokyo, Japan
- 15:20 S28-007 **Optimal design of metallic corrugated sandwich plates to blast loading**
Jianxun Zhang*, Qinghua Qin, Weilong Ai, Tao Wang, Tiejun Wang
Xi'an Jiaotong University, China

S29-S1

Thursday June 20, 16:00–17:40

Room: 202B

Co-Chair: Baolin Wang (China), Lei Wang (China)

- 16:00 S29-003 **Keynote Presentation**
Thermal shock resistance of solids associated with non-classical heat conduction
Baolin Wang*, Jiecai Han
Harbin Institute of Technology, China
- 16:30 S29-005 **Keynote Presentation**
Tensile deformation behavior of a nickel-base superalloy under dynamic loads
Lei Wang*, Yang Liu, Xiu Song, Junchao Jin, Beiji Zhang
Northeastern University, China
- 17:00 S29-002 **The effect of temperature on cracks of ultra-high temperature ceramics**
Dingyu Li, Weiguo Li, Ruzhuan Wang*, Daining Fang
Chongqing University, China
- 17:20 S29-004 **Degradation in strength of silica fiber-reinforced phenolic resin composite under heat flux environment**
Jun Liang, Shengbo Shi*, Linjie Li
Harbin Institute of Technology, China

S30-S1

Wednesday June 19, 10:30–12:30

Room: 215

Co-Chair: Kazuhiko Sasagawa (Japan), Yuan Li (Japan)

- 10:30 S30-014 **Keynote Presentation**
Cracks on the eternal smile
Yapu Zhao*, Ziqian Wang
Institute of Mechanics, Chinese Academy of Sciences, China
- 11:00 S30-006 **Keynote Presentation**
MEMS stiction: contact mechanics and fracture mechanics approaches
Yin Zhang*, Yapu Zhao
Institute of Mechanics, Chinese Academy of Sciences, China
- 11:30 S30-007 **A modified couple stress nonlinear theory for Bernoulli–Euler microbeam**
Kun Huang*, Yajun Yin, Fan Yang, Qinshan Fan
Tsinghua University, China
- 11:50 S30-013 **Phase field model of crack propagation and application in Lithium ion battery**
Peng Zuo*, Yapu Zhao
Institute of Mechanics, Chinese Academy of Sciences, China
- 12:10 S30-005 **Monte Carlo simulation of fatigue crack initiation at elevated temperature**
Feifei He*, Cher Ming Tan, Shuai Zhang, Shuguang Cheng
Nanyang Technological University, Singapore

S30-S2

Wednesday June 19, 13:30–15:40

Room: 215

Co-Chair: Yonggang Meng (China), Yin Zhang (China)

- 13:30 S30-008 **Keynote Presentation**
Numerical study of allowable current density for electromigration damage of multilevel interconnection in integrated circuit
Kazuhiko Sasagawa*, Kazuhiro Fujisaki, Takahiro Yanagi
Hirosaki University, Japan
- 14:00 S30-016 **Core shell nanowire surface fastener used for the mechanical and electrical room temperature bonding**
Peng Wang*, Yang Ju, Atsushi Hosoi
Nagoya University, Japan
- 14:20 S30-002 **Electrical breakdown of a metallic nanowire mesh**
Yuan Li*, Hironori Tohmyoh, Masumi Saka
Tohoku University, Japan
- 14:40 S30-017 **Anchor design for microdevice fabricated by silicon-on-glass process based on bonding strength consideration**
Jun He*, Fang Yang, Danqi Zhao, Xian Huang, Wei Wang, Dacheng Zhang
Peking University, China
- 15:00 S30-003 **Growth of grass like architectures on Si substrate and its mechanism study**
Lijiao Hu*, Yang Ju, Hosoi Atsushi
Nagoya University, Japan
- 15:20 S30-018 **Experiments on the mechanical behavior of anodically bonded interlayer of Pyrex Glass/Al/Si**
Yunqun Hu*
Nanjing University of Aeronautics and Astronautics, China

S30-S3

Wednesday June 19, 16:00–18:00

Room: 215

Co-Chair: Yapu Zhao (China), Yunqun Hu (China)

- 16:00 S30-009 **Keynote Presentation**
Wear life test of silicon mems devices under different gas environments
Yonggang Meng*, Sihan Shen
Tsinghua University, China
- 16:30 S30-001 **Keynote Presentation**
Finite-size effect of carbon nanotube bundles (CNBs) on their effective mechanical behaviors: A numerical study
Wu-Gui Jiang*, Shao-Ming Peng, Hong-Ping Zhao
Nanchang Hangkong University, China
- 17:00 S30-011 **Study on radiation induced mechanical degradation of amorphous silicon carbide films**
Bo Meng*, Wei Tang, Xuhua Peng, Haixia Zhang
Peking University, China
- 17:20 S30-012 **Droplet ejection and liquid-solid separation from covered microfluidic systems**
Weiqiang Wang*, Thomas B. Jones
Nanjing University of Science and Technology, China
- 17:40 S30-010 **Fracture on infrared MEMS packaging**
Xiaoxiong Zhou*, Yongzheng Wen, Xiaomei Yu
Peking University, China

S31-S1

Tuesday June 18, 10:30–12:30

Room: 212A

Co-Chair: Jie Wang (China), Ruslan R. Balokhonov (Russia)

- 10:30 S31-015 **Keynote Presentation**
Structure of micro-crack population and damage evolution in concrete
Andrey P. Jivkov*
The University of Manchester, UK
- 11:00 S31-007 **Keynote Presentation**
The interphase elasto-plastic damaging model
Giuseppe Fileccia Scimemi, Giuseppe Giambanco*, Antonino Spada
Aerospace and Materials' Engineering-University of Palermo, Italy
- 11:30 S31-004 **Towards a better understanding of the FPZ evolution during fracture and damage in quasi-brittle materials using mesomodels**
Laura B. Rojas-Solano, Peter Grassl, David Grégoire*, Gilles Pijaudier-Cabot
University of Pau, France
- 11:50 S31-014 **Wave propagation analysis in brittle materials using a rate-dependent micromechanical damage model**
Qiu Hai Zuo, Luis E. Deganis, Gang Wang*
The University of Alabama in Huntsville, USA
- 12:10 S31-009 **Three-dimensional dislocation dynamics simulations of cyclic deformation in FCC metals**
Zhiqiang Wang*
University of North Texas, USA

S31-S2

Tuesday June 18, 16:00–18:00

Room: 212A

Co-Chair: Giuseppe Giambanco (Italy), David Grégoire (UK)

- 16:00 S31-011 **Keynote Presentation**
Multiscale crystal defect dynamics and simulations of dislocation and fracture
Shaofan Li*
University of California-Berkeley, USA
- 16:30 S31-002 **Keynote Presentation**
Phase field modeling of quasi-static crack propagation coupled ferroelectric domains wicking under electromechanical loading
Yong Ni*, A.K. Soh
University of Science and Technology of China, China
- 17:00 S31-008 **A meso-numerical model for damage evolution of 2D-C/SiC composites under tension loading**
Min-ge Duan, Fei Xu*, Zhong-bin Tang
Northwestern Polytechnical University, China
- 17:20 S31-016 **Meso-scale features and couple stresses in fracture process zone**
Craig N. Morrison*, Andrey P. Jivkov, John R. Yates
The University of Manchester, UK
- 17:40 S31-013 **Phase field modeling of dislocation transmission across a coherent interface**
Songlin Zheng*, Yong Ni, Linghui He
University of Science and Technology of China, China

S31-S3

Wednesday June 19, 10:30–12:20

Room: 212A

Co-Chair: Yong Ni (China), Zhiqiang Wang (China)

- 10:30 S31-003 **Keynote Presentation**
Phase field simulations on the nonlinear fracture of ferroelectric materials
Hongliang Gu, Jie Wang*
Zhejiang University, China
- 11:00 S31-012 **Three dimensional MPM modeling of ductile fracture based on a decohesion constitutive model**
Pengfei Yang, Yong Gan, Xiong Zhang, Zhen Chen, Yan Liu*
Tsinghua University, China
- 11:20 S31-001 **Micromechanical modeling and numerical simulation of ablation of 3D C/C composites**
Na Liu*, Qingsheng Yang
Beijing University of Technology, China
- 11:40 S31-017 **Virtual crack closure technique based on MSIM method**
Feng Su, Jie Wu*, Yongchang Cai
Tongji University, China
- 12:00 S31-005 **Mesoscale numerical analysis of deformation and fracture in coated materials**
Ruslan R. Balokhonov*, Varvara A. Romanova, Sergey A. Martinov
Institute of Strength Physics and Materials Science (ISPMS) SB RAS, Russia

S32-S1

Wednesday June 19, 13:30–15:20

Room: 212A

Co-Chair: Yuh J. Chao (China), Wanlin Guo (China)

- 13:30 S32-005 **Keynote Presentation**
Fracture initiation and size effect in V-notched structures under mixed mode loading
Pietro Cornetti*, Alberto Sapora, Alberto Carpinteri
Politecnico di Torino, Italy
- 14:00 S32-011 **Moiré interferometry for high temperature mixed mode fracture experiments**
Shaoqin Zhang*, Wanlin Guo, He Li, Huihua Zhang, Ying Deng, Qiong Wu, Qinghui Xiao, Peng Zhou
Nanchang Hangkong University, China
- 14:20 S32-013 **Coupled fracture mode associated with anti-plane loading of cracks and notches**
Filippo Berto*, Paolo Lazzarin, Andrei Kotousov
University of Padova, Vicenza
- 14:40 S32-023 **The effect of thickness on components of the non-singular T-stress under mixed mode loading**
Yu.G. Matvienko, A.S. Chernyatin*, I.A. Razumovsky, Hui-Ji Shi, Zhao-Xi Wang
Mechanical Engineering Research Institute of the Russian Academy of Sciences, Russia
- 15:00 S32-016 **Experimental and numerical analysis of mixed mode fracture**
Octavian Pop*, Mamadou Meite, Frédéric Dubois, Joseph Absi
Université de Limoges, France

S32-S2

Wednesday June 19, 16:00–17:50

Room: 212A

Co-Chair: Zhiliang Zhang (Norway), Xudong Qian (Singapore)

- 16:00 S32-034 **Keynote Presentation**
Constraint effect in fracture: Investigation of cruciform specimens using the J-A2 method
Larry W. Sharpe, Yuh J. Chao*
Tianjin University, China
- 16:30 S32-001 **Numerical study on crack-tip stress intensity factor for inclined crack emanating from the edge of a hole in finite-thickness plates**
Avinash N. Khadtare, Mohan Kumar N. M., Murigendrappa S.M.*
National Institute of Technology Karnataka, India
- 16:50 S32-002 **T-Stress estimation by the global approach for inclined notches under compression**
Mohammed Hadj Meliani*, Zitouni Azari, Guy Pluvinage, Yury Matvienko
Hassiba Benbouali University of Chlef, Algeria
- 17:10 S32-022 **The study of mixed-mode crack propagation by the method of caustics**
Guiyun Gao, Jie Zhou*, Zheng Li, Bin Fu
Peking University, China
- 17:30 S32-003 **I/II mixed mode fracture in rapheme**
Bin Zhang*
Nanjing University of Aeronautics and Astronautics, China

S32-S3

Thursday June 20, 10:30–12:20

Room: 212A

Co-Chair: Ming-Liang Zhu (China), Octavian Pop (France)

- 10:30 S32-010 **Keynote Presentation**
Various crack tip constraints and their effect on ductile crack growth
Zhiliang Zhang*
Norwegian University of Science and Technology, Norway
- 11:00 S32-012 **On mixed-mode fracture**
Simon S. Wang, Christopher M. Harvey, Liangliang Guan*, Huimin Xie
Loughborough University, UK
- 11:20 S32-018 **A CMOD-based hybrid J-R approach for mixed-mode specimens**
Wuchao Yang, Xudong Qian*
National University of Singapore, Singapore
- 11:40 S32-006 **Effect of thickness on fracture properties and a concept of equivalent thickness**
Chongmin She, Peishi Yu*, Wanlin Guo
Nanjing University of Aeronautics and Astronautics, China
- 12:00 S32-007 **Three-parameter descriptions for the three-dimensional stress field near the crack front**
Chongmin She*, Junhua Zhao, Wanlin Guo
Nanjing University of Aeronautics and Astronautics, China

S32-S4

Thursday June 20, 13:30–15:20

Room: 212A

Co-Chair: Shaoqin Zhang (China), Murigendrappa S.M. (India)

- 13:30 S32-015 **Keynote Presentation**
Solutions of the second elastic–plastic fracture mechanics parameter in test specimens under biaxial loading
Ping Ding, Xin Wang*
Carleton University, Canada
- 14:00 S32-008 **In-situ observation of mixed mode fatigue crack growth behavior in heat affected zone of a welded joint**
Ming-Liang Zhu*, De-Qiang Wang, Fu-Zhen Xuan, Shan-Tung Tu
East China University of Science and Technology, China
- 14:20 S32-019 **Simulation of mixed mode LCF crack propagation using cohesive zone models**
Huan Li*, Huang Yuan
University of Wuppertal, Germany
- 14:40 S32-033 **Experiments on cracks under spatial loading**
Hans A. Richard*, Alexander Eberlein, Nils-H. Schirmeisen
University of Paderborn, Germany
- 15:00 S32-017 **Cracks under mixed mode loading: Questions and solutions**
Hans Albert Richard*, Britta Schramm, Alexander Eberlein, Gunter Kullmer
University of Paderborn, Germany

S33-S1

Thursday June 20, 10:30–12:00

Room: 405

Co-Chair: Zengtao Chen (Canada), Yunxin Gao (UK)

- 10:30 S33-001 **Keynote Presentation**
Fracture analysis in plane piezoelectric media using hybrid finite element model
Hui Wang, Qing-Hua Qin*
Australian National University, Australia
- 11:00 S33-011 **Three-dimensional annular saturated crack propagation in ultralow permeability rock under wave and electro-magneto-thermo-elastic fields**
Bojing Zhu*, Yaolin Shi*
Key Laboratory of Computational Geodynamics of Chinese Academy of Sciences, China
- 11:20 S33-012 **Interaction between an annular crack and the imperfect interface in magneto-electroelastic layers**
Yansong Li*, Longjiang Bian, Jun Li
Hebei University of Engineering, China
- 11:40 S33-013 **Numerical simulations of interface cracks in layered magneto-electroelastic solids under dynamic loadings**
Michael Wünsche*, Chuanzeng Zhang, Jan Sladek, Vladimir Sladek
University of Siegen, Germany

S33-S2

Thursday June 20, 13:30–15:30

Room: 405

Co-Chair: Qing-Hua Qin (Australia), Yansong Li (China)

- 13:30 S33-015 **Keynote Presentation**
Multivariable-coupling in ferroelectric field effect transistor
Y. C. Zhou*
Xiangtan University, China
- 14:00 S33-007 **Keynote Presentation**
Finite element method for plane problems with cracks in icosahedral quasicrystals
Lianzhi Yang, Liangliang Zhang, Yang Gao*
China Agricultural University, China
- 14:30 S33-008 **J-integral calculation of nonlinear fracture for colloidal soft material**
Hongyan Wang*, Jun Lei, Qingsheng Yang
Beijing University of Technology, China
- 14:50 S33-009 **Numerical method to transient elastodynamic plane crack for piezoelectric solids**
Peng Zhao*, Taiyan Qin
China Agricultural University, China
- 15:10 S33-004 **On the biaxial dynamic fracture of magneto-electro-elastic composites**
Pei-Wei Zhang*
Southeast University, China

S33-S3

Thursday June 20, 16:00–17:30

Room: 405

Co-Chair: Yang Gao (China), Pei-Wei Zhang (China)

- 16:00 S33-014 **Keynote Presentation**
Applications of mechanics in development of superconducting magnets
Yunxin Gao*, Nicholas Dalton
Siemens PLC, UK
- 16:30 S33-003 **Thermo-elastic analysis of a cracked substrate bonded to a coating using the hyperbolic heat conduction theory**
Zengtao Chen*, Keqiang Hu
University of New Brunswick, Canada
- 16:50 S33-006 **Numerical simulations of thermo-electro-magnetic phenomena in YBCO films subjected to strains**
Jing Xia*, Youhe Zhou
Lanzhou University, China
- 17:10 S33-010 **Pre-kinking analysis of a mixed-mode crack in a magneto-electroelastic layer**
Keqiang Hu*, Zengtao Chen
University of New Brunswick, Canada

S34-S1

Wednesday June 19, 13:30–15:20

Room: 207

Co-Chair : Xide Li (China), Lucien Lairinandrasana (France)

- 13:30 S34-003 **Keynote Presentation**
Towards molecularly informed traction-separation relations
Seung R. Na, Zhiyi Cao, Kenneth M. Liechti*
University of Texas, USA
- 14:00 S34-001 **Micromechanical rapheme of advanced ceramics**
Patricia Alveen, Declan McNamara*, Declan Carolan, Neal Murphy, Alojz Ivankovic
University College Dublin, Ireland
- 14:20 S34-002 **Experimental investigation on deformation and failure of rock under cyclic indentation**
Hao Zhang*, Haipeng Song, Yilan Kang, Ganyun Huang
Tianjin University, China
- 14:40 S34-019 **Regularities of multiparticle interactions in random structures, damage and failure of unidirectional glass-epoxi plastics under multiaxial proportional loading**
Alexey Vyacheslavovich Zaitsev, Anton Vladimirovich Kisilitsyn*, Vitaliy Sergeevich Koksharov, Yuriy Viktorovich Sokolkin
Perm National Research Polytechnic University, Russia
- 15:00 S34-008 **Mode II and III interface cracking in copper-graphite composite**
Shi-jun Guo*, Qing-sheng Yang
Beijing University of Technology, China

S34-S2

Wednesday June 19, 16:00–18:00

Room: 207

Co-Chair: Huimin Xie (China), Kazuki Shibanuma (Japan)

- 16:00 S34-014 **Keynote Presentation**
Experimental study on propagation rule of semi-elliptical surface crack on steel plate strengthened with FRP under bending loads
Chuanyu Zhao, Peiyan Huang*, Fajuan Feng
South China University of Technology, China
- 16:30 S34-017 **Keynote Presentation**
Fracture toughness of SE(B) specimens of steel in the presence of splitout
Pablo J. Lara Melcher, Enrique M. Castrodeza*
COPPE/Federal University of Rio de Janeiro, Brazil
- 17:00 S34-005 **Investigation of the fracture behavior of Tungsten at the micro scale**
Nicola J. Schmitt*, Christoph Bohnert, Christoph Eberl, Oliver Kraft, Sabine M. Weygand
Karlsruhe Institute of Technology (KIT), Germany
- 17:20 S34-006 **Thermal fatigue behavior of Au interconnects under alternating current loading**
Xue Ling*, Xide Li
Tsinghua University, China
- 17:40 S34-016 **A self-consistent model in the local residual stress evaluation of 316H stainless steel**
Jianan Hu*, Bo Chen, David Smith, Peter Flewitt, Alan C.F. Cocks
University of Oxford, UK

S34-S3

Thursday June 20, 10:30–12:10

Room: 207

Co-Chair: Yilan Kang (China), Kenneth M. Liechti (USA)

- 10:30 S34-009 **Prediction model of cleavage fracture toughness of ferrite steel**
Kazuki Shibamura*, Shuji Aihara, Motoyuki Matsubara, Hiroyuki Shirahata, Tsunehisa Handa
The University of Tokyo, Japan
- 10:50 S34-010 **Multiscale 3D ductile fracture simulation integrating tomographic characterization**
Shan Tang*, Adrian M. Kopacz, Stephanie Chan, Greg B. Olson, Wing Kam Liu
Chongqing University, China
- 11:10 S34-013 **Investigation of grain-scale surface deformation of a pure aluminum polycrystal through kinematic-thermal full-field coupling measurement**
Xiaogang Wang*, Jean-Francois Witz, Ahmed El Bartali, Philippe Dufrenoy, Eric Charkaluk
Laboratoire de Mécanique de Lille-CNRS UMR 8107, France
- 11:30 S34-018 **Local approach of fracture on semi-crystalline polymers: Contribution of X-ray laminography technique**
Lucien Laiarinandrasana*, Thilo F. Morgeneyer, Henry Proudhon, Lukas Helphen
Mines PariTech Centre des Matériaux – CNRS UMR, France
- 11:50 S34-015 **Numerical analysis of K_I of semi-elliptical surface crack on X80 steel plate strengthened with FRP under tensile load**
Chuanyu Zhao, Peiyan Huang*, Fajuan Feng
South China University of Technology, China

S35-S1

Wednesday June 19, 16:00–17:40

Room: 208B

Co-Chair: Mikhail D. Starostenkov (Russia), Ming Wang Fu (Hong Kong, China)

- 16:00 S35-004 **Keynote Presentation**
Flaw insensitive fracture in nanocrystalline rapheme
Xiaoyan Li*, Teng Zhang, Huajian Gao
Tsinghua University, China
- 16:30 S35-005 **Keynote Presentation**
On fatigue mechanisms of fcc-structured metal films at nanoscales
Guang-Ping Zhang*, Xue-Mei Luo, Xiao-Fei Zhu, Bin Zhang, Ting-Yu Xiao
Institute of Metal Research, Chinese Academy of Sciences, China
- 17:00 S35-003 **Grain misorientation and grain-boundary rotation dependent mechanical properties in polycrystalline rapheme**
Jiangtao Wu*, Yujie Wei
Institute of Mechanics, Chinese Academy of Sciences, China
- 17:20 S35-008 **General relationship between strength and hardness**
Peng Zhang*, Shouxin Li, Zhefeng Zhang
Institute of Metal Research, Chinese Academy of Sciences, China

S35-S2

Thursday June 20, 10:30–12:00

Room: 208B

Co-Chair: Xiaoyan Li (China), Yingjun Gao (China)

- 10:30 S35-007 **Keynote Presentation**
Driving forces on micro/nano curved surfaces
Yajun Yin*, Jiye Wu, Qinshan Fan
Tsinghua University, China
- 11:00 S35-006 **Keynote Presentation**
Analyzing cleavage processes by micrometer-sized specimen testing
Stefan Wurster*, Reinhard Pippan
Erich Schmid Institute of Materials Science of the Austrian Academy of Sciences, Austria
- 11:30 S35-014 **A molecular dynamics study of fracture criteria at the nanoscale**
Heiko Krull, Huang Yuan*
University of Wuppertal, Germany
- 11:50 S35-013 **A hybrid model of intergranular and transgranular ductile fracture prediction in micro forming deformation**
Ming Wang Fu*, Jia Qi Ran
The Hong Kong Polytechnic University, Hong Kong, China

S35-S3

Thursday June 20, 13:30–15:10

Room: 208B

Co-Chair: Stefan Wurster (Austria), Guang-Ping Zhang (China)

- 13:30 S35-009 **Keynote Presentation**
Orientation anisotropy of deformation and fracture of nanofibres of the ordered alloys with tetragonal symmetry L10 superstructure
Mikhail D. Starostenkov*, Alexander V. Yashin, Sergey V. Pomanovskiy, Sergey V. Bovkush, Andrey V. Krasnokutskiy
Altai State Technical University, Russian Federation
- 14:00 S35-012 **Keynote Presentation**
Homogenization and effective strength of ductile nanoporous materials
Djimedo Kondo*, Vincent Monchiet, Luc Dormieux
Institut D'Alembert, UMR 7190 CNRS, UPMC, France
- 14:30 S35-016 **Mixed-mode crack initiation at the edge of Cu/Si interface in nanoscale components**
Yabin Yan*, Kohei Kishimoto, Takashi Sumigawa, Takayuki Kitamura
Institute of Structural Mechanics, China Academy of Engineering Physics, China
- 14:50 S35-002 **Structural properties of diesel oil thin films confined in solid surfaces by Molecular dynamics simulations**
Cang Xu, Huiqing Lan*
Beijing Jiaotong University, China

S35-S4

Thursday June 20, 16:00–17:30

Room: 208B

Co-Chair: Djimedo Kondo (France), Peng Zhang (China)

- 16:00 S35-010 **Keynote Presentation**
Phase-field-crystal modeling for microcrack propagation and branching of ductile materials
Yingjun Gao*
Guangxi University, China
- 16:30 S35-001 **Nano-fracture mechanics experiments using the scanning force microscope**
Dariusz M. Jarzabek*, Zygmunt Rymuza, Helmut Schiff, Thomas A. Jung
Institute of Fundamental Technological Research, Polish Academy of Sciences, Poland
- 16:50 S35-015 **Micro-cutting tests: A new way to measure the fracture toughness and yield stress of polymeric nanocomposites**
Hongjian Wang*, Li Chang, Lin Ye, Gordon Williams
The University of Sydney, Australia
- 17:10 S35-011 **Micro-scale testing to evaluate the fracture characteristics of thermally exposed thermal barrier coatings**
Dong Liu*, Peter E. J. Flewitt
University of Bristol, UK

S36-S1

Thursday June 20, 10:30–12:00

Room: 215

Co-Chair: Yuan Li (Japan), Dragos A. Apostol (Romania)

- 10:30 S36-016 **Keynote Presentation**
Cap effect on pull-out behavior of CNT in CNT-reinforced nanocomposites
Ning Hu*, Yuan Li, Sen Liu
Chiba University, Japan
- 11:00 S36-001 **Compression of copper nanosphere by molecular dynamics**
Jianjun Bian*, Gangfeng Wang
Xi'an Jiaotong University, China
- 11:20 S36-002 **Fracture behaviour and toughening mechanisms of unsaturated polyester-based clay anocomposites**
M.T. Albdiry*, B.F. Yousif, H. Ku
University of Southern Queensland (USQ), Australia
- 11:40 S36-003 **Mode I interlaminar fracture toughness and fatigue delamination growth of CF/EP laminates modified by nano-silica and liquid rubber**
Jianing Zhang*, Shiqiang Deng, Lin Ye, Zhong Zhang
The University of Sydney, Australia

S36-S2

Thursday June 20, 13:30–15:10

Room: 215

Co-Chair: Ning Hu (Japan), Huiming Ning (Japan)

- 13:30 S36-012 **Fatigue and fracture behavior of columnar grained Cu with preferentially oriented nanoscale twins**
Qingsong Pan*, Qihong Lu, Lei Lu
Institute of Metal Research, Chinese Academy of Sciences, China
- 13:50 S36-010 **Mechanics analysis of CNT based on an orthotropic shell model considering transverse shear deformation**
Bin Gu*, Weifeng Yuan, Youjun Ning
School of manufacturing Science and Engineering, SWUST, China
- 14:10 S36-007 **Improvement of interlaminar mechanical properties of CARALL based on nanofiller interface reinforcement and other fabrication techniques**
Huiming Ning*, Ning Hu
Chiba University, Japan
- 14:30 S36-004 **Evaluation on the factors influencing thermal stress-induced growth of metallic nanowires**
Yuan Li*, Kentaro Miura, Shien Ri, Masumi Saka
Tohoku University, Japan
- 14:50 S36-014 **Mechanical behavior of Aluminum/Silicon nanocomposite thin film using molecular dynamics simulation**
Dan Huang*, Jingjing Zhao, Qing Zhang
Hohai University, China

S36-S3

Thursday June 20, 16:00–17:30

Room: 215

Co-Chair: Dan Huang (China), Bin Gu (China)

- 16:00 S36-006 **Keynote Presentation**
Toughness enhancement in nanocomposite thermosets with application to carbon-epoxy system
Catalin R. Picu, Dan M. Constantinescu*, Marin Sandu, Dragos A. Apostol, Ioana Cosmoiu
University Politehnica of Bucharest, Romania
- 16:30 S36-013 **Structure and magnetic properties of perovskite LaFeO₃ nanocrystals synthesized via reverse micelle technique**
Abdullah A. Saad*, Wasi Khan, Pooja Dhiman, A. H. Naqvi, M. Singh
Aligarh Muslim University, India
- 16:50 S36-015 **Stress relaxation of nanotwinned copper at different temperature**
Xu Sheng Yang*, Guo Yong Wang, Tong Yi Zhang
Hong Kong University of Science and Technology, Hong Kong, China
- 17:10 S36-017 **Deformation and failure of rapheme sheet and rapheme-polymer interface**
Mingchao Wang*, Cheng Yan, Ning Hu
Queensland University of Technology, Australia

S37-S1

Tuesday June 18, 16:00–17:30

Room: 211

Co-Chair: Lixun Cai (China), Andrey A. Lependin (Russia)

- 16:00 S37-003 **Keynote Presentation**
Stress concentration based on non-linear motion equations and its application for non-destructive detection of plate
Jianhua Xiao*, Jingjing Wang
Henan Polytechnic University, China
- 16:30 S37-004 **Based on micromechanical damage of Q345 specimen's acoustic emission quantitative assessment in tensile process**
Ying Zhang*, Zixing Wang, Junpeng Zhou, Ailing Liu
Northeast Petroleum University, China
- 16:50 S37-009 **An approach for full-range true stress-strain curves of materials based on vic-3D technology and FEA method**
Di Yao*, LiXun Cai
Southwest Jiaotong University, China
- 17:10 S37-002 **Estimating uniaxial constitutive relationships of materials by using double-hardness indentation method**
Hui Chen*, Li-Xun Cai, Chen Bao
Southwest Jiaotong University, China

S37-S2

Wednesday June 19, 10:30–11:30

Room: 211

Co-Chair: Jianhua Xiao (China), Ying Zhang (China)

- 10:30 S37-008 **Acoustic emission evaluation of fracture characteristics in thermal barrier coatings under bending**
Li Yang*, Zhi-chun Zhong, Jing You, Yi-chun Zhou
Xiangtan University, China
- 10:50 S37-006 **Damage size identification method based on Lamb waves**
Jianlin Chen*, Zheng Li, Bing Li
Peking University, China
- 11:10 S37-007 **Some statistical parameters of acoustic emission signals in porous iron under static loading**
Victor V. Polyakov, Aleksandr V. Egorov, Andrey A. Lependin*
Altay State University, Russia

S38-S1

Tuesday June 18, 16:00–18:00

Room: 205B

Co-Chair: Tianyou Fan (China), Brian Nyyvang Legarth (Denmark)

- 16:00 S38-016 **Keynote Presentation**
Nonlinear fracture mechanics of metal foams
Tianyou Fan*, Ridong Liao, Lingyun Xie, Linfeng Sun
Beijing Institute of Technology, China
- 16:30 S38-008 **Keynote Presentation**
Roles of cohesive-length scales for intrinsic and extrinsic toughening
M. D. Thouless*, R.B. Sills
University of Michigan, USA
- 17:00 S38-001 **Damage evolution model based on acoustic emission series**
Li Wang*, Jinsheng Ye, Dahu Rui, Jianhui Yang
Henan Polytechnic University, China
- 17:20 S38-009 **A homogenized model for delamination growth in laminated shells with cohesive interfaces**
Roberta Massabo*, Francesca Campi
DICCA and MaST, University of Genova, Italy
- 17:40 S38-006 **A. FEM for progressive damage evolution in laminated composites**
Wei Liu*, Qingda Yang, Xianyue Su
Peking University, China

S38-S2

Wednesday June 19, 10:30–12:30

Room: 205B

Co-Chair: Qingda Yang (USA), Roberta Massabo (Italy)

- 10:30 S38-002 **Keynote Presentation**
An efficient augmented finite element method for arbitrary cracking and crack interaction in heterogeneous solids
Qingda Yang*, Wei Liu, Xian-Yue Su, Dao-sheng Ling
University of Miami, USA
- 11:00 S38-007 **Keynote Presentation**
Overall mechanical behavior of nanocrystalline materials accompanied by crack initiations and propagations on grain boundaries
Li Chen, Yueguang Wei*
Institute of Mechanics, Chinese Academy of Science, China
- 11:30 S38-003 **Analysis of resistance cracking process on the experiment of meso and macroscopic of quasi-brittle materials**
Limin Wang*, Shilang Xu, Donghuan Zhang, Dehu Yu
Qingdao Technological University, China
- 11:50 S38-004 **The method of matched asymptotic expansion applied to a steadily propagating crack in a viscous material: Revisiting the Hui Riedel solution**
Radhi Abdelmoula*, Gilles Debruyne, Jia Li
LSPM, Paris XIII University, France
- 12:10 S38-010 **The mechanical fracture characterization of non-linear flexible ceramics using digital image correlation**
Younes Belrhiti, Ion Octavian Pop*, Pasca Doumalin, Jean-Christophe Dupre, Thomas Auer, Dietmar Gruber, Harald Harmuth, Marc Huger, Thierry Chotard
GEMH, CEC, Université de Limoges, France

S38-S3

Wednesday June 19, 13:30–15:20

Room: 205B

Co-Chair: Krishnaswamy Ravi-Chandar (USA), Radhi Abdelmoula (France)

- 13:30 S38-015 **Keynote Presentation**
Ductile fracture in polycrystalline materials: A multiscale investigation
Andrew Gross, William F. Hickey, Krishnaswamy Ravi-Chandar*
University of Texas, USA
- 14:00 S38-011 **On fracture toughness JIC testing of martensitic stainless steels**
Jianqiang Chen*, Yves Verreman, Jacques Lantaigne
Ecole Polytechnique de Montréal, Canada
- 14:20 S38-013 **Numerical modeling and analysis of dynamic crack propagation in rubber**
Elsiddig Elmukashfi*, Martin Kroon
Royal Institute of Technology, Sweden
- 14:40 S38-014 **Fracture of anisotropic materials with plastic strain-gradient effects**
Brian Nyvang Legarth*
Technical University of Denmark, Denmark
- 15:00 S38-017 **Crack delopment and dynamic nature of crack propagation in structures**
Subhash Chanda*
A.C.College, Jalpaiguri, India

S39-S1

Wednesday June 19, 16:00–17:50

Room: 205A

Co-Chair: Jizeng Wang (China), Zhenyu Yang (China)

- 16:00 S39-002 **Keynote Presentation**
Superelasticity, superplasticity, and superrigidity at the nanoscale
Changqing Sun*
Xiangtan University, China
- 16:30 S39-007 **Nature's design of hierarchical superhydrophobic surfaces of a water strider for low adhesion and low energy dissipation**
Yewang Su, Baohua Ji*, Yonggang Huang, Keh-Chih Hwang
Beijing Institute of Technology, China
- 16:50 S39-003 **A comparative study of atomic-scale structure evolution for metallic glass: The effect of composition and cooling rate**
Congling Li, Yujie Wei, Xinghua Shi*
Institute of Mechanics, Chinese Academy of Sciences, China
- 17:10 S39-001 **Wrinkling and vacancy defects in graphite induced by high-energy irradiation**
Xiao-Yi Liu, Feng-Chao Wang*, Heng-An Wu
University of Science and Technology of China, China
- 17:30 S39-008 **Formation of debris clouds produced by hypervelocity impact of icy droplet on the aerospace structure**
Quanzi Yuan*, Ya-Pu Zhao
Institute of Mechanics, Chinese Academy of Sciences, China

S39-S2

Thursday June 20, 10:30–12:00

Room: 205A

Co-Chair: Changqing Sun (China), Fuping Yuan (China)

- 10:30 S39-009 **Keynote Presentation**
Crack and fracture theory of liquid crystals and quasicrystals
Tian-You Fan*
Beijing Institute of Technology, China
- 11:00 S39-021 **Effect of diffusion-induced bending on diffusion-induced stress near the end faces of an elastic hollow cylinder**
Fuqian Yang*
University of Kentucky, USA
- 11:20 S39-010 **Analysis of failure waves with an elasto-statistical-brittle model**
Zhijie Jiang*, Mengfen Xia, Haiying Wang
Institute of Mechanics, Chinese Academy of Sciences, China
- 11:40 S39-020 **Low-energy ion irradiation effects on the mechanical behaviors of β -SiC ceramics**
Zhenyu Yang*, Zixing Lu
BeiHang University, China

S39-S3

Thursday June 20, 13:30–15:40

Room: 205A

Co-Chair: Ya-Pu Zhao (China), Jianshan Wang (China)

- 13:30 S39-015 **Keynote Presentation**
Fracture of low-dimensional nanomaterials
Wanlin Guo*, Yufeng Guo, Chun Tang, Liangzhi Kou
Nanjing University of Aeronautics and Astronautics, China
- 14:00 S39-014 **Mechanics of semiflexible polymer chains under confinements**
Jizeng Wang*, Runhua Li
Lanzhou university, China
- 14:20 S39-012 **Fracture problem of the thin superconducting strip with transverse crack**
Cun Xue*, An He, Huadong Yong, Youhe Zhou
Lanzhou University, China
- 14:40 S39-013 **Fracture behaviors under electromagnetic force with field-dependent critical current in thin superconducting films**
An He*, Cun Xue, Huadong Yong, Youhe Zhou
Lanzhou University, China
- 15:00 S39-011 **Elasto-plastic wave propagation on short-duration loading**
Magomedova Daria Kurbanovna*
Saint Petersburg State University, Russia
- 15:20 S39-005 **Initiation and interaction of a pulse beam of xenon ions with an obstacle**
Mviktor A. Orozov, Yurii V. Petrov, Anton A. Lukin*, Viktor M. Kats, Vladimir A. Bratov, Sergei I. Fedoseenko
St. Petersburg State University, Russia

S39-S4

Thursday June 20, 16:00–17:30

Room: 205A

Co-Chair: Wanlin Guo (China), Anton A. Lukin (Russia)

- 16:00 S39-004 **Keynote Presentation**
Mechanics and physics of chirality transfer
Jianshan Wang*
Tianjin University, China
- 16:30 S39-017 **Spiral and croissant cracks in drying thin films**
Joel Marthelot*, Benoit Roman, Jose Bico, Jeremie Teisseire, Davy Dalmas, Francisco Melo
PMMH, ESPCI ParisTech, France
- 16:50 S39-019 **Shock response of nanotwinned copper from large-scale molecular dynamics simulations**
Fuping Yuan*, Xiaolei Wu
Institute of Mechanics, Chinese Academy of Sciences, China
- 17:10 S39-018 **Fracture of metallic ring samples under magnetic pulse shock action**
Viktor A. Morozov, Yurii V. Petrov, Anton A. Lukin, Viktor M. Kats, Svetlana A. Atroshenko*, Georgii D. Fedorovskii
St. Petersburg State University, Russia

S40-S1

Thursday June 20, 10:30–12:20

Room: 210A

Co-Chair: Ming Gao (USA), Oleh Yasniy (Ukraine)

- 10:30 S40-015 **Keynote Presentation**
Constitutive rapheme and computational simulations of the external pressure induced buckling collapse of HDPE liners
Patricia María Frontini*, Juan Pablo Torres, Federico Rueda
University of Mar del Plata, Argentina
- 11:00 S40-003 **The elastic-plastic limit pressure of cylinder under internal pressure dependent on a new yield criterion**
Xiaoyu Liu, Zheng Yang*, Shanshan Huang
Xi'an Jiaotong University, China
- 11:20 S40-002 **On kinetics of “diffusion” cracks and delaminations**
Ilya N. Dashevskiy*
Institute for Problems in Mechanics of the Russian Academy of Sciences, Russia
- 11:40 S40-007 **Thermal stress intensity factors calculation for deepest and surface points of semi-elliptical crack in cylinders under linear gradient thermal load by two dimensional weight function**
Rahmatollah Ghajar*, Hamed Saeidi Gooagarchin
K.N. Toosi University of Technology Pardis St., Iran
- 12:00 S40-001 **Crack tip constraint effect on fracture toughness and its application in pipeline strain-based design**
Da-Ming Duan*
Trans Canada Pipelines Ltd, Canada

S40-S2

Thursday June 20, 13:30–15:40

Room: 210A

Co-Chair: Zheng Yang (China), Zhongjun Ren (China)

- 13:30 S40-011 **Keynote Presentation**
Critical strain-based ductile damage criterion and its application to mechanical damage in pipelines
Ming Gao*, Ravi Krishnamurthy, Udayasankar Arumugam, Samarth Tandon
Blade Energy Partners, USA
- 14:00 S40-010 **Finite element analysis on burst pressure of steel pipes with corrosion defects**
Nasrul Azuan Alang*, Norhaida Ab Razak, Khairidz Azuwar Shafie', Ahmad Syahrizan Sulaiman
Universiti Malaysia Pahang, Malaysia
- 14:20 S40-014 **Improved exploitation of high-strength steels in pressure vessel design by simulations based on damage mechanics**
Victoria Brinnel*, Christian Schruoff, Sebastian Münstermann
RWTH Aachen University, Germany
- 14:40 S40-009 **Experimental and numerical analyses of dynamic behaviors of decompression and crack propagation/arrest in underwater pipelines**
Hiroaki Nakai*, Kazuki Shibamura, Shuji Aihara, Masatoshi Tsukamoto
The University of Tokyo, Japan
- 15:00 S40-006 **Research on four-point bend fatigue property for heterogeneous joint of marine riser**
Zhaohui Yu*, En Dang, Long Yang, Jing Niu, Jianxun Zhang
Xi'an Jiaotong University, China
- 15:20 S40-004 **Influence of flaw configuration on the critical strength of a wallthinned straight pipe**
M. Tsuji*, T. Meshii
University of Fukui, Japan

S40-S3

Thursday June 20, 16:00–17:50

Room: 210A

Co-Chair: Yinghua Liu (China), Da-Ming Duan (China)

- 16:00 S40-019 **Keynote Presentation**
Effects of specimen geometry and mode loading on crack growth resistance curves of x80 pipeline girth welds
Claudio Ruggieri*
University of Sao Paulo, Brazil
- 16:30 S40-012 **API 579 G-factors for K calculations and improvements for assessment of crack-like flaws in pipelines**
Shaikh Rahman, Ming Gao*, Ravi Krishnamurthy
Blade Energy Partners, USA
- 16:50 S40-017 **The influence of temperature on the fatigue crack growth rate in the material of thermal power plant steam superheater collector**
Oleh Yasniy*, Vitaly Brevus, Andriy Sobchak, Vasyl Nemchenko
Ternopil Ivan Pul'uj National Technical University, Ukraine
- 17:10 S40-005 **Finite element investigation of speed dependent dynamic fracture toughness of X80 line pipe steel**
Zhongjun Ren*, Chongqing Ru, Daming Duan
Hunan University of Science and Technology, China

S41-S1

Monday June 17, 16:00–18:00

Room: 203A

Co-Chair: Ken-ichi Manabe (Japan), Juan Zhang (China)

- 16:00 S41-003 **Keynote Presentation**
Experimental investigations on the cyclic behavior and fatigue of extruded 2017 aluminum alloy
Abdelghani May, Lakhdar Taleb*, Mohamed El Amine Belouchrani
Mechanics, INSA, France
- 16:30 S41-005 **Keynote Presentation**
Experimental investigation on rapheme y behaviour of high strength rail steel under uniaxial and compression-torsion cyclic loadings
Chung Lun Pun, Peter J. Mutton, Qianhua Kan, Guozheng Kang, Wenyi Yan*
Monash University, Australia
- 17:00 S41-001 **Comparison of different techniques for the monitoring of the Piobert–Lüders bands development**
Johann Petit*, Danièle Wagner, Nicolas Ranc, Guillaume Montay, Manuel Francois
LEME, EA4416, Université Paris Ouest, France
- 17:20 S41-004 **Influence of plastic yield of current collector on diffusion induced stress in layered anode**
Zongzan Lee*, Yicheng Song, Junqian Zhang
Shanghai Institute of Applied Mathematics and Mechanics, China
- 17:40 S41-014 **Texture evolution in Mg-Al and Mg-RE alloy during hot extrusion**
Li Jin, Jie Dong*, Zhenyan Zhang, Wenjiang Ding
Shanghai Jiaotong University, China

S41-S2

Tuesday June 18, 10:30–12:20

Room: 203A

Co-Chair: Xianghe Peng (China), Tsuyoshi Furushima (Japan)

- 10:30 S41-008 **Keynote Presentation**
Plastic strain gradient induced internal stress and geometrically necessary dislocation density in grain boundary regions
Anxin Ma*, Alexander Hartmaier
ICAMS, Ruhr-university Bochum, Germany
- 11:00 S41-006 **Strain rate dependent deformation and failure in composite microstructures under dynamic loadings**
Yuli Chen*
BeiHang University, China
- 11:20 S41-007 **Cyclic plasticity models at finite deformations describing the Bauschinger effect and ratchetting behaviour**
Yilin Zhu*, Guozheng Kang, Qianhua Kan, Chao Yu
Southwest Jiaotong University, China
- 11:40 S41-009 **Time dependent ratcheting-fatigue interactions of tempered 42CrMo steel: Experiments and constitutive model**
Juan Zhang*, Haibo Luo, Zhiwu Zhu, Guozheng Kang
Southwest Jiaotong University, China
- 12:00 S41-025 **Effect of particulate shape on cyclic deformation of inclusionreinforced composites: Meso-mechanical constitutive modeling and simulations**
Sujuan Guo*, Guozheng Kang, Fuzhen Xuan
East China University of Science and Technology, China

S41-S3

Tuesday June 18, 16:00–18:00

Room: 203A

Co-Chair: Yanyao Jiang (China), Yuli Chen (China)

- 16:00 S41-018 **Keynote Presentation**
Observation of necking and fracture behavior of sheet metal in bore expanding test
Ken-ichi Manabe*, Yuki Kinoshita, Sergei Alexandrov, Tusyoshi Furushima, Ming Yang
Tokyo Metropolitan University, Japan
- 16:30 S41-024 **Keynote Presentation**
Combined self-consistent and Mori-Tanaka approach for evaluation of elastoplastic property of particulate composites
Xianghe Peng*, Ning Hu, Xuesong Long, Hengwei Zheng
Chongqing University, China
- 17:00 S41-015 **A coupled thermo-mechanically cyclic plasticity model considering inelastic heat generation**
Qianhua Kan*, Guozheng Kang, Wenyi Yan, Yilin Zhu, Han Jiang
Southwest JiaoTong University, China
- 17:20 S41-017 **Influence of free surface roughening on ductile fracture behavior under uni-axial tensile state for metal foils**
Tsuyoshi Furushima*, Hitomi Tsunozaki, Ken-ichi Manabe, Ming Yang, Sergei Alexandrov
Tokyo Metropolitan University, Japan
- 17:40 S41-011 **Grain size dependence of the yield stress for metals at quasistatic and dynamic loadings**
Elijah N. Borodin, Alexander E. Mayer*
Chelyabinsk State University, Russia

S41-S4

Wednesday June 19, 10:30–12:00

Room: 203A

Co-Chair: Guozheng Kang (China), Linli Zhu (China)

- 10:30 S41-026 **Keynote Presentation**
Nanoplasticity
Elias C. Aifantis
Aristotle University, Greece
- 11:00 S41-021 **Influence of microcracks on elasticity modulus of a material under cyclic loading**
Miaolin Feng, Yanyao Jiang*
Shanghai JiaoTong University, China
- 11:20 S41-016 **Impact dynamic mechanics behavior and constitutive model of soil**
Zhiwu Zhu*, Haidong Zhang, Han Jiang, Qianhua Kan
Southwest Jiaotong University, China
- 11:40 S41-013 **Temperature dependence of slips resistance and texture evolution in magnesium alloy AZ31B: Experiments and numerical investigations**
Yao Liu*, Yujie Wei
Institute of Mechanics, Chinese Academy of Sciences, China

S41-S5

Wednesday June 19, 13:30–15:30

Room: 203A

Co-Chair: Anxin Ma (Germany), Qianhua Kan (China)

- 13:30 S41-020 **Keynote Presentation**
Cyclic deformation of AZ31B magnesium alloy under combined axial-torsion loading
Yanyao Jiang*, Qin Yu, Ying Xiong
University of Nevada, USA
- 14:00 S41-010 **Keynote Presentation**
Statistical analysis at grain level for predicting low-cycle fatigue life of a polycrystalline metal by using SRVE
Keshi Zhang*, Yingsong Ma
Guangxi University, China
- 14:30 S41-019 **Micropolar approach on the porous medium plasticity with equivalent couple stress**
Han Jiang*, Yujie Liu, Guozheng Kang
Southwest Jiaotong University, China
- 14:50 S41-022 **A mechanism-based plastic model to simulate the mechanical properties in nanostructured bimodal metals**
Linli Zhu*, Jian Lu
Zhejiang University, China
- 15:10 S41-012 **Evolution of perturbations of temperature and dislocation density at high-rate shear deformation of pure metals and alloys**
Alexander E. Mayer*, Elijah N. Borodin, Polina N. Mayer, Yury V. Vorobyov, Dmitry A. Tikhonov
Chelyabinsk State University, Russia

S42-S1

Tuesday June 18, 16:00–17:40

Room: 206A

Co-Chair: Shao-Yun Fu (China), Mamoru Mizuno (Japan)

- 16:00 S42-003 **Keynote Presentation**
Variation in thermal conductivity of CFRP plates due to impact damage
Mamoru Mizuno*, Atsushi Ogawa, Garuda Fujii
Akita Prefectural University, Japan
- 16:30 S42-001 **Keynote Presentation**
Fracture and failure of marine composites subjected to dynamic loading and seawater exposure
Luoyu R. Xu*
University of Texas, USA
- 17:00 S42-014 **A numerical model to simulate the pullout of carbon fibre with radially grown carbon nanotubes**
Wenyi Yan*, Yuanyuan Jia, Zuorong Chen
Monash University, Australia
- 17:20 S42-002 **Effect of nanoparticle modification on carbon fibre composite mode II delamination**
Ying Zeng*, Hong-Yuan Liu, Yiu-Wing Mai, Xu-Sheng Du
Shanghai Aircraft Design & Research Institute, China

S42-S2

Wednesday June 19, 10:30–12:10

Room: 206A

Co-Chair: Yi-Qi Wang (Korea), Jānis Andersons (Latvia)

- 10:30 S42-015 **Keynote Presentation**
Tensile and impact properties at room temperature and low temperature of carbon nanotube and graphene reinforced epoxy composites
Shaoyun Fu*
Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, China
- 11:00 S42-006 **Keynote Presentation**
Wear resistant polymers with incorporation of HDI microcapsule based self-healing chemistry
Lee Hoon Lim, Mingxing Huang, He Zhang, Jinglei Yang*
Nanyang Technological University, Singapore
- 11:30 S42-005 **Numerical simulation of the influence of particle clustering on tensile behavior of particle reinforced composites, study of shape of the particles**
Seyed Mohammad Reza Rafeipour Alavi, Armin Abedini, Zengtao Chen*
University of New Brunswick, Canada
- 11:50 S42-008 **Effects of anodizing temperature on the microstructure of Ti₆Al₄V and its apparent shear strength bonded with epoxy**
Peigang He*, Ke Chen, Bin Yu, Jinglei Yang
Nanyang Technological University, Singapore

S42-S3

Wednesday June 19, 13:30–15:10

Room: 206A

Co-Chair: Xuefeng Yao (China), Luoyu R. Xu (USA)

- 13:30 S42-016 **Evaluation and optimization the impact and fire properties of flax composites with the additional nanoclay by Taguchi method**
Cheon Won, Yi-qi Wang*, Jung-II Song
Changwon National University, Korea
- 13:50 S42-011 **The effect of nano- and micro-fillers on the strength and toughness of PIR foams obtained from renewable resources**
Jānis Andersons*
University of Latvia, Latvia
- 14:10 S42-012 **Experiment study on deformation and fracture of SiC/C composite**
Xiaoyu Liu*, Liangjia Chen, Yinji Ma, Wenfeng Hao, Xuefeng Yao, Siqing Wang
Tsinghua University, China
- 14:30 S42-013 **Ultra high temperature oxidation and fracture behavior of ZrB₂/SiC ceramics**
Yinji Ma*, Xiaoyu Liu, Xuefeng Yao
Tsinghua University, China
- 14:50 S42-007 **Self-healing epoxy via encapsulated epoxy-amine chemistry**
He Zhang*, Jinglei Yang
Nanyang Technological University, Singapore

S43-S1

Wednesday June 19, 16:00–17:40

Room: 206A

Co-Chair: Rafael Estevez (France), Byoung-Ho Choi (Republic of Korea)

- 16:00 S43-003 **Keynote Presentation**
Assessment of damage and long-term tensile strength of polyethylene
Ben Jar*
University of Alberta, Canada
- 16:30 S43-008 **Keynote Presentation**
The delayed debond analysis for sandwich beam with viscoelastic core and steel faceplates
Guangping Zou*, Qichao Xue, Hailin Xiong, Ye Wu, Meng Chai
Harbin Engineering University, China
- 17:00 S43-002 **The tensile and shear failure behavior dependenc on chain length in polymers**
Junhua Zhao*, Timon Rabczuk
Bauhaus-University Weimar, Germany
- 17:20 S43-020 **Dynamic growth of voids under effects of thermal and vapor pressure in electronic packaging**
Xiaohu Yao*, Yue Mei, Xuejun Fan
South China University of Technology, China

S43-S2

Thursday June 20, 10:30–12:10

Room: 206A

Co-Chair: Moussa Nait Abdelaziz (France), Junhua Zhao (China)

- 10:30 S43-001 **Keynote Presentation**
Measurement of adhesion energy of electrospun polymer membranes using a shaft-loaded blister test
Haining Na, Shing-Chung Wong*, Pei Chen
University of Akron, USA
- 11:00 S43-004 **Keynote Presentation**
Numerical investigation of 3D effects in polymer fracture
Shu Guo, Rafael Estevez*
Universite Grenoble, UMR CNRS 5266, France
- 11:30 S43-005 **A damage model for sandwich plate with viscoelastic core in 3-point bending fatigue experiments**
Qichao Xue*, Guangping Zou, Hailin Xiong, Jian Hu
Harbin Engineering University, China
- 11:50 S43-017 **A combined experimental and numerical investigation of epoxy fracture**
Xavier M. Poulain*, Anthony de Castro, Soondo Kweon, Gary D. Roberts, Robert K. Goldberg,
Amine A. Benzerga
Texas A&M University, USA

S43-S3

Thursday June 20, 13:30–15:40

Room: 206A

Co-Chair: Guangping Zou (China), Alicia Salazar (Spain)

- 13:30 S43-010 **Keynote Presentation**
Fracture of rubbers under biaxial loading: A criterion based upon the intrinsic defect concept
Moussa Nait Abdelaziz*, Fahmi Zairi
Polytech Lille, Lille 1 University, France
- 14:00 S43-006 **Viscoplastic time-dependent crack initiation and propagation from notches in ultrahigh molecular weight polyethylene**
Jevan Furmanski*, Abhiram Sirimamella, Clare Rimnac
Los Alamos National Laboratory, USA
- 14:20 S43-007 **Observations and analysis of fatigue crack growth in circular notched polyethylene specimens**
Byoung-Ho Choi*, Ilhyun Kim, Yongjian Zhao, Ji Mi Lee, Alexander Chudnovsky
Korea University, Republic of Korea
- 14:40 S43-019 **Thermomechanical behaviors of ani-sotropic shape memory elastomer composites**
Qi Ge, Binglian Wang, Martin Dunn, Hang (Jerry) Qi*
University of Colorado, USA
- 15:00 S43-015 **Exploring the contributions of variable network structure on rubber elasticity using model silicone elastomers**
Anju R. Babu, Namrata Gundiah*
Indian Institute of Science, India
- 15:20 S43-009 **Time-dependent mechanical properties characterization of soft matter/materials using finite element calculation and micro/nanoindentation experiments**
Qiang Zhang*, Qing-Sheng Yang
Beijing University of Technology, China

S43-S4

Thursday June 20, 16:00–17:50

Room: 206A

Co-Chair: Ben Jar (Canada), Furmanski Jevan (USA)

- 16:00 S43-012 **Keynote Presentation**
Effect of molar mass on fracture behavior of PVC
Takashi Kuriyama*, Minoru Hata, Masahisa Enomoto
Yamagata University, Japan
- 16:30 S43-011 **The correlation between the dynamic fracture surface energy values G_{ID} and the amount of created surface**
Jean-Benoit Kopp*, Jean Schmittbuhl, Jian Lin, Christophe Fond
ICube-Département mécanique, France
- 16:50 S43-013 **Influence of crack sharpness on the fracture toughness of epoxy resins**
Alicia Salazar*, Yatish Patel, J. Gordon Williams
Universidad Rey Juan Carlos, Spain
- 17:10 S43-014 **Fracture mechanical observations in experimental trouser tear testing in thin polymer films**
Eskil Andreasson*, Sharon Kao-Walter, Nasir Mehmood
Blekinge Institute of Technology, Sweden
- 17:30 S43-016 **Mode-I fracture behaviors of a shear thickening fluid as adhesive layer under different loading rates**
Maisha Tabassum*, Lin Ye, Li Chang, Klaus Friedrich
The University of Sydney, Australia

S44-S1

Monday June 17, 16:00–18:00

Room: 202B

Co-Chair: Si Hai Mai (France), Bing-Rong Miao (China)

- 16:00 S44-001 **Keynote Presentation**
Fatigue crack growth in the contact wire of railway catenary
Si Hai Mai*, Mac Lan Nguyen-Tajan, Arnaud Verrier, Josselin Banting, Stéphane Avronsard
Société Nationale des Chemins de Fer Français, France
- 16:30 S44-009 **Keynote Presentation**
Safe life and damage tolerance of railway axles
Dietmar Klingbeil*, Christian Klinger, Uwe Zerbst
BAM-Federal Insutute for Materials Reseach and Testing, Germany
- 17:00 S44-008 **New fatigue life and durability evaluating method of high speed train carbody structure**
Bing-Rong Miao*
Southwest JiaoTong University, China
- 17:20 S44-004 **Fatigue crack growth behaviour and characterization of railway D1 wheel steel**
Yong X. Zhao*, Qiang Wang, Bin B. Du
Southwest JiaoTong University, China
- 17:40 S44-007 **Fatigue threshold behaviour as the short cracks growth of smooth railway LZ50 axle steel**
Gao K. Liu*, Yong X. Zhao, Bing Yang
Southwest JiaoTong University, China

S44-S2

Tuesday June 18, 10:30–12:00

Room: 202B

Co-Chair: Yong X. Zhao (China); Gao K. Liu (China)

- 10:30 S44-002 **Keynote Presentation**
Rolling press effects on the fatigue behaviour of smooth railway LZ50 carbon steel
Yong X. Zhao*, Bing Yang, Bin B. Du
Southwest JiaoTong University, China
- 11:00 S44-003 **Experimental research on the fatigue cracking thresholds of railway D1 wheel steel**
Qiang Wang*, Yong X. Zhao, Gao K. Liu
Southwest JiaoTong University, China
- 11:20 S44-006 **Fatigue short crack behaviour with multi-microstructure barriers of smooth railway LZ50 carbon steel**
Yong X. Zhao*, Bing Yang, Bin B. Du
Southwest JiaoTong University, China
- 11:40 S44-005 **Measurement on the fracture toughness values of railway D1 wheel steel**
Bin B. Du*, Yong X. Zhao, Bu Z. Xu
Southwest JiaoTong University, China

S45-S1

Wednesday June 19, 13:30–15:00

Room: 211

Co-Chair: Michael D. Lepech (USA), Bernd Maier (Austria)

- 13:30 S45-002 **Keynote Presentation**
On the mechanism of martensite formation during short fatigue crack propagation in austenitic stainless steel: Experimental identification and modelling concept
Ulrich Krupp*, Ingmar Roth, Hans-Jürgen Christ, Martin Kübbeler, Claus-Peter Fritzen
University of Applied Sciences Osnabrück, Germany
- 14:00 S45-001 **Analysis of fatigue crack initiation and propagation in ship structures**
Wengang Mao*, Jonas W. Ringsberg
Chalmers University of Technology, Sweden
- 14:20 S45-004 **Influence of microstructure discontinuities on the fatigue strength of metallic materials**
Steffen Rödling*, Matthias Decker, Manfred Hück
IABG mbH, Germany
- 14:40 S45-012 **A tool for the fatigue propagation analysis of multiple threedimensional cracks from fastener holes**
Yixiu Shu*, Yazhi Li, Zhengxin Fan
Northwestern Polytechnical University, China

S45-S2

Wednesday June 19, 16:00–17:30

Room: 211

Co-Chair: Ulrich Krupp (Germany), Paul Kainzinger (Austria)

- 16:00 S45-003 **Keynote Presentation**
Some notes on estimating stress-life curves for mechanical design
Hans-Peter Gaenser*, Monika Dunst, Matthias Gerhold
Materials Center Leoben Forschung GmbH, Austria
- 16:30 S45-005 **Suspension springs-experimental proof of reliability under complex loading**
Matthias Decker*, Stefen Rödling , Manfred Hück
IABG mbH, Germany
- 16:50 S45-007 **Pit-To-Crack transition and corrosion fatigue of 12% Cr steam turbine blade Steel**
Bernd M. Schoenbauer*, Andrea Perlega, Stefanie E. Stanzl-Tschegg
University of Natural Resources and Life Sciences, Austria
- 17:10 S45-011 **Statistical evaluation of material properties of cast and wrought steels**
Xiang Zhou*, Hans-Peter Gaenser, Reinhard Pipan
Materials Center Leoben Forschung GmbH, Austria

S45-S3

Thursday June 20, 10:30–12:00

Room: 211

Co-Chair: Hans-Peter Gaenser (Austria), Wengang Mao (Sweden)

- 10:30 S45-010 **Keynote Presentation**
Coupled fracture and corrosion service life models for LCA of advanced infrastructure materials
Michael D. Lepech*
Stanford University, USA
- 11:00 S45-006 **Influence of different microstructures of the welding zone on the fatigue crack growth behaviour of HSLA steels**
Bernd Maier*, Christoph Guster, Richard Tichy, Werner Ecker
Montanuniversitaet Leoben, Austria
- 11:20 S45-008 **Influence of micro-shrinkage on the fatigue behavior of ductile iron**
Paul Kainzinger*, Christoph Guster
Montanuniversitaet Leoben, Austria
- 11:40 S45-009 **Reliability-based fatigue life prediction method for compressor wheel rub of turbocharger for vehicle application**
Zheng Wang*, Zeng-Quan Wang, Weidong Xing, A-Na Wang, Lin Hua
China North Engine Research Institute, China

S46-S1

Monday June 17, 16:00–17:30

Room: 211

Co-Chair: Yukui Gao (China), Lin Peng Ru (Sweden)

- 16:00 S46-003 **Keynote Presentation**
Determination of residual stresses in structural elements using electron speckle interferometry method
Leonid Lobanov*, Vyacheslav Pivtorak, Viktor Savitsky, Galina Tkachuk
E.O. Paton Electric Welding Institute of NASU, Ukraine
- 16:30 S46-002 **3D FE analysis of peening of strain-rate sensitive materials using multiple impingement model**
Shaker Meguid, Fan Yang, Chen Zhuo*
University of Toronto, Canada
- 16:50 S46-007 **Isolation of contributions of residual stress and weld microstructure to fatigue crack growth in welds**
Rui Bao*, Ning Tang, Xiang Zhang, Phil Irving
Beihang University, China
- 17:10 S46-006 **Extrinsic cohesive modeling of the dynamic impact fracture of tempered glass**
Shunhua Chen*, Mengyan Zang
South China University of Technology, China

S46-S2

Tuesday June 18, 10:30–11:40

Room: 211

Co-Chair: Leonid Lobanov (Ukraine), Rui Bao (China)

- 10:30 S46-001 **Keynote Presentation**
Residual stresses induced by surface enhancement processes
Yukui Gao*, Zheng Zhong
Tongji University, China
- 11:00 S46-004 **Influence of residual stresses on the crack propagation in flat bars**
Jürgen Maierhofer*, Reinhard Pippan, Hans-Peter Gänser
Erich Schmid Institute of Materials Science, Austria
- 11:20 S46-005 **Surface integrity and the influence of tool wear in high speed machining of Inconel 718**
Ru Lin Peng*, Jinming Zhou, Sten Johansson, Annethe Billenius,
Volodymyr Bushlya, Jan-Eric Stahl
Linköping University, Sweden

S47-S1

Thursday June 20, 13:30–15:30

Room: 211

Co-Chair: Chengzhi Qi (China), Chunsheng Lu (Australia)

- 13:30 S47-008 **Keynote Presentation**
Understanding size effects on diffusion-induced-stresses and fracture in lithium ion battery electrodes
Yang T. Cheng*, Mark W. Verbrugge, Juchuan Li, Rutooj D. Deshpande
University of Kentucky, USA
- 14:00 S47-003 **Keynote Presentation**
Surface effects and flexoelectricity on the vibration behavior of piezoelectric nanobeams
Zhi Yan, Liying Jiang*
The University of Western London, Canada
- 14:30 S47-001 **Polymeric fiber arrays for adhesion**
Shing-Chung Wong*
University of Akron, USA
- 14:50 S47-011 **Scale effect of the tensile strength of aligned-flax-fiber reinforced composite**
Janis Andersons*, Edgars Sparnins, Janis Modniks
University of Latvia, Latvia
- 15:10 S47-006 **The golden ratio in the fracture mechanism of concrete and ice**
Bernardino Chiaia, Alessandro P. Fantilli*, Barbara Frigo
Politecnico di Torino, Italy

S47-S2

Thursday June 20, 16:00–18:00

Room: 211

Co-Chair: Yang T. Cheng (USA), Liying Jiang (Canada)

- 16:00 S47-007 **Keynote Presentation**
Structural hierarchy and dynamic size effect of rock strength
Chengzhi Qi*, Qihu Qian, Qingming Li
Beijing University of Civil Engineering and Architecture, China
- 16:30 S47-004 **Keynote Presentation**
Revisit on the fractal dimension in damage and fracture
Chunsheng Lu*
Curtin University, Australia
- 17:00 S47-009 **Effect of stress singularities on scaling of quasibrittle fracture**
Jia-Liang Le, Mathieu Pieuchot, Roberto Ballarini*
University of Minnesota, USA
- 17:20 S47-005 **Scaling behavior in quasi static and impact fragmentation of brittle materials**
Marina Davydova*, Sergey Uvarov
Russian Academy of Sciences, Russia
- 17:40 S47-010 **Experimental validation of the relationship between parameters of 3P-Weibull distributions based in J_c or K_{Jc}**
Juan E. Perez Ipiña*, Carlos Berejnoi
Universidad Nacional del Comahue, Argentina

S48-S1

Wednesday June 19, 13:30–15:50

Room: 208A

Co-Chair: Weiqiu Chen (China), Yuanqing Cui (China)

- 13:30 S48-001 **Keynote Presentation**
Multilayered piezomagnetic/piezoelectric composite with periodic interface cracks under magnetic or electric field
Yongping Wan, Yanpeng Yue*, Zheng Zhong
Tongji University, China
- 14:00 S48-003 **Keynote Presentation**
Constrained domain switching induced fracture in ferroelectric single crystals/ ceramics: Experiments versus model
Faxin Li*, Yingwei Li
Peking University, China
- 14:30 S48-002 **Electroelastic analysis of four mode-III cracks originating from a circular hole in piezoelectric materials**
Junhong Guo*, Jing Yu
Inner Mongolia University of Technology, China
- 14:50 S48-004 **Dynamic response of an interface crack between magnetoelastoelectric and functionally graded elastic layers**
Keqiang Hu*, Zengtao Chen, Jiawei Fu
University of New Brunswick, Canada
- 15:10 S48-025 **Ideal strength of twinned and perfect NiTi martensite crystal**
Petr Sestak*, Miroslav Cerny, Jaroslav Pokluda
Brno University of Technology, Czech Republic
- 15:30 S48-026 **Damage modeling in sintered metals under multi-axial loading conditions**
Songyun Ma*, Huang Yuan
University of Wuppertal, Germany

S48-S2

Wednesday June 19, 16:00–17:50

Room: 208A

Co-Chair: Yongping Wan (China), Junhong Guo (China)

- 16:00 S48-011 **Keynote Presentation**
A homogeneous model for magneto-active polymers
Wei Hong*, Yi Han
Iowa State University, USA
- 16:30 S48-005 **Tetragonal PbTiO₃ oxygen vacancy modulation by epitaxial strain: A first-principles study**
Qiong Yang*, Yichun Zhou, Juexian Cao
Xiangtan University, China
- 16:50 S48-006 **Phase field study on the dynamics of magnetic vortex in ferromagnetic nanostructures**
Jianwei Zhang, Jie Wang*
Zhejiang University, China
- 17:10 S48-008 **Parameter identification of a modified dynamical hysteresis model with immune clone method**
Yongfei Zhang*, Youhe Zhou
Lanzhou University, China
- 17:30 S48-022 **Semi-permeable crack analysis in a 2D magneto-electroelastic medium based on the SEMPS model**
Qiao Yun Zhang*, Cui Ying Fan, Ming Hao Zhao, Ernian Pan
Zhengzhou University, China

S48-S3

Thursday June 20, 10:30–12:10

Room: 208A

Co-Chair: Bin Chen (China), W. J. Feng (China)

- 10:30 S48-018 **Keynote Presentation**
Penny-shaped crack solutions for piezoelectric solids
Weiqiu Chen*
Zhejiang University, China
- 11:00 S48-014 **Keynote Presentation**
Physical mechanisms of magnetostriction or electrostriction induced interfacial fracture in a bi-layered multiferroic smart composite
Hao Zhao, Tao Xiong, Yong-Dong Li*, Kang Yong Lee
Academy of Armored Force Engineering, China
- 11:30 S48-012 **An opening crack model in thermo-magneto-electro-elastic solids**
Xian-Ci Zhong*
Guangxi University, China
- 11:50 S48-013 **First principle study of polarization-strain coupling in SrBi₂Ta₂O₉ and Bi₄Ti₃O₁₂**
Limei Jiang*, Yichun Zhou
Xiangtan University, China

S48-S4

Thursday June 20, 13:30–15:40

Room: 208A

Co-Chair: Faxin Li (China), Xian-Ci Zhong (China)

- 13:30 S48-023 **Keynote Presentation**
Effect of humidity on gecko adhesion
Bin Chen*
Zhejiang University, China
- 14:00 S48-024 **Pre-fracture zone model on magneto-electrically permeable interface crack between two dissimilar magnetoelastoelectroelastic materials**
P. Ma, W. J. Feng*, R. K. L. Su
Shijiazhuang Tiedao University, China
- 14:20 S48-019 **On the dynamic behaviour of surface-bonded piezoelectric sensors/actuators with partially debonded adhesive layers**
Congrui Jin, Lu Han, Guoliang Huang, Xiaodong Wang*
University of Alberta, Canada
- 14:40 S48-020 **Nonuniform ferroelastic domain switching driven by two-parameter crack tip stress field**
Yuanqing Cui*, Zheng Zhong
Tongji University, China
- 15:00 S48-021 **Modeling of isothermal stress cycling degradation of shape memory alloys using non-constant material parameters**
Xiaoyong Zhang*, Xiaojun Yan, Huimin Xie
Tsinghua University, China
- 15:20 S48-010 **Exact fundamental thermo-elastic solutions of a transversely isotropic elastic medium with a half infinite plane crack**
Xiangyu Li*
Southwest Jiaotong University, China

S49-S1

Thursday June 20, 10:30–12:10

Room: 213A

Co-Chair: Yanping Cao (China), Jinxiong Zhou (China)

- 10:30 S49-007 **Keynote Presentation**
Rayleigh wave propagation in liquid crystalline elastomers
Ying Liu*, Shuai Yang
Beijing Jiaotong University, China
- 11:00 S49-004 **Keynote Presentation**
Mechanics of gelatin and elastin based hydrogels as tissue engineered constructs
Achu G. Byju, Ankur H. Kulkarni, Namrata Gundiah*
Indian Institute of Science, India
- 11:30 S49-003 **Indentation method for determining the constitutive parameters of hyperelastic soft materials**
Man-Gong Zhang*, Yan-Ping Cao, Guo-Yang Li, Xi-Qiao Feng
Tsinghua University, China
- 11:50 S49-005 **Stamp collapse in transfer printing**
Jian Wu, Diqin Liu*
Tsinghua University, China

S49-S2

Thursday June 20, 13:30–15:20

Room: 213A

Co-Chair: Zishun Liu (China), Rui Huang (USA)

- 13:30 S49-002 **Keynote Presentation**
Electromechanical stability of cone dielectric elastomer actuator
Xiaohong Wu, Wenjie Sun, Meie Li, Jinxiong Zhou*
Xi'an Jiaotong University, China
- 14:00 S49-009 **Large deformation study of temperature-sensitive hydrogel**
Jianying Hu, Zhiwei Ding, Zishun Liu*
Xi'an Jiaotong University, China
- 14:20 S49-006 **A high-level coarse-grained biomembrane model**
Sulin Zhang*, Changjin Huang, Hongyan Yuan
The Pennsylvania State University, USA
- 14:40 S49-013 **Transition from shear thinning to thickening in two-dimensional colloidal gels**
Zhongyu Zheng*, Yuren Wang
National Microgravity Laboratory, China
- 15:00 S49-008 **A fractional-order model on new experiments of linear viscoelastic creep of hami Melon**
Zheng Xu, Wen Chen
Hohai University, China

S49-S3

Thursday June 20, 16:00–17:30

Room: 213A

Co-Chair: Patricia Frontini (Argentina), Ying Liu (China)

- 16:00 S49-001 **Keynote Presentation**
Mechanical and fracture behaviour of gelatin gels
Marina Czerner, Lucas Sanchez Fellay, Josefa Martucci, Laura Fasce, Roxana Ruseckaite, Patricia Frontini*
University of Mar del Plata, Argentina
- 16:30 S49-011 **Analytical solution of swell-induced surface instability for graded hydrogel layers**
Zhigen Wu, Rui Huang*, Yihua Liu, Hao Li
University of Texas, USA
- 16:50 S49-010 **A strategy to evaluate the properties of circular ring dielectric actuators**
Yin Wang*, Jinxiong Zhou, Xiaohong Wu, Ling Zhang
Xi'an Jiaotong University, China
- 17:10 S49-012 **Micromechanics models of particulate filled elastomer at finite strain deformation**
Yunpeng Jiang*
Hohai University, China

S50-S1

Wednesday June 19, 13:30–15:30

Room: 401

Co-Chair: Daniel Bonamy (France), Moisés Hinojosa (Mexico)

- 13:30 S50-027 **Keynote Presentation**
Constrained crack growth: scaling and dynamics
Alex Hansen*
Norwegian University of Science and Technology, Norway
- 14:00 S50-004 **Keynote Presentation**
Aftershocks in sheared granular matter
Takahiro Hatano*
The University of Tokyo, Japan
- 14:30 S50-008 **Repulsion and attraction of two interacting cracks in plane strain geometry**
Juha H. Koivisto*, Mikko J. Alava
Aalto University, Finland
- 14:50 S50-017 **Variation of ductile fracture roughness with material properties**
Yuanyuan Cao*, Laurent Ponson, Alan Needleman, Viggo Tvergaard, Elisabeth Bouchaud
Institut Jean Le Rond d'Alembert, France
- 15:10 S50-026 **Crack density of stiff coating on soft plastic substrate**
Joel Marthelot*, Benoit Roman, Jose Bico, Jeremie Teisseire, Davy Dalmas
PMMH, ESPCI Paris Tech, France

S50-S2

Wednesday June 19, 16:00–17:50

Room: 401

Co-Chair: Davy Dalmas (France), Takahiro Hatano (Japan)

- 16:00 S50-009 **Keynote Presentation**
Temporal and spatial evolution of bursts in a fiber bundle model of creep rupture
Ferenc Kun*, Zsuzsa Danku, Zoltán Halász
University of Debrecen, Hungary
- 16:30 S50-001 **ECM-based statistical simulation of progressive failure in symmetric laminates damaged by transverse ply cracking**
Fang Wang*, J. Qian Zhang, Lu Li, Z. Qian Chen
Southwest University, China
- 16:50 S50-002 **Intermittency in brittle cracks: Model experiment in artificial rocks**
Jonathan Barés, Lamine Hattali, Davy Dalmas, Daniel Bonamy
CEA IRAMIS SPCSI, France
- 17:10 S50-003 **Non-Gaussian statistics and spatially-organized extreme events on experimental fracture surfaces**
Stéphane Vernède*, Yuantuan Cao, Laurent Ponson
EO Technology, China
- 17:30 S50-013 **Study of ductile-brittle transition in fiber bundle model under meanfield approximation**
Subhadeep Roy*, Purusattam Ray
The Institute of Mathematical Sciences, India

S50-S3

Thursday June 20, 10:30–12:00

Room: 401

Co-Chair: Laurent Ponson (France), Osvanny Ramos (France)

- 10:30 S50-011 **Keynote Presentation**
Specific adhesion of dissimilar materials
Jizeng Wang*
Lanzhou University, China
- 11:00 S50-014 **Propagation of tensile planar cracks in highly heterogeneous media: A numerical study**
Manish Vasoya*, Laurent Ponson, Véronique Lazarus
Université Paris-Sud, France
- 11:20 S50-015 **Size effects on compressive strength from a statistical physics perspective**
Jérôme Weiss*, Lucas Girard, David Amitrano, Florent Gimbert
University Joseph Fourier, France
- 11:40 S50-016 **Thermally induced creep rupture of fiber bundles**
Naoki Yoshioka*, Ferenc Kun, Nobuyasu Ito
Kyoto University, Japan

S50-S4

Thursday June 20, 13:30–15:10

Room: 401

Co-Chair: Jizeng Wang (China), Xin-Lin Gao (USA)

- 13:30 S50-023 **Keynote Presentation**
Apparent continuum-level scale velocity versus true local propagation velocity in the dynamic fracture of nominally brittle polymers
Claudia Guerra, Julien Scheibert, Davy Dalmas, Daniel Bonamy*
IRAMIS/SPCSI, CEA-Saclay, France
- 14:00 S50-025 **Keynote Presentation**
Experimental and numerical investigation of crack front pinning in planar heterogeneous interfaces
Davy Dalmas*, Lina Alzate, Sylvain Patinet, Etienne Barthel, Véronique Lazarus, Damien Vandembroucq
Unité Mixte de Recherche CNRS, France
- 14:30 S50-024 **Crack nucleation and propagation in 2D and 3D conditions on heterogeneous materials**
Moisés Hinojosa*, Victoria Merino, Jorge Aldaco, Dana Aguirre
Autonomous University of Nuevo Leon, Mexico
- 14:50 S50-018 **Predicting sample lifetimes in creep**
Juha Koivisto*, Markus Ovaska, Amandine Miksic, Lasse Laurson, Mikko Alava
Aalto University, Finland

S50-S5

Thursday June 20, 16:00–17:40

Room: 401

Co-Chair: Ferenc Kun (Japan), Naoki Yoshioka (Japan)

- 16:00 S50-005 **Keynote Presentation**
Modeling of mechanical responses and progressive failure of triaxially woven SiCf -SiC composites
Sahil G. Kulkarni, Xin-Lin Gao*
Texas A&M University, USA
- 16:30 S50-019 **Keynote Presentation**
Acoustic emissions in fracturing paper
Menka Stojanova, Stéphane Santucci, L  ic Vanel, Osvanny Ramos*
Universit   de Lyon, France
- 17:00 S50-020 **Study of dislocation and fracture dynamics during fatigue of aluminum from acoustic emission data**
St  phanie Deschanel*, Wafa Ben Rhouma, J  r  me Weiss
Universit   de Lyon, France
- 17:20 S50-022 **Understanding the evolution of mechanical properties under irradiation in nuclear glasses via experiments**
Marina Barlet*, Jean-Marc Delaye, Cindy L. Rountree
CEA/IRAMIS/SPCSI, France

S51-S1

Wednesday June 19, 16:00–17:10

Room: 205B

Co-Chair: Sergei Alexandrov (Russia), Yinghua Liu (China)

- 16:00 S51-008 **Keynote Presentation**
Fracture mechanics model for fatigue strength of metallic alloys with large second phase particles
Uwe Zerbst, Mauro Madia, Dieter Schöne, Dietmar Klingbeil*
BAM Federal Institute for Materials Research and Testing, Germany
- 16:30 S51-007 **Study on CTOD and microstructure in flash welded joints for 630-730 MPa grade mooring chains**
Shuwei Leng*, Zhangmu Miao, Ping Sun, Xuelian Yao
School of Transportation of Wuhan University of Technology, China
- 16:50 S51-010 **Effect of the pearlite content of ferritic cast iron material on the crack resistance behaviour under dynamic load**
Hans-Peter Winkler, Roland Hüggenberg, Annette Ludwig, Gerhardt Pusch, Peter Trubitz*
Technische Universität Bergakademie Freiberg, Germany

S51-S2

Thursday June 20, 10:30–12:00

Room: 205B

Co-Chair: Guozhen Wang (China), Daren Peng (Australia)

- 10:30 S51-009 **Keynote Presentation**
Strain gage radial locations for the accurate determination of mode I stress intensity factors
Murthy K.S.R.K, Hrushikesh Sarangi, Debabrata Chakraborty*
Indian Institute of Technology Guwahati, India
- 11:00 S51-002 **Thickness-dependence of lower bounds of fracture toughness of ferritic steels in the ductile-to-brittle transition regime**
Hans J. Schindler*
Mat-Tec AG, Switzerland
- 11:20 S51-003 **Experimental verification of optimal strain gage locations for the accurate determination of stress intensity factors**
Murthy K.S.R.K*, Hrushikesh Sarangi, Debabrata Chakraborty
Department of Mechanical Engineering, IIT Guwahati, India
- 11:40 S51-005 **Analysis of crack retardation effects and crack path in ship structure members on different routes**
Fredhi Agung Prasetyo*, Wengang Mao, Tomohei Kobayashi, Naoki Osawa, Jonas W. Ringsberg
Osaka University, Japan

S51-S3

Thursday June 20, 13:30–15:30

Room: 205B

Co-Chair: Douglas Scarth (Canada), Murthy K.S.R.K. (India)

- 13:30 S51-016 **Keynote Presentation**
An efficient method for determining the limit load for highly undermatched welded structures
Sergei Alexandrov*, Robert Goldstein
Russian Academy of Sciences, Russia
- 14:00 S51-019 **Keynote Presentation**
AE monitoring and structural modeling of the Asinelli Tower in Bologna
Giuseppe Lacidogna*, Stefano Invernizzi, Alberto Carpinteri
Politecnico di Torino, Italy
- 14:30 S51-014 **Safety assessment and fatigue life analysis of aged crane structures**
Kai Qi*, Weixiong Wang, Xinhua Wang, Aihua Jiang, Boqing Liu, Zhongliang Guo, Jin Liu
Guangzhou Academy Special Equipment Inspection & Testing, China
- 14:50 S51-020 **Corrosion fatigue life prediction by a probabilistic model with Monte Carlo simulation**
Xing Liu*, Xiancheng Zhang, Shantung Tu
East China University of Science and Technology, China
- 15:10 S51-001 **A geometry dependent generalized eta and gamma function for calculation of plastic part of J integral from experiment for axially cracked thin-walled tubes**
Gopal Sanyal*, Mahendra Kumar Samal
Bhabha Atomic Research Centre, India

S51-S4

Thursday June 20, 16:00–17:50

Room: 205B

Co-Chair: Giuseppe Lacidogna (Italy), Peter Trubitz (Germany)

- 16:00 S51-017 **Keynote Presentation**
Local fracture behavior and integrity assessment of a dissimilar metal welded joint in nuclear power systems
Guozhen Wang*, Haitao Wang, Fuzhen Xuan, Shantung Tu
East China University of Science and Technology, China
- 16:30 S51-018 **Experimental research on steel tube columns filled with recycled aggregate concrete under compressive loading**
Jiangfeng Dong*, Qingyuan Wang, Min Hou
Sichuan University, China
- 16:50 S51-011 **Study of fracture mechanics assessments in industrial applications**
Bartolomeus Irwanto*, Thorsten Prothmann
Alstom Ltd, 5242 Birr, Switzerland
- 17:10 S51-015 **An assessment of stress intensity factors for frame, thin-wall and welded structures**
Daren Peng*, Rhys Jones
Monash University, Australia
- 17:30 S51-012 **Investigation on dimensionless load separation method in the J resistance curves estimation**
Chen Bao*, Lixun Cai, Yao Yao, Kaikai Shi
Southwest Jiaotong University, China

S52-S1

Wednesday June 19, 13:30–15:50

Room: 202B

Co-Chair: Gangfeng Wang (China), Jun Luo (China)

- 13:30 S52-018 **Keynote Presentation**
Surface cracking in silicon by sliding contact and the effect of anisotropy
Mark Hoffman*, Oscar Borrero-Lopez, Tania Vodenitcharova, M.Z.Quadir
The University of New South Wales, Australia
- 14:00 S52-002 **Multiscale monitoring of interface failure of brittle coating/ductile substrate systems: A non-destructive evaluation method combined digital image correlation with acoustic emission**
Weiguo Mao*, Duojin Wu, Wangbin Yao, Meng Zhou, Yichun Zhou, Chunsheng Lu
Xiangtan University, China
- 14:20 S52-003 **A unified analysis of a micro-beam, droplet and CNT ring adhered on a substrate**
Jianlin Liu*
China University of Petroleum, China
- 14:40 S52-004 **Interfacial mechanics of fiber push-out test: Nano-indentation technique and cohesive element modeling**
Xi Li*, Qingsheng Yang
Beijing University of Technology, China
- 15:10 S52-015 **Finite element analysis of the interface adhesion of elastic-plastic thin film/substrate system using virtual crack closure technique**
Wang Zhu*, Yichun Zhou, Shiguo Long
Xiangtan University, China
- 15:30 S52-016 **ECCI and EBSD study of subsurface damage in high speed turning of inconel 718 under different tools and machining parameters**
Zhe Chen*, Rulin Peng, Jinming Zhou, Johan Moverare, Volodymr Bushlya, Sten Johansson
Linköping University, Sweden

S52-S2

Wednesday June 19, 16:00–17:30

Room: 202B

Co-Chair: Mark Hoffman (Australia), Mikhail Perelmuter (Russia)

- 16:00 S52-006 **Keynote Presentation**
Influence of residual surface tension on crack tip field
Gangfeng Wang, Yuan Li*
Xi'an Jiaotong University, China
- 16:30 S52-008 **Extracting mixed-mode traction separation relations for silicon/epoxy interfaces**
Shravan Gowrishankar, Rui Huang, Kenneth M. Liechti*
University of Texas, USA
- 16:50 S52-007 **Size-dependent surface/interface energy and interface adhesive strength**
Lihong Liang*, Hua Wei, Yueguang Wei
Institute of Mechanics, Chinese Academy of Sciences, China
- 17:10 S52-010 **FEM-SGBEM coupling for modeling of cracks in 3D elastic media with influence of surface stresses**
Binh T. Nguyen*, Jaroon Rungamornrat, Teerapong Senjuntichai
Chulalongkorn University, Thailand

S52-S3

Thursday June 20, 10:30–12:20

Room: 202B

Co-Chair: Noriko Katsube (USA), Weiguo Mao (China)

- 10:30 S52-005 **Keynote Presentation**
Analysis of bridged crack growth along interface
Mikhail Perelmuter*
Institute for Problems in Mechanics of RAS, Russia
- 11:00 S52-011 **Interfacial delamination of SMA reinforced composite plate under low velocity impact**
Dongjie Liang, Jun Luo*
Huazhong University of Science and Technology, China
- 11:20 S52-013 **Interaction of graphene nano-ribbon on carbon nanotube**
Qifang Yin, Xinghua Shi*
Institute of Mechanics, Chinese Academy of Sciences, China
- 11:40 S52-012 **Energy corrugation in atomic-scale friction on graphite revisited by molecular dynamics simulations**
Xiaoyu Sun*, Qunyang Li, Xi-Qiao Feng
Tsinghua University, China
- 12:00 S52-017 **Modelling of molecular bonding with a cohesive zone model strategy**
Guillaume Parry*, Rafael Estevez
Universite Grenoble, France

S53-S1

Monday June 17, 16:00–17:50

Room: 213A

Co-Chair: Xuejun Zheng (China), Guillaume Parry (France)

- 16:00 S53-006 **Keynote Presentation**
Residual stress and fracture toughness of sputtered TiN films
Xiaolu Pang, Liqiang Zhang, Hai Tran, Alex Volinsky*
University of South Florida, USA
- 16:30 S53-023 **A novel model for fracture of bilayer film with the effect of the electrostatic traction**
Haitao Liu, Cuiying Fan, Minghao Zhao*, Tongyi Zhang
Zhengzhou University, China
- 16:50 S53-002 **Contact fracture mechanism of electroplated coating on stainless steel substrate**
Akio Yonezu*, Michihiro Niwa
Chuo University, Japan
- 17:10 S53-024 **Fracture behavior of thin aluminum films on soft substrate**
Dan Wu*, Huimin Xie, Yajun Yin
Tsinghua University, China
- 17:30 S53-028 **Rolling contact fatigue behavior of laser clad WC/Ni composite coating**
Jinsha Xu*, Xiancheng Zhang, Fuzhen. Xuan, Zhengdong Wang, Shantung Tu
East China University of Science and Technology, China

S53-S2

Tuesday June 18, 10:30–12:00

Room: 213A

Co-Chair: Alex Volinsky (USA), Akio Yonezu (Japan)

- 10:30 S53-007 **Keynote Presentation**
Toughening and asymmetry in peeling of heterogeneous adhesives
Laurent Ponson*, Shuman Xia, Guruswami Ravichandran, Kaushik Bhattacharya
CNRS -Université Pierre et Marie Curie, France
- 11:00 S53-004 **Influence of interface roughness on the fatigue life of thermal barrier coatings**
Robert Eriksson*, Hakan Brodin, Soren Sjoström, Sten Johansson, Lars Ostergren, Xin-Hai Li
Linköpings University, Sweden
- 11:20 S53-005 **Experimental and Numerical investigation into the adhesion of PVD coatings on minting dies**
Jason Tunis, Xin Wang*, Xianyao Li
Carleton University, Canada
- 11:40 S53-025 **Self-patterning through thin film buckling**
Jean-Yvon Faou*, Guillaume Parry, Sergey Grachev, Etienne Barthel
Surface du Verre et Interfaces, UMR 125 CNRS/Saint-Gobain, France

S53-S3

Tuesday June 18, 16:00–17:50

Room: 213A

Co-Chair: Minghao Zhao (China), Duosheng Li (China)

- 16:00 S53-018 **Keynote Presentation**
Effect of annealing temperature on the electrostrictive properties of 0.94 (Na_{0.5}Bi_{0.5}) TiO₃-0.06BaTiO₃ thin films
Xun Liu, Xuejun Zheng*, Jiaoyun Liu, Kesheng Zhou, Dihui Huang
Xiangtan University, China
- 16:30 S53-009 **Experimental study of the influence of thermal shock on mechanical properties of ceramic coating systems**
Xiaona Li*, Lihong Liang, Hua Wei, Yueguang Wei
Institute of Mechanics, Chinese Academy of Sciences, China
- 16:50 S53-010 **Size-dependent mechanical properties of Parylene-C thin films**
Yi-Jing Sun*, Zhi-Ying Li, Jun-Yong Lu, Zhi-Jia Wang, Tong-Yi Zhang
Hong Kong University of Science and Technology, Hong Kong, China
- 17:10 S53-011 **Asymptotic solutions for buckling delamination induced crack propagation in the thin film-compliant substrate system**
Tongqing Lu*, Tiejun Wang
Xi'an Jiaotong University, China
- 17:30 S53-012 **Modeling delamination in patterned thin film electrodes for high energy density lithium ion batteries**
Lu Bo*, Song Yicheng, Junqian Zhang
Shanghai University, China

S53-S4

Wednesday June 19, 10:30–12:00

Room: 213A

Co-Chair: Xiangli Zhong (China), Fanlin Zeng (China)

- 10:30 S53-008 **Keynote Presentation**
Changes of solid oxide fuel cell material during reduction
Fenghui Wang*, Haibo Shi, Xia Wang, Kang Lou, Shaoming Wang
Northwestern Polytechnical University, China
- 11:00 S53-013 **A simplified approach for the evaluation of nearly singular integrals in boundary element method**
Jia H. Lv*, Yu Miao
Huazhong University of Science and Technology, China
- 11:20 S53-014 **Evaluation of the strength of thin metallic films coated on brittle materials by using an indentation fracture method**
Nakamura Yuzo*, Kawabata Takashi, Ishigami Shinya, Wakiyama Jun, Maeda Yoshikazu
Kagoshima University, Japan
- 11:40 S53-015 **Crack and defect formation in diamond films**
Duosheng Li*, Qinghua Qin, Xianliang Zhou, Dunwen Zuo, Xiaozhen Hua
Nanchang Hangkong University, China

S53-S5

Wednesday June 19, 13:30–15:30

Room: 213A

Co-Chair: Fenghui Wang (China), Masanori Nakatani (Japan)

- 13:30 S53-003 **Keynote Presentation**
Fractured-induced ripple patterns on polymer films
Yueh-Ying Lee, Fuqian Yang, Sanboh Lee*
National Tsing Hua University, Taiwan, China
- 14:00 S53-026 **Keynote Presentation**
Towards interface toughness measurement in nanometric films
Guillaume Parry*, Jean-Yvon Faou, Sergey Grachev, Etienne Barthel
SIMaP, Grenoble INP-CNR-UJF, France
- 14:30 S53-016 **Mechanics of graphene bubbles**
Wei Gao, Kaimin Yue, Kenneth Liechti, Rui Huang*
University of Texas at Austin, USA
- 14:50 S53-017 **Influence of growth pattern of thermally grown oxide on delamination of thermal barrier coatings**
Weixu Zhang*, Zhi Qu, Luochuan Su, Yongle Sun, Tie Jun Wang
Xi'an Jiaotong University, China
- 15:10 S53-027 **Electrochemical behavior of passive film on 304 stainless steel and chromaticity inspection method of film quality**
Cong Q. Cheng*, Tie Sh. Cao, Jie Zhao, Ming K. Lei
Dalian University of Technology, China

S53-S6

Wednesday June 19, 16:00–17:30

Room: 213A

Co-Chair: Sanboh Lee (Taiwan, China), Weixu Zhang (China)

- 16:00 S53-021 **Keynote Presentation**
Influence of the misfit strain and temperature on the characteristics of the metal-ferroelectric-insulator-semiconductor field-effect transistors
Xiangli Zhong*, Limei Jiang, Yi Zhang, Jinbin Wang, Yichun Zhou
Xiangtan University, China
- 16:30 S53-019 **Crack healing behavior of SiN/SiC nano-laminated films**
Masanori Nakatani*, Junki Nishimura, Satoshi Hanaki, Hitoshi Uchida
University of Hyogo, Japan
- 16:50 S53-020 **Thermally activated polarization dynamics under the effects of lattice mismatch strain and external stress in ferroelectric film**
Yi Zhang, Yichun Zhou*, Xiangli Zhong
Xiangtan University, China
- 17:10 S53-022 **Mechanical properties and fracture behavior of poly(vinylidene fluoride)-polyhedral oligomeric silsesquioxane nanocomposites by nanotensile testing**
Fanlin Zeng*, Yizhi Liu, Yi Sun
Harbin Institute of Technology, China

S54-S1

Tuesday June 18, 16:00–17:40

Room: 206B

Co-Chair: Chun-Sheng Wang (China), Yuling Zhang (China)

- 16:00 S54-001 **Keynote Presentation**
Study of the creep damage properties of asphalt mixture under static load
Zhigang Zhou*
Changsha University of Science and Technology, China
- 16:30 S54-003 **Keynote Presentation**
Minneapolis I-35W bridge collapse and application of modern engineering fracture mechanics
Su Hao*, Mark Paul
ACII, INC., Irvine, CA/Wilmette, IL USA
- 17:00 S54-007 **Fatigue strength and fatigue life evaluation of national cultural relic steel bridges**
Chun-Sheng Wang*, Lan Duan, Shi-Chao Wang, Jing-Yu Hu
Chang'an University, China
- 17:20 S54-005 **Investigation of improving life of cable-stayed bridge with the magnetorheological damper**
Tiger Sun*, Xianghe Peng, Chao Feng, Haitao Li
Chongqing University, China

S54-S2

Wednesday June 19, 10:30–11:50

Room: 206B

Co-Chair: Su Hao (USA), Zhigang Zhou (China)

- 10:30 S54-004 **Keynote Presentation**
Fatigue safety monitoring and fatigue life evaluation for existing concrete bridges
Chun-Sheng Wang*, Mu-Sai Zhai, Yu-Jiao Wang
Chang'an University, China
- 11:00 S54-006 **Keynote Presentation**
Application research of elastic-plastic fracture toughness index CTOD in the design of railway steel bridge
Yuling Zhang*
China Academy of Railway Sciences, China
- 11:30 S54-002 **Analysis on arithmetic and application of rigidity distribution for simply supported structure**
Ling-bo Wang*, Pei-wen Jiang
Key Laboratory for Bridge and Tunnel of Shaanxi Province, China

M01

Professor Sir Alan Howard Cottrell Memorial Symposium

M01-S1

Monday June 17, 16:00–18:00

Room: 202A

Co-Chair: Toshimitsu Yokobori (Japan), Stephen D. Antolovich (USA)

- 16:00 M01-001 **Keynote Presentation**
Cottrell, structural integrity and society
David M. R. Taplin*, Alberto Carpinteri
ICF-WASI CEO/President Emeritus, Aston University, England
- 16:30 M01-008 **Keynote Presentation**
The Cottrell Legacy: Metamorphosis of ICF into the World Academy of Structural Integrity 2011-2021
Alberto Carpinteri*, David M.R.Taplin
ICF-WASI President, Politecnico di Torino, Italy
- 17:00 M01-009 **Keynote Presentation**
Sir Alan Cottrell and the dislocation mechanics of fracturing
Ronald W. Armstrong*
University of Maryland, USA
- 17:30 M01-005 **Keynote Presentation**
Influence of strain aging on the failure of metallic materials
Matthieu Maziere*, Samuel Forest, Huaidong Wang, Nisters Carina, Berdin Clotilde, Strudel Jean-Loup
Centre des Matériaux Mines Paris, France

M01-S2

Tuesday June 18, 10:30–12:30

Room: 202A

Co-Chair: David M. R. Taplin (England), Alberto Carpinteri (Italy)

- 10:30 M01-002 **Keynote Presentation**
The characterization of dominating region of fracture (process region) around a crack tip based on the concept of mechanical similarity and atomic mechanics
Toshimitsu Yokobori*, Yoshiko Nagumo, Takahiro Yajima, Toshihito Ohmi
Tohoku University, Japan
- 11:00 M01-007 **Keynote Presentation**
Strain concentration in tensile, fatigue and fracture behaviour
Stephen D. Antolovich*, Ronald W. Armstrong
Georgia Institute of Technology, USA
- 11:30 M01-004 **Keynote Presentation**
The invariant integral: Some news
Genady P. Cherepanov*
The New York Academy of Sciences, USA
- 12:00 M01-003 **Keynote Presentation**
Numerical and analytical prediction of GB microcrack initiation: Effect of material and microstructure parameters
Mohamed Ould Moussa*, Maxime Sauzay, Kokleang Vor
CEA de Saclay DEN/DANS/DMN/SRMA/LC2M Batiment, France

M02

Professor Anthony G. Evans Memorial Symposium

M02-S1

Monday June 17, 16:00–18:00

Room: 401

Co-Chair: Michael Thouless (USA), Roberto Ballarini (USA)

- 16:00 M02-017 **Keynote Presentation**
Rate effects in frictional slip, ill-posedness, its resolution, and consequences for slip-rupture dynamics
James R. Rice*
Harvard University, USA
- 16:30 M02-015 **Keynote Presentation**
Rheology of creases
Zhigang Suo*
Harvard University, USA
- 17:00 M02-014 **Keynote Presentation**
Ductile vs. brittle fracture behaviors in metallic glasses
Huajian Gao*
Brown University, USA
- 17:30 M02-013 **Keynote Presentation**
Mechanics of reversible adhesion
Jian Wu, Keh-Chih Hwang, Yonggang Huang*, John A. Rogers
Northwestern University, USA

M02-S2

Tuesday June 18, 10:30–12:30

Room: 401

Co-Chair: William Curtin (Switzerland), Xuanhe Zhao (USA)

- 10:30 M02-001 **Keynote Presentation**
Structural testing at the micro and nano scales; breaking invisible specimens with zero force
Roberto Ballarini*
University of Minnesota, USA
- 11:00 M02-016 **Keynote Presentation**
High-resolution three-dimensional characterization of the fracture of ceramic textile composites under in situ loading at temperatures above 1700°C
Robert O. Ritchie*, Hrishikesh A. Bale, Alastair A. MacDowell, Abdel Haboub, James R. Nasiatka, Brian N. Cox, David B. Marshall
University of California, USA
- 11:30 M02-011 **Keynote Presentation**
Ballistic resistance of pyramidal lattice-cored sandwich plates with ceramic prism insertions and metallic foam cladding
Chang Y. Ni, Feng Jin, Tian J. Lu*
Xi'an Jiaotong University, China
- 12:00 M02-004 **Keynote Presentation**
Trans-scale interface fracture characterization for ductile film/ceramic substrate systems
Yueguang Wei*, Jingru Song, Jianyun Liu
Institute of Mechanics, Chinese Academy of Science, China

M02

Professor Anthony G. Evans Memorial Symposium

M02-S3

Tuesday June 18, 16:00–18:00

Room: 401

Co-Chair: Tian J. Lu (China), Yueguang Wei (China)

- 16:00 M02-007 **Keynote Presentation**
Applications and mechanics for the cracking of films on compliant substrates
M.D. Thouless*, J. Huang, B. C. Kim, S. Takayama
University of Michigan, USA
- 16:30 M02-010 **Keynote Presentation**
Buckling delamination of compressed thin films
Myoung-Woon Moon*, Kwang-Ryeol Lee
IMCI, KIST, Korea Republic
- 17:00 M02-002 **Keynote Presentation**
Cracking and decohesion of single atomic layers on ductile substrates
Xuanhe Zhao*
Duke University, USA
- 17:30 M02-012 **Keynote Presentation**
Modeling and optimization of nanotubes reinforced ceramic composites
Fabio Pavia*, William A. Curtin
Institute of Mechanical Engineering, EPFL, Switzerland

M02-S4

Wednesday June 19, 10:30–12:30

Room: 401

Co-Chair: Robert O. Ritchie (USA), Myoung-Woon Moon (Republic of Korea)

- 10:30 M02-005 **Keynote Presentation**
Puncture resistance of steel sandwich panels with anticlastic core structures
Fabien Ebnoether, Dirk Mohr*
Ecole Polytechnique, France
- 11:00 M02-009 **Keynote Presentation**
On the notion of fracture locus of a ductile material
A. Amine Benzerga*, Nithin Thomas, Shami Basu
Texas A&M University, USA
- 11:30 M02-003 **Keynote Presentation**
A pipeline approach to developing virtual tests for composite materials
Brian N. Cox*, Hrishikesh Bale, Matthew Blacklock, David B. Marshall, John Shaw, Robert O. Ritchie, Qingda Yang, Frank Zok, Renaud Rinaldi, Tony Fast
Teledyne Scientific, USA
- 12:00 M02-019 **Keynote Presentation**
Modeling of internal charge density hysteresis and piezoelectricity of ferroelectrets
B.X. Xu, D. Gross*, H. von Seggern, S. Zhukov
Department of Solid Mechanics, TU Darmstadt, Germany

M03

Challenging Issues in Smart Materials and Structures

M03-S1

Monday June 17, 16:00–18:00

Room: 208A

Co-Chair: Tong-Yi Zhang (Hong Kong, China), Cunfa Gao (China)

- 16:00 M03-002 **Keynote Presentation**
Effects of electric field and poling on the cyclic bending fatigue in cracked piezoceramics
Yasuhide Shindo*, Fumio Narita, Masayuki Sato
Tohoku University, Japan
- 16:30 M03-009 **Keynote Presentation**
Fracture mechanical concepts for cracks in ferroelectric materials
Meinhard Kuna*
TU Bergakademie Freiberg, Germany
- 17:00 M03-005 **Three-phase elliptical inclusions with an internal stress field of linear form**
Xu Wang*
East China University of Science and Technology, China
- 17:20 M03-006 **Dislocations emitted from a blunt crack tip in a piezoelectric material**
Haopeng Song*, Cunfa Gao
Nanjing University of Aeronautics & Astronautics, China
- 17:40 M03-007 **An imperfect joint on the propagation of thickness-twist waves in an inhomogeneous piezoelectric plate**
Z.-H. Qian*, P. Li, F. Jin
Nanjing University of Aeronautics and Astronautics, China

M03-S2

Tuesday June 18, 10:30–12:20

Room: 208A

Co-Chair: Yasuhide Shindo (Japan), Leslie Banks-Sills (Israel)

- 10:30 M03-012 **Keynote Presentation**
The role of electrostatic tractions in the fracture of dielectric materials under mechanical and/or electric loading
Tong-Yi Zhang*, Tao Xie
Hong Kong University of Science and Technology, Hong Kong, China
- 11:00 M03-017 **Phase-transformation toughening of antiferroelectric ceramics**
Wei Hong*, Jingyi Zhang, Eli Young, Xiaoli Tan
Iowa State University, USA
- 11:20 M03-011 **Evaluation of strength recovery and analysis of damage progression of notched unidirectional carbon/epoxy composites encompassing selfhealing of interfacial debonding**
Kazuaki Sanada*, Yuta Mizuno, Yasuhide Shindo
Toyama Prefectural University, Japan
- 11:40 M03-008 **On temperature-dependent fracture of PZT and lead-containing materials combined with temperature-dependent ferroelasticity**
Kyle G. Webber*, Yo-Han Seo, Jürgen Rödel
Technische Universität Darmstadt, Germany
- 12:00 M03-010 **Multi-layered piezomagnetic/piezoelectric composite with periodic interface cracks subjected to in-plane mechanical, magnetic or electric loading**
Wenxiang Tian*, Yaochen Li, Zheng Zhong
Tongji University, China

M03

Challenging Issues in Smart Materials and Structures

M03-S3

Tuesday June 18, 16:00–18:00

Room: 208A

Co-Chair: Dai-Ning Fang (China), Meinhard Kuna (Germany)

- 16:00 M03-018 **Keynote Presentation**
Fracture criteria for piezoelectric ceramics
Leslie Banks-Sills*
Tel Aviv University, Israel
- 16:30 M03-015 **Keynote Presentation**
Dielectric breakdown from the nano- to millimeter scale: Long known but still not well understood
Gerold A. Schneider*, Claudia Neusel
Hamburg University of Technology, Germany
- 17:00 M03-014 **Wear resistant polymers with incorporation of HDI microcapsule based self-healing chemistry**
Nay Win Khun, Dawei Sun, Mingxing Huang, He Zhang, Jinglei Yang*
Nanyang Technological University, Singapore
- 17:20 M03-013 **Anti-plane moving polarization saturation crack in ferroelectric solids**
Hao-Sen Chen*, Dai-Ning Fang
Tsinghua University, China
- 17:40 M03-003 **Tension-tension fatigue and electrical resistance of carbon nanotube/polymer composites at cryogenic temperatures**
Yasuhide Shindo, Tomo Takeda, Zhijuan Wei*, Yu Kuronuma, Fumio Narita
Tohoku University, Japan

M04

Very High Cycle Fatigue

M04-S1

Monday June 17, 16:00–18:00

Room: 210B

Co-Chair: Youshi Hong (China), Manuela Sander (Germany)

- 16:00 M04-031 **Keynote Presentation**
Microplasticity, microdamage, microcracking in ultrasonic fatigue
C. Bathias*, D. Field, S. Antolovich, P.C. Paris
University of Paris Ouest, France
- 16:30 M04-020 **Keynote Presentation**
Defect induced scaling in gigacycle fatigue
Vladimir Oborin, Mickail Bannikov, Oleg Naimark*, Palin-Luc Thierry
Institute of continuous media mechanics UB RAS, Russia
- 17:00 M04-003 **Is there a threshold for PSB formation in iron**
Chong Wang*, Danièle Wagner, Qingyuan Wang, Claude Bathias
Université Paris Ouest Nanterre La Défense, France
- 17:20 M04-001 **Thermal dissipation investigation in very high cycle fatigue**
Zhiyong Huang*, Claude Bathias, Danièle Wagner
Sichuan University, China
- 17:40 M04-009 **Effect of surface residual stress and loading tape on very high cycle fatigue properties of clean spring steel**
Wei Li*, Tatsuo Sakai, Huang Yuan
Beijing Institute of Technology, China

M04-S2

Tuesday June 18, 10:30–12:20

Room: 210B

Co-Chair: Claude Bathias (France), Qingyuan Wang (China)

- 10:30 M04-002 **Keynote Presentation**
Experimental and analytical study of the effect of variable amplitude loadings in VHCF regime
Manuela Sander*, Thomas Müller
University of Rostock, Institute of Structural Mechanics, Germany
- 11:00 M04-005 **Fatigue strength prediction for high-strength steels with fish-eye mode failure**
Chengqi Sun*, Zhengqiang Lei, Jijia Xie, Youshi Hong
Institute of Mechanics, Chinese Academy of Sciences, China
- 11:20 M04-006 **Application of Dang Van criterion to rolling contact fatigue in wind turbine roller bearings**
Michele Cerullo*
Technical University of Denmark, Denmark
- 11:40 M04-007 **Effects of microstructure on very-high-cycle fatigue crack initiation and life scatter for a high strength steel**
Zhenqiang Lei*, Youshi Hong, Jijia Xie, Chengqi Sun, Xiaolong Liu
Institute of Mechanics, Chinese Academy of Sciences, China
- 12:00 M04-014 **Effect of yttrium content on the ultra-high cycle fatigue behavior of Mg-Zn-Y-Zr alloys**
Daokui Xu*, Enhou Han
Institute of Metal Research, Chinese Academy of Sciences, China

M04

Very High Cycle Fatigue

M04-S3

Tuesday June 18, 16:00–17:50

Room: 210B

Co-Chair: Oleg Naimark (Russia), Martina Zimmermann (Germany)

- 16:00 M04-008 **Keynote Presentation**
Very high cycle fatigue for single phase ductile materials: Microplasticity and energy dissipation
Veronique Favier, Ngoc L. Phung, Nicolas M., Nicolas Ranc, Nicolas Saintier, Chong Wang, Daniele Wagner*, Claude Bathias, Antoine Blanche, Andre Chrysochoos, Fabienne Gregori
Arts et Métiers Paris Tech, CNRS, PIMM, France
- 16:30 M04-011 **Evaluation of an ultrasonic device to test fretting-fatigue in very high cycle regime**
Pedro Filgueiras, Claude Bathias, Ernani Palma, M. Wang*
Université Paris Ouest, France
- 16:50 M04-010 **The effects of ultrasonic shot peening treatment on the very long life fatigue behavior of welded joints**
Y.J. Liu*, M. K. Khan, C. He, Q.Y. Wang
Sichuan University, China
- 17:10 M04-027 **Investigations of subcritical crack propagation under high cycle fatigue**
Attilio Arcari, Nagaraja Iyyer*, Kittur Madan
Technical Data Analysis Inc., USA
- 17:30 M04-030 **The significance of two-phase plasticity for the crack initiation process during very high cycle fatigue of duplex steel**
Giertler Alexander*, Söker Marcus, Dönges Benjamin, Istomin Konstantin, Christ Hans-Jürgen, Pietsch Ullrich, Fritzen Claus-Peter, Ludwig Wolfgang, Krupp Ulrich
University of Applied Sciences Osnabrück, Germany

M04-S4

Wednesday June 19, 10:30–12:00

Room: 210B

Co-Chair: Veronique Favier (France), Palin-Luc Thierrt (France)

- 10:30 M04-016 **Keynote Presentation**
Effect of aging condition on fatigue strength of maraging steel in long life region
Qiang Chen*, Qingyuan Wang, Norio Kawagoishi, Kohji Kariya, Yuzo Nakamura, Nu Yan
Kumamoto University, Japan
- 11:00 M04-013 **Very high cycle fatigue (VHCF) behavior of structured Al 2024 thin sheets**
Sebastian Stille*, Tilmann Beck, Lorenz Singheiser
Institute of Energy and Climate Research: IEK-2, FZ Juelich, Germany
- 11:20 M04-018 **Very high cycle fatigue strength of a high strength steel under sea water corrosion**
Palin-Luc Thierrt*, Claude Bathias
Arts et Métiers Paris Tech, France
- 11:40 M04-024 **Experimental investigation on effects of various factors on very high cycle fatigue property for spring steels**
Taku Miura, Tatsuo Sakai*, Takayuki Sakakibara, Shingo Mimura, Takanori Kuno, Shoichi Kikuchi, Akira Ueno
Ritsumeikan University, Japan

M04

Very High Cycle Fatigue

M04-S5

Wednesday June 19, 13:30–15:20

Room: 210B

Co-Chair: Qiang Chen (Japan), Laurent Gallimard (France)

- 13:30 M04-004 **Keynote Presentation**
Subsurface non defect fatigue crack origin and local plasticity exhaustion
Guocai Chai*
Strategy research, Sandvik Materials Technology, Sweden
- 14:00 M04-015 **Influence of high mean stresses on lifetime and damage of the martensitic steel X10CrNiMoV12-2 in the VHCF regime**
Stephan Kovacs, Beck Tilmann*, Singheiser Lorenz
Forschungszentrum Jülich, IEK-2, Germany
- 14:20 M04-017 **Influence of deformation-induced alpha prime martensite on the crack initiation mechanism in a metastable austenitic steel in the HCF and VHCF regime**
Martina Zimmermann*, Andrei Grigorescu, Carsten Mueller-Bollenhagen, Hans-Jüergen Christ
Universitaet Siegen, Germany
- 14:40 M04-025 **Surface crack initiation phenomenon in very high cycle fatigue**
Muhammad Kashif Khan*, Qingyuan Wang
Sichuan University, China
- 15:00 M04-026 **Finite element modeling of the coupling between thermal dissipation and fish-eye crack growth in very high cycle fatigue regime**
Laurent Gallimard*, Quan H. Nguyen, Claude Bathias
Université Paris Ouest Nanterre La Défense, France

M04-S6

Wednesday June 19, 16:00–17:40

Room: 210B

Co-Chair: Guocai Chai (Sweden), Beck Tilmann (Germany)

- 16:00 M04-019 **Study of fatigue crack mechanism on an armco iron in the gigacycle fatigue by temperature recording and microstructural observations**
Chong Wang, Danièle Wagner*, Qingyuan Wang, Claude Bathias
University Paris Ouest, France
- 16:20 M04-021 **The effect of damage accumulation in slip bands on the resonant behavior in the very high cycle fatigue (VHCF) regime**
Philipp Hilgendorff*, Andrei Grigorescu, Martina Zimmermann, Claus-Peter Fritzen, Hans-Juergen Christ
Universität Siegen, Germany
- 16:40 M04-022 **Lifetime and crack initiation of fcc materials in small scale under multiaxial cyclic loading in the high and very high cycle fatigue regimes**
Thomas Straub*, Tobias Kennerknecht, Matthew F. Berwind, Yuri Lapusta, Christoph Eberl
Institute for Applied Materials, Karlsruhe Institute of Technology, Germany
- 17:00 M04-023 **Very high cycle fatigue behavior of plasma nitrated 316 stainless steel**
Daisuke Yonekura*, Kei Ozaki, Ryota Shibahara, Insup Lee, Ri-ichi Murakami
The University of Tokushima, Japan
- 17:20 M04-028 **α -iron and carbon steels under VHCF conditions: Localized deformation, crack initiation and fracture**
Bach Jochen, Johannes J. Möller*, Bitzek Erik, Heinz Höppel Werner, Göken Mathias
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

M05

Extended Finite Element Methods and Their Applications

M05-S1

Monday June 17, 16:00–17:30

Room: 208B

Co-Chair: Zhuo Zhuang (China), Dandan Xu (China)

- 16:00 M05-014 **Keynote Presentation**
Implementation of the extended finite element method for hydraulic fracture problems
Zuorong Chen*
CSIRO Earth Science and Resource Engineering, Australia
- 16:30 M05-001 **An interaction integral method for 2D elastodynamic crack problems**
Zhiyong Wang, Li Ma*, Linzhi Wu
Harbin Institute of Technology, China
- 16:50 M05-002 **The numerical simulation of the crack elastic–plastic extension based on the generalized extended element method**
Xiao-Zhou Xia*, Qing Zhang, Hong Wang
Hohai University, China
- 17:10 M05-007 **Residual stress analysis of a thermal barrier coating system**
H.J. Shin*, B.J. Kim, C.S. Seok, J.M. Koo, B.S. Lim, M.K. Kim
Sungkyunkwan University, South Korea

M05-S2

Tuesday June 18, 10:30–12:00

Room: 208B

Co-Chair: Zuorong Chen (Australia), Jianbo Li (China)

- 10:30 M05-012 **Keynote Presentation**
Development of XFEM on CB shell element for simulating 3D arbitrary crack growth
Zhuo Zhuang*
Tsinghua University, China
- 11:00 M05-003 **The extended finited element method for frictional contact problem**
Zhiqiang Hu*, Guogang Fan, Gao Lin
Dalian University of Technology, China
- 11:20 M05-005 **Crack modeling using extended finite element method with mesh superposition**
Maigefireti Maitireyimu*, Zhanli Liu, Zhuo Zhuang, Masanori Kikuchi
Tsinghua University, China
- 11:40 M05-008 **Dynamic crack propagation analysis by the extended finite element method**
Luyang Shi*, Tiantang Yu
Hohai University, China

M05 Extended Finite Element Methods and Their Applications

M05-S3

Tuesday June 18, 16:00–17:30

Room: 208B

Co-Chair: Zhongpu Zhang (Australia), Li Ma (China)

- 16:00 M05-013 **Keynote Presentation**
XFEM modeling of ultrasonic wave propagation in polymer matrix particulate/fibrous composites
Zhanli Liu*, Ted Belytschko
Tsinghua University, China
- 16:30 M05-004 **Numerical simulation for discontinuities propagation on the curved shell structure with XFEM**
Heng Wang, Zhuo Zhuang*, Zhanli Liu, Dandan Xu, Qinglei Zeng
Tsinghua University, China
- 16:50 M05-006 **Crack propagation simulations of concrete structures based on cohesive crack models in XFEM**
Shouyan Jiang*, Chengbin Du
Hohai University, China
- 17:10 M05-011 **A hybrid scaled boundary finite element-extent finite element method to model discrete cracks**
Jianbo Li*, Xunqiang Yin, Gao Lin, Zhiqiang Hu
Dalian University of Technology, China

M05-S4

Wednesday June 19, 10:30–11:50

Room: 208B

Co-Chair: Zhanli Liu (China), Qinglei Zeng (China)

- 10:30 M05-009 **Study of dynamic crack branching with extended finite element method**
Dandan Xu*, Zhanli Liu, Zhuo Zhuang
Tsinghua University, China
- 10:50 M05-010 **Finite element analysis software integration of extended finite element method (XFEM) based on different elements**
Qinglei Zeng*, Zhanli Liu, Zhuo Zhuang
Tsinghua University, China
- 11:10 M05-016 **Loading positions in fracture response of inlay fixed partial dentures**
Zhongpu Zhang*, Mark C. Thompson, Clarice Field, Wei Li, Qing Li, Michael V. Swain
University of Sydney, Australia
- 11:30 M05-015 **Analysis of universal weight function method for interface crack problems under mechanical and thermal loadings**
Long Li, Guozhong Chai, Yumei Bao*
Zhejiang University of Technology, China

M06

Materials and Structures under Severe Conditions

M06-S1

Wednesday June 19, 10:30–11:50

Room: 208A

Co-Chair: Stefano Signetti (Italy), Chen-Guang Huang (China)

- 10:30 M06-001 **Thermal shock residual strength of ultra-high temperature ceramics with the consideration of temperature**
Dingyu Li*, Weiguo Li, Ruzhuan Wang, Daining Fang
Chongqing University, China
- 10:50 M06-003 **Computation of losses in a HTS slab in the liquid nitrogen region carrying AC transport current in external AC magnetic field**
Chen-Guang Huang*, You-He Zhou
Lanzhou University, China
- 11:10 M06-002 **UHPC precast product under severe freeze-thaw conditions**
Ming-Gin Lee*, Kun-Long Lee, Mang Tia
Chaoyang University of Technology, Taiwan, China
- 11:30 M06-004 **Spider-web-inspired anti-catastrophe civil structures**
Stefano Signetti*, Nicola Pugno
Università di Trento, Italy

M07 Strategic International Cooperative Research on the Predicting Methods of the Life of Crack Growth and Initiation under High Temperature–Creep Fatigue Conditions

M07-S1

Thursday June 20, 13:30–15:10

Room: 207

Co-Chair: Toshimitsu Yokobori (Japan), Kamran Nikbin (UK)

- 13:30 M07-006 **Keynote Presentation**
Evaluation of creep damage and fracture in high Cr steel welds
Masaaki Tabuchi*
Materials Reliability Unit, National Institute for Materials Science, Japan
- 14:00 M07-001 **Keynote Presentation**
Novel direct method on the life prediction of component under high temperature—creep fatigue conditions
Haofeng Chen*
University of Strathclyde, UK
- 14:30 M07-002 **Creep crack initiation and growth behavior in weldments of high Cr steels**
Ryuji Sugiura*, Toshimitsu Yokobori, Kazuto Sato, Masaaki Tabuchi, Kenichi Kobayashi, Masataka Yatomi, Kamran Nikbin
Tohoku University, Japan
- 14:50 M07-004 **Three-dimensional vacancy diffusion analysis related to micro damage of C(T) specimen for P92 steel under creep condition**
Haruhisa Shigeyama*, A. Toshimitsu Yokobori Jr., Ryuji Sugiura, Takashi Matsuzaki
Tohoku University, Japan

M07-S2

Thursday June 20, 16:00–17:50

Room: 207

Co-Chair: Masaaki Tabuchi (Japan), Haofeng Chen (UK)

- 16:00 M07-007 **Keynote Presentation**
Fracture based testing and modelling, and component fracture based testing and modelling, and component life assessment of welds
Kamran Nikbin*
Imperial College, UK
- 16:30 M07-005 **Study on the predicting models of low-cycle thermal fatigue life of Glidcop Al-15**
Haibo Chen, Weiling Xiao, Yan Yin*
University of Science and Technology of China, China
- 16:50 **Discussion**

M08

Reliability and Integrity of Engineering Structures

M08-S1

Monday June 17, 16:00–17:40

Room: 203B

Co-Chair: Ernian Pan (USA), Xin Chen (Japan)

- 16:00 M08-021 **Keynote Presentation**
High temperature failure of silica optical fibers for sensing applications
Yun Tu, Peng Han, Shan-Tung Tu*
East China University of Science and Technology, China
- 16:30 M08-017 **Keynote Presentation**
Interlaminar shear strength for three kinds of ceramic matrix composites at 1173K
Jianjie Gou, Chengyu Zhang, Shengru Qiao*, Xuanwei Wang
Northwestern Polytechnical University, China
- 17:00 M08-006 **Prediction of the elliptic surface crack growth behavior based on cycle strain damage**
Kaikai Shi*, Long Chen, Lixun Cai
Southwest Jiaotong University, China
- 17:20 M08-016 **Effect of SiC partilces on fatigue crack propagation of spray-formed SiC particulate-reinforced Al–Si alloy composites**
Wei Li*, Jian Chen, Jianjun He, Wei Qiu, Yanjie Ren, Jianlin Chen
Changsha University of Science and Technology, China

M08-S2

Tuesday June 18, 10:30–12:00

Room: 203B

Co-Chair: Shengru Qiao (China), Sugui Tian (China)

- 10:30 M08-005 **Keynote Presentation**
Stress analysis of spring-shaped fiber reinforced anisotropic and layered composites
Ali Sanghaleh, Ernian Pan*
University of Akron, USA
- 11:00 M08-007 **Effect of pitch difference on anti-loosening performance for high strength bolts and nuts**
Xin Chen*, Yu-Ichiro Akaishi, Nao-Aki Noda, Yoshikazu Sano, Yasushi Takase
Kyushu Institute of Technology, Japan
- 11:20 M08-024 **Comparing crack growth testing and simulation results under thermo-mechanical fatigue conditions**
Ramesh Chandwani*, Christopher M. Timbrell, Steve Jacques, Lee Waterhouse, Andrew Wisbey, Steve Williams
Zentech International Limited, UK
- 11:40 M08-002 **Integrity increasing of damaged steel pipelines using external and internal reinforcing**
Janos Lukacs*, Gyula Nagy, Imre Torok
University of Miskolc, Hungary

M08-S3

Tuesday June 18, 16:00–17:50

Room: 203B

Co-Chair: Shan-Tung Tu (China), Zhanpeng Lu (China)

- 16:00 M08-003 **Keynote Presentation**
High temperature precipitation strengthening of an Al-containing austenitic stainless steel
Xianping Dong, Lin Zhao, Feng Sun, Lanting Zhang*
Shanghai Jiaotong University, China
- 16:30 M08-012 **Research on the new low temperature self-protective pasty boronizing processes of thermal power plant economizer pipe**
Jianjun He*, Jian Chen, Yan Ren, Wei Qiu, Beier Luo
Changsha University of Science & Technology, China
- 16:50 M08-026 **Reliability of micro/macro-fatigue crack growth behavior in the wires of cable-stayed bridge**
Keke Tang*
East China University of Science and Technology, China
- 17:10 M08-022 **Application of boundary element method in the linear elastic contact problems**
Xingshuai Zheng*, Jianming Zhang
Hunan University, China
- 17:30 M08-004 **Study on fracture toughness of multilayer weld joint based on microstructure**
Yuemei Zhu*, Haili Wu, Guoqing Jia, Shangfei Qiao, Chunxiang An
Shanghai Electric Power Generation Equipment Co., Ltd., China

M08

Reliability and Integrity of Engineering Structures

M08-S4

Wednesday June 19, 10:30–11:30

Room: 203B

Co-Chair: Keke Tang (China), Lanting Zhang (China)

- 10:30 M08-015 **LCF behavior and life modeling of DZ125 under complicated load condition at high temperature**
Jia Huang*, Xiaoguang Yang, Duoqi Shi, Xiaoan Hu
BeiHang University, China
- 10:50 M08-023 **Atomistic simulation of fatigue crack growth in α -Fe under high temperature**
Tong Liu*, Minshan Liu
Thermal Energy Engineering Research Center of Zhengzhou University, China
- 11:10 M08-011 **A design criterion of high temperature structure based on creep damage mechanisms**
Ting Ye*, Fu-Zhen Xuan, Zhengdong Wang, Shan-Tung Tu
East China University of Science and Technology, China

M09

Boundary Element Methods and Applications

M09-S1

Thursday June 20, 10:30–12:10

Room: 212B

Co-Chair: Chuanzeng Zhang (Germany), CuiYing Fan (China)

- 10:30 M09-002 **Keynote Presentation**
Some benchmark problems and basic ideas for the accuracy of conventional and fast boundary element method
Zhenhan Yao*
Tsinghua University, China
- 11:00 M09-006 **Keynote Presentation**
Fast multipole BEM for modeling material related problems
Yijun Liu*, Shuo Huang
University of Cincinnati, USA
- 11:30 M09-001 **Development of classical boundary element analysis of fracture mechanics in gradient materials**
Quentin Z.Q. Yue*, Hong Tian Xiao
The University of Hong Kong, Hong Kong, China
- 11:50 M09-003 **Fast boundary element analysis for 3D magneto-electro-elastic bimaterial**
Ernian Pan*, Yanfei Zhao
University of Akron, USA

M09-S2

Thursday June 20, 13:30–15:00

Room: 212B

Co-Chair: Zhenhan Yao (China), Haitao Wang (China)

- 13:30 M09-008 **Keynote Presentation**
A BEM for transient coupled thermoelastic crack analysis of homogeneous/functionally graded bimetals
Chuanzeng Zhang*, Alexander Ekhlakov, Oksana Khay
University of Siegen, Germany
- 14:00 M09-011 **Crack growth-based fatigue life prediction using spline fictitious boundary element method**
Cheng Su*, Chun Zheng
South China University of Technology, China
- 14:20 M09-013 **Numerical method for penny-shaped cracks in 3D magnetoelastoelectric media based on EMPS model**
Zhenghua Guo, Cuiying Fan*, Minghao Zhao
Zhengzhou University, China
- 14:40 M09-012 **Three-dimensional fracture analysis using boundary face method**
Guizhong Xie*, Jianming Zhang, Fenglin Zhou
Hunan University, China

M09

Boundary Element Methods and Applications

M09-S3

Thursday June 20, 16:00–18:00

Room: 212B

Co-Chair: Yijun Liu (USA), Quentin ZQ Yue (China)

- 16:00 M09-014 **Keynote Presentation**
Crack analysis by boundary element method with fields in crack cavity
Mengmeng Lian, Cuiying Fan, Minghao Zhao*
Zhengzhou University, China
- 16:30 M09-015 **Keynote Presentation**
Null-field integral approach for the piezoelectricity problems with arbitrary elliptical inhomogeneities
Ying-Te Lee*, Jeng-Tzong Chen, Shyh-Rong Kuo
National Taiwan Ocean University, Taiwan, China
- 17:00 M09-010 **Reserch on characteristic values of notched plane problem of orthotropic materials**
Song Cen, Xiangrong Fu*, Ge Tian, Jiao Deng, Mingjue Zhou, Mengyan Song
China Agricultural University, China
- 17:20 M09-007 **Numerical simulation on microstructure of graphite using fast multipole boundary element method**
Hongtao Wang, Haitao Wang, Lie Jin*, Xinxin Wu, Zhenhan Yao
Tsinghua University, China
- 17:40 M09-009 **An investigation on fracture toughness of graphite using test and numerical methods**
Siyang Zhu*, Libin Sun, Xiaowei Luo
Tsinghua University, China

M10

Local Approaches to Cleavage and Ductile Fracture

M10-S1

Monday June 17, 16:00–17:50

Room: 207

Co-Chair: Masakazu Kobayashi (Japan), Andrey P. Jivkov (UK)

- 16:00 M10-006 **Keynote Presentation**
Fracture toughness predictions using the Weibull stress model with implications for estimations of the T_0 reference temperature
Claudio Ruggieri*, Robert H. Dodds
University of Sao Paulo, Brazil
- 16:30 M10-002 **Modeling the effect of residual stress on the ductile fracture behavior of an aluminum alloy 5083-H116**
Xiaosheng Gao*, Jun Zhou
The University of Akron, USA
- 16:50 M10-008 **On modeling of thermal embrittlement in RPV steels using the local approach to fracture**
Andrieu Antoine, André Pineau, Joly Pierre, François Roch, Mathieu Maziere*
Ecole des Mines de Paris, France
- 17:10 M10-018 **Analysis of the specimen type effect on fracture toughness of RPV steels with different embrittlement degrees on the basis of the Prometey and the Beremin models**
Valentin N. Fomenko, Victor I. Kostylev*, Boris Z. Margolin
Central Research Institute of Structural Materials "Prometey", Russia
- 17:30 M10-010 **In-situ synchrotron-radiation computed laminography observation and simulations of ductile fracture of a forged 6061-T6 Al-alloy**
Thilo F. Morgeneyer*, Yang Shen, Jerome Garnier, Lukas Helfen, Lucien Allais, Alexandre Tanguy, Jerome Crepin
Centre des Matériaux-Mines ParisTech, France

M10-S2

Tuesday June 18, 10:30–12:20

Room: 207

Co-Chair: Kim RW Wallin (Finland), Thilo F. Morgeneyer (France)

- 10:30 M10-014 **Keynote Presentation**
Application of damage models to the ductile-brittle transition region of reactor steels
Thomas Linse, Meinhard Kuna*
TU Bergakademie Freiberg, Germany
- 11:00 M10-005 **Load history effects on fracture toughness of RPV steel**
Jeremy Hure*, Benoit Tanguy
CEA Saclay DEN/DANS/DMN/SEMI/LCMI, France
- 11:20 M10-011 **Influence of static strain aging on ductile-to-brittle transition in C-Mn steel**
Antony Marais, Matthieu Maziere*, Samuel Forest, Aurore Parrot, Patrick Le Delliou
Mines Paris Tech, Centre des Matériaux, France
- 11:40 M10-020 **Stress-controlled and stress-and-strain controlled criteria of brittle fracture in local approach**
Victoria A. Shvetsova*, Boris Z. Margolin, Alexander G. Gulenko
Institute of Structural Materials "Prometey", Russia
- 12:00 M10-024 **Local approach applied to the fracture toughness of resistance spot welds**
Florent Krajcarz, Anne-Francoise Gourgues-Lorenzon, Emmanuel Lucas, Matthieu Maziere*, André Pineau
Centre des Matériaux, MINES Paris Tech, UMR CNRS 7633, France

M10

Local Approaches to Cleavage and Ductile Fracture

M10-S3

Tuesday June 18, 16:00–17:40

Room: 207

Co-Chair: Boris Z. Margolin (Russia), Matthieu Maziere (France)

- 16:00 M10-022 **Keynote Presentation**
Long-unnoticed origin of ductile fracture in aluminium alloys
 Hiroyuki Toda, Hideyuki Oogo, Hideki Tsuruta, Kentaro Uesugi, Akihisa Takeuchi, Yoshio Suzuki, Masakazu Kobayashi*
Toyohashi University of Technology, Japan
- 16:30 M10-016 **Keynote Presentation**
Application of the local approach for prediction of ductile fracture of highly irradiated austenitic steels
 Boris Z. Margolin*, Alexander A. Sorokin, Viktor I. Kostylev
Central Research Institute of Structural Material "Prometey", Russia
- 17:00 M10-004 **Cleavage modelling with experimental particle size distribution and novel particle failure criterion**
 Andrey P. Jivkov*, Peter James
The University of Manchester, UK
- 17:20 M10-021 **The scatter of measured K_{IC} related to the scatters of local parameters of X_f , σ_f and ε_{pc}**
 Jianhong Chen*, Rui Cao
Lanzhou University of Technology, China

M10-S4

Wednesday June 19, 10:30–12:30

Room: 207

Co-Chair: Benoit Tanguy (France), Xiaosheng Gao (USA)

- 10:30 M10-023 **Keynote Presentation**
The elusive temperature dependence of the Master Curve
 Kim R.W. Wallin*
Materials and Built Environment, Finland
- 11:00 M10-003 **Keynote Presentation**
Parameters affecting cleavage fracture in duplex stainless steels
 Guocai Chai*, Peter Stenvall
Strategy Research, Sandvik Materials Technology, Sweden
- 11:30 M10-007 **A local approach to creep-fatigue-oxidation interactions in Inco718 alloy**
 André Pineau, Raul De Moura Pinho, Stéphane Pierret*, Caroline Mary,
Snecma-SAFRAN Group; Site de Villaroche YQMM, France
- 11:50 M10-013 **Integrated damage mechanics approach to brittle and ductile crack propagation**
 Geralf Hütter*, Thomas Linse, Uwe Mühlich, Meinhard Kuna
TU Bergakademie Freiberg, Germany

M11-S1

Thursday June 20, 16:00–18:00

Room: 202A

Co-Chair: Zhiping Xu (China), Dechang Li (China)

- 16:00 M11-005 **Keynote Presentation**
Bioinspiration from the sea: Structure, mechanics and performance of teleost fish scales
Deju Zhu, Lawrence Szewciw, Franck Vernerey, Francois Barthelat*
McGill University, Canada
- 16:30 M11-004 **Keynote Presentation**
Probing mechanical principles of cell-nanoparticles interaction
Xinghua Shi*
Institute of Mechanics, Chinese Academy of Sciences, China
- 17:00 M11-001 **How the tooth got its stripes: A kinetic strain patterning hypothesis**
Brian Cox*
Teledyne Scientific, Thousand Oaks, USA
- 17:20 M11-002 **Coarse-grained molecular simulations of the processes of nanoparticles penetrating an asymmetric lipid bilayer**
Xiacong He*, Zhiguo Qu, Feng Xu
Xi'an Jiaotong University, China
- 17:40 M11-003 **Coarse-grained and atomistic molecular dynamics study of the interactions between HIV-1 protease and its inhibitors**
Dechang Li*, Ming S. Liu, Baohua Ji, Keh-Chih Hwang, Yonggang Huang
Beijing Institute of Technology, China

M12

Fracture and Instabilities in Soft Solids

M12-S1

Tuesday June 18, 16:00–17:40

Room: 202B

Co-Chair: Jinxiong Zhou (China), Oscar Lopez-Pamies (USA)

- 16:00 M12-004 **Keynote Presentation**
Electro-cavitation instability: Theory, experiment and application
Xuanhe Zhao*
Duke University, USA
- 16:30 M12-009 **Keynote Presentation**
Buckling to creasing transition in soft materials
Shengqiang Cai*
University of California, USA
- 17:00 M12-007 **The brittleness of physical gels**
Wei Hong*
Iowa State University, USA
- 17:20 M12-002 **Research on dynamic mechanical properties of soft abdominal tissues**
Bao Zhen Wang*, Shi Sheng Hu
University of Science and Technology of China, China

M12-S2

Wednesday June 19, 10:30–12:10

Room: 202B

Co-Chair: Shengqiang Cai (USA), Bao Zhen Wang (China)

- 10:30 M12-001 **Keynote Presentation**
A phase-field model for rubber fracture
Wei Hong*
Iowa State University, USA
- 11:00 M12-005 **Keynote Presentation**
Cavitation in rubber: An elastic instability or a fracture phenomenon?
Oscar Lopez-Pamies*, Victor LeFevre
University of Illinois at Urbana-Champaign, USA
- 11:30 M12-006 **Swelling induced instability of stimuli-responsive hydrogels**
Wei Guo, Jiasong Geng, Jinxiong Zhou*
Xi'an Jiaotong University, China
- 11:50 M12-008 **Microscopic model for fracture of crystalline Si-NWs for lithium ion batteries**
Ill Ryu*, Seok Woo Lee, Yi Cui, William Nix
Stanford University, USA

M13 Atomistic Modeling & Simulation of Mechanical Properties and Fracture of Materials

M13-S1

Monday June 17, 16:00–18:00

Room: 212B

Co-Chair: Shigenobu Ogata (Japan), Jun Chen (China)

- 16:00 M13-005 **Keynote Presentation**
The nature of crack propagation in brittle crystals
Dov Sherman*
Technion-Israel Institute of Technology, Israel
- 16:30 M13-007 **Keynote Presentation**
Connecting microscopic structure and macroscopic mechanical properties of structural materials from first principles
Guang-Hong Lu*
Beihang University, China
- 17:00 M13-001 **Atomistic understanding on creep in bulk nanostructured metals**
Yun-Jiang Wang*, Guo-Jie J. Gao, Shigenobu Ogata
Osaka University, Japan
- 17:20 M13-009 **Chirality and size dependent elastic properties of silicene nanoribbons under uniaxial tension**
Yuhang Jing*, Yi Sun, Hongwei Niu, Jun Shen
Harbin Institute of Technology, China
- 17:40 M13-018 **Molecular dynamics simulation of fatigue crack growth interacting with twin boundary in bcc NiAl**
Xiongwei Yang*, Xinhua Yang, Xiaoqiao He
Huazhong University of Science and Technology, China

M13-S2

Tuesday June 18, 10:30–12:20

Room: 212B

Co-Chair: Guang-Hong Lu (China), Wangyu Hu (China)

- 10:30 M13-028 **Keynote Presentation**
Structure collapse of micronanoscaled metals and its physical origin
Zhangjie Wang, Zhiwei Shan*
Xi'an Jiaotong University, China
- 11:00 M13-002 **The micro-mechanism of the micro-spallation in metal Pb under shock loading**
Jun Chen*, Meichen Xiang
Institute of Applied Physics and Computational Mathematics, China
- 11:20 M13-003 **Analysis of a singular stress field near the edge of joint using molecular dynamics**
Hideo Koguchi, Nobuyasu Suzuki*
Nagaoka University of Technology, Japan
- 11:40 M13-027 **Relating fracture and surface energies: The case of liquid metal embrittlement**
Thierry Auger*, Duane Johnson, Linlin Wang, Samuel Hemery
MSSMAT/ECP, UMR CNRS 8579, France
- 12:00 M13-029 **MD simulation of the tensile deformation and fracture of perfect and defect-containing TiAl single crystals**
Henan Wu, Dongsheng Xu*, Hao Wang, Anil K. Sachdev, Rui Yang
Institute of Metal Research, Chinese Academy of Sciences, China

M13 Atomistic Modeling & Simulation of Mechanical Properties and Fracture of Materials

M13-S3

Tuesday June 18, 16:00–17:50

Room: 212B

Co-Chair: Masanori Kohyama (Japan), Shinya Taketomi (Japan)

- 16:00 M13-014 **Keynote Presentation**
Finite element simulation of crack propagation for α -Ti based on cohesive zone law deriving from molecular dynamics
Xiangguo Zeng*, Rongpeng Xu, Yi Liao, Jinghong Fan
Sichuan University, China
- 16:30 M13-006 **Fatigue damage behavior of crack propagation under cyclic loading using molecular dynamics in bcc iron**
Lei Ma, Shifang Xiao, Huiqiu Deng, Wangyu Hu*
Hunan University, China
- 16:50 M13-008 **Towards theoretical connection between tensile strength of a grain boundary and segregated impurity concentration: Helium in iron as an example**
Lei Zhang*, Ying Zhang, Guang-Hong Lu
Beihang University, China
- 17:10 M13-026 **Atomistic simulations of crack—microstructure interactions**
Erik Bitzek*
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
- 17:30 M13-015 **Finite element simulation of interfacial fracture between Fe_3C and α -Fe based on cohesive zone law deriving from molecular dynamics**
Taolong Xu*, Xiangguo Zeng, Yi Liao, Rongpeng Xu, Jinghong Fan
Sichuan University, China

M13-S4

Wednesday June 19, 10:30–12:20

Room: 212B

Co-Chair: Dongsheng Xu (China), Tomotsugu Shimokawa (Japan)

- 10:30 M13-011 **Keynote Presentation**
Effects of solute atom diffusion dynamics on dislocation motion
Shigenobu Ogata*, Akio Ishii, Ju Li, Hajime Kimizuka, Hideki Mori
Osaka University, Japan
- 11:00 M13-010 **Dislocation dynamics analysis of hydrogen embrittlement in alpha iron based on atomistic investigations**
Shinya Taketomi*, Honami Imanishi, Ryosuke Matsumoto, Noriyuki Miyazaki
Saga University, Japan
- 11:20 M13-025 **Atomistic simulations of grain boundary fracture in tungsten bicrystals**
Johannes J. Möller*, Erik Bitzek
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
- 11:40 M13-017 **Atomistic simulations of deformation and failure of triple periodic graphitic structure with negative curvature**
Jianyang Wu*, Jianying He, Zhiliang Zhang
Norwegian University of Science and Technology (NTNU), Norway
- 12:00 M13-012 **Energetic investigation of effects of O on mechanical properties of NiAl intermetallics**
Xuelan Hu*
Civil Aviation University of China, China

M13 Atomistic Modeling & Simulation of Mechanical Properties and Fracture of Materials

M13-S5

Wednesday June 19, 13:30–15:50

Room: 212B

Co-Chair: Dov Sherman (Israel), Erik Bitzek (Germany)

- 13:30 M13-013 **Keynote Presentation**
First-principles study of local energy and local stress in metallic grain boundaries and interfaces
Masanori Kohyama*, Shingo Tanaka, Somesh Bhattacharya, Vikas Sharma, Hao Wang, Yoshinori Shiihara, Shoji Ishibashi
National Institute of Advanced Industrial Science and Technology, Japan
- 14:00 M13-023 **Keynote Presentation**
Atomistic simulation of the deformation and fracture mechanisms in TiAl under different loading conditions
Dongsheng Xu*, Hao Wang, Henan Wu, Rui Yang, Anil K. Sachdev, David Rodney, Patrick Veysiere
Institute of Metal Research, Chinese Academy of Sciences, China
- 14:30 M13-016 **Effect of vacancy on the sliding of an iron grain boundary**
Hong-Bo Zhou*, Guang-Hong Lu
Beihang University, China
- 14:50 M13-020 **Molecular dynamics simulation of dislocation-grain boundary interaction and crack initiation in α -titanium**
Hao Wang*, Dongsheng Xu, Dave Rugg, Aijun Huang, Rui Yang
Institute of Metal Research, CAS, China
- 15:10 M13-024 **Void interaction and coalescence during dynamic fracture of single crystal silicon**
Qunfeng Liu*, Shengping Shen
Xi'an Jiaotong University, China
- 15:30 M13-019 **Influence of interfacial mechanical properties on elongation of the multilayered composite metals**
Tomotsugu Shimokawa*
Kanazawa University, Japan

M14

Fracture of Metallic Nanomaterials and Metallic Glasses

M14-S1

Monday June 17, 16:00–17:30

Room: 215

Co-Chair: Ming Dao (USA), Xiang Guo (China)

- 16:00 M14-006 **Keynote Presentation**
Ballistic properties of nanocrystalline steel plates with gradient of grain sizes
Antoine Jerusalem, William Dickson, Yuming Zhang, Ming Dao*, Jian Lu, Francisco Galvez
MIT, USA
- 16:30 M14-001 **Fracture behaviour of severely plastically deformed metals**
Anton Hohenwarter*, Reinhard Pippan
Montanuniversität Leoben, Austria
- 16:50 M14-003 **Fracture and fatigue of bulk metallic glasses**
Bernd Gludovatz*, Marios D. Demetriou, Jamie J. Kruzic, William L. Johnson, Robert O. Ritchie
Lawrence Berkeley National Laboratory, USA
- 17:10 M14-011 **The concepts and properties of nanoskin materials and components created by ultrasonic nanocrystal surface modification**
Young Shik Pyoun*, Qingyuan Wang, Muhammad Kashif Khan, Ravil Kayumov, Junhyong Kim
Sun Moon University, South Korea

M14-S2

Tuesday June 18, 10:30–11:50

Room: 215

Co-Chair: Anton Hohenwarter (Austria), Bernd Gludovatz (USA)

- 10:30 M14-004 **Failure mode transition of Zr-based bulk metallic glass**
Fan Zeng*, Lanhong Dai
Institute of Mechanics, Chinese Academy of Sciences, China
- 10:50 M14-007 **On bifurcation of homogenous deformation in metallic glasses**
Yan Chen*, Lanhong Dai
Institute of Mechanics, Chinese Academy of Sciences, China
- 11:10 M14-008 **Mesh dependence of transverse cracking in laminated stainless steel with both high strength and high ductility**
X. Guo*, W.J. Zhang, J. Lu
Tianjin University, China
- 11:30 M14-010 **Hamiltonian analysis applied to the dynamic crack growth and arrest in a double cantilever beam**
Gilles Debruyne*, Radhi Abdelmoula
EDF R&D, LaMSID EDF-CEA, France

M15 Simulation and Testing of Crack Propagation on All Length Scales

M15-S1

Wednesday June 19, 16:00–17:50

Room: 203B

Co-Chair: Zeljko Bozic (Croatia), Philip Moseley (Switzerland)

- 16:00 M15-005 **Keynote Presentation**
Fracture of functionally graded/homogeneous bimetals with an interface crack and systems of cracks subjected to a heat flux and shear loading
Vera Petrova, Siegfried Schmauder*
IMWF, University of Stuttgart, Germany
- 16:30 M15-003 **Efficient simulation of crack growth in multiple-crack systems considering internal boundaries and interfaces**
Paul Judt*, Andreas Ricoeur
University of Kassel, Germany
- 16:50 M15-004 **Crack growth life assessment on turbine component under combined fatigue loading**
Dianyin Hu*, Rongqiao Wang, Huawei Liu, Jiaming Wei
Beihang University, China
- 17:10 M15-002 **Molecular dynamics simulation of intergranular crack in α -Fe**
Lei Zhou*, Yafang Guo
Beijing Jiaotong University, China
- 17:30 M15-019 **Multiscale modelling of damage and failure in hierarchical materials**
Ingo Scheider*, Mosler Jörn
Institute of Materials Materials Mechanics/ACE Centre, Germany

M15-S2

Thursday June 20, 10:30–12:00

Room: 203B

Co-Chair: Siegfried Schmauder (Germany), Jianying He (Norway)

- 10:30 M15-013 **Keynote Presentation**
A novel digital image correlation procedure for discontinuous displacement fields: Application to fracture
Jeffrey Poissant, Francois Barthelet*
McGill University, Canada
- 11:00 M15-015 **Keynote Presentation**
Reinforcement effect of piezoelectric z-pin on fracture toughness of laminated composites
Bin Gu*, Weifeng Yuan, Youjun Ning
Southwest University of Science and Technology, China
- 11:30 M15-007 **Numerical investigation of the fracture behavior of tungsten at the micro scale**
Christoph Bohnert*, Sabine M. Weygand, Nicola J. Schmitt, Oliver Kraft
Karlsruhe University of Applied Sciences, Germany
- 11:50 M15-012 **On propagation of interface cracks parallel to free boundaries in relation to delamination of multilayered coatings**
Robert V. Goldstein, Konstantin B. Ustinov*
IPMech RAS, Russia
- 12:10 M15-001 **The TFEM formulation for crack propagation problems**
Shengchuan Wu*, Weihua Zhang
Southwest Jiaotong University, China

M15 Simulation and Testing of Crack Propagation on All Length Scales

M15-S3

Thursday June 20, 13:30–15:40

Room: 203B

Co-Chair: Konstantin B. Ustinov (Russia), Bin Gu (China)

- 13:30 M15-009 **Keynote Presentation**
Fracture of core/shell structured metal/polymer particles
Jianying He*, Jianyang Wu, Zhiliang Zhang, Tore Helland, Helge Kristiansen
Norwegian University of Science and Technology, Norway
- 14:00 M15-010 **Mechanics mechanism of re-fracturing in inclusion reservoirs**
Shifeng Xue, Xinmin Chen, Zhongying Han*, Weidong Zhang
China University of Petroleum, China
- 14:20 M15-016 **On the formation of regular crack networks around a circular hole under uniform compression**
Ilya N. Dashevskiy*
Institute for Problems in Mechanics of the Russian Academy of Sciences, Russia
- 14:40 M15-018 **Fatigue crack growth modelling in welded stiffened panels under cyclic tension**
Zeljko Bozic*, Siegfried Schmauder, Marijo Mlikota, Martin Hummel
University of Zagreb, Croatia
- 15:00 M15-008 **Adaptive atomistic-to-continuum modeling of propagating defects**
Philip Moseley*, Jay Oswald, Ted Belytschko
Ecole Polytechnique Federale de Lausanne, Switzerland
- 15:20 M15-020 **Numerical study of the fracture behavior of an electron beam welded steel joint by cohesive zone modeling**
Haoyun Tu*, Siegfried Schmauder, Ulrich Weber
University of Stuttgart, Germany