

The 2nd International Conference on Material Strength and Applied Mechanics (MSAM 2019)

May 27- 30, 2019, Kiev, Ukraine

Conference Guide

dreamstime

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Part I Conference Schedule

Monday, May 27, 2019

| Time | Activity | Location |
|-------------|--------------|--------------------------------------|
| 09:00-19:30 | Registration | 3F, Hall “Assembly” Ukraine Hotel |

Notes: If tickets for meals and field visit are given to you, please keep them carefully as there are no replacements.

Tuesday, May 28, 2019

| Time | Activities | Location |
|-------------|---|-----------------------------|
| 08:30-08:40 | Opening Ceremony and Welcoming Speech Prof. Valery V. Kharchenko , <i>Conference Chair, Director of IPS, NASU, Ukraine</i> | 3F, Hall “Assembly” |
| 08:40-09:20 | Keynote Speech 1- Extreme Strength of Single Layers of Two-Dimensional Carbides (MXenes) Prof. Yury Gogotsi , <i>Department of Materials Science and Engineering, Drexel University, USA</i> | |
| 09:20-10:00 | Keynote Speech 2 - New Adhesive Strength Evaluation Method Based on the Singular Stress Field Considering Three Dimensional Joint Geometry Prof. Nao-Aki Noda , <i>Department of Mechanical and Engineering, Kyushu Institute of Technology, Japan</i> | |
| 10:00-10:30 | Pose for a Group Photo and Coffee Break | |
| 10:30-11:10 | Keynote Speech 3 - Hydrogen Embrittlement in the Presence of Cracks -- <i>A Tribute to John Ford, Antonio Machado and Thomas Stearns Eliot</i> Prof. Jesús Toribio , <i>Fracture & Structural Integrity Research Group (FSIRG), University of Salamanca (USAL), Spain</i> | |
| 11:10-11:50 | Keynote Speech 4 - The Bionic Functional Surface (BFS) Related to the Drag Reduction and Anti-Fouling Prof. Limei Tian , <i>Key Laboratory of Bionic Engineering, Ministry of Education, Jilin University, China</i> | 3F, Hall “Assembly” |
| 11:50-12:20 | Poster Presentations | |
| 12:20-13:00 | Lunch | 2F, Restaurant “Ukraine” |

Tuesday, May 28, 2019

| | | |
|-------------|--|--------------------------|
| 13:30-17:55 | Oral Session 1: Experimental Methods and Application | 3F, Hall “Assembly” |
| 13:30-17:55 | Oral Session 2: Computational Methods and Modeling | 2F, Hall “Mariinsky” |
| 13:30-17:50 | Oral Session 3: Applied Mechanics, Materials, and Miscellaneous Problems | 3F, Hall “Forum” |
| 18:00-19:00 | Dinner | 2F, Restaurant “Ukraine” |

Wednesday, May 29, 2019

| Time | Activities | Location |
|-------------|---|--------------------------|
| 08:30-12:05 | Invited Session 1: Experimental and Computational Methods | 3F, Hall “Assembly” |
| 12:05-13:00 | Lunch | 2F, Restaurant “Ukraine” |
| 13:30-17:30 | Invited Session 2: Applied Mechanics and Material Properties, Miscellaneous | 3F, Hall “Assembly” |
| 18:00-19:30 | Welcome Banquet & Prizes Ceremony | 2F, Restaurant “Ukraine” |

Thursday, May 29, 2019

| Time | Field Visit |
|-------------|---|
| 08:20-14:10 | 3.5-hour excursion to some local attractions & 2-hour boat trip along Dnieper river |

Part II Keynote Speeches

Keynote Speech 1: Extreme Strength of Single Layers of Two-Dimensional Carbides (MXenes)

Speaker: Prof. Yury Gogotsi

Department of Materials Science and Engineering, Drexel University, USA



Biography: Dr. Yury Gogotsi is Charles T. and Ruth M. Bach Professor, Distinguished University Professor and Trustee Chair of Materials Science and Engineering at Drexel University. He also serves as Director of the A.J. Drexel Nanomaterials Institute. He received his MS (1984) and PhD (1986) from Kiev Polytechnic and a DSc degree from the Ukrainian Academy of Sciences in 1995. His research group works on nanostructured carbons, 2D carbides and other nanomaterials for energy, water and biomedical applications. He has co-authored 2 books, 16 book chapters, more than 500 papers in peer-reviewed journals, edited 14 books, and obtained more than 50 patents. He was recognized as Highly Cited Researcher by Thomson-Reuters/Clarivate Analytics in 2014-2017 (h-index exceeding 100).

He has received numerous awards for his research including the European Carbon Association Award, S. Somiya Award from the International Union of Materials Research Societies, Nano Energy award from Elsevier, International Nanotechnology Prize (RUSNANOPrize), R&D 100 Award from R&D Magazine (twice) and two Nano 50 Awards from NASA Nanotech Briefs. He has been elected as a Fellow of the American Association for Advancement of Science (AAAS), Materials Research Society, American Ceramic Society, the Electrochemical Society, Royal Society of Chemistry, NanoSMAT Society, as well as Academician of the World Academy of Ceramics and Full Member of the International Institute for the Science of Sintering. He also serves on the MRS Board of Directors and acts as Associate Editor of ACS Nano.

Abstract of the speech: Two-dimensional (2D) transition metal carbides and nitrides (MXenes) are becoming one of the largest families of 2D materials. Since the discovery of the first MXene (Ti_3C_2) in 2011, about 30 different compositions have been synthesized, and structures and properties of about 60 MXenes have been theoretically predicted. For example, 2D Ti_2C , V_2C , Nb_2C , Mo_2C , Ta_4C_3 , Cr_2TiC_2 , Mo_2TiC_2 have been fabricated. MXenes have shown promising properties in different applications, including energy storage, wireless communications, wearable electronics, water membranes, sensors, composite reinforcements, and biomedical applications such as brain electrodes. In all these applications, mechanical stability of the materials plays a critical role. This presentation will provide an overview of computational and experimental studies of mechanical properties of

MXenes.

Density functional theory and molecular dynamic (MD) studies have suggested that the elastic properties in MXene basal planes should be quite high (c_{11} in the range of 500 to 800 GPa), placing MXenes among the strongest 2D materials, slightly below h-BN and graphene. Unlike the latter two, that need to be grown or mechanically exfoliated as single layers to achieve high strength, MXenes are made via solution processing, making large-scale synthesis possible. MD simulations predicted the highest bending rigidity for Ti_3C_2 and Ti_4C_3 among all the known 2D materials, including graphene and MoS_2 .

We recently measured freestanding single-layer (1L) and bilayer (2L) Ti_3C_2 MXene on $\sim 1\text{-}\mu\text{m}$ wells via atomic force microscope (AFM) indentation. The measured 2D elastic modulus is about 326 ± 29 N/m, which corresponds to a Young's modulus of 330 ± 30 GPa, and makes Ti_3C_2 MXene the third strongest 2D sheet characterized to date.⁵ Additionally, Ti_3C_2 MXene Young's modulus is the highest among the solution-processed 2D materials, exceeding those of transition metal dichalcogenides and graphene oxide. These values suggest a great potential of 2D MXenes for fabrication of multifunctional nacre-like composites for a variety of applications including structural composites, coatings, and wearables.

Keynote Speech 2: New Adhesive Strength Evaluation Method Based on the Singular Stress Field Considering Three Dimensional Joint Geometry

Speaker: Prof. Nao-Aki Noda

Department of Mechanical and Engineering, Kyushu Institute of Technology, Japan



Biography: Nao-Aki Noda received his Ph.D. degree in Mechanical Engineering from Kyushu University, Japan in 1984. He has been doing research and teaching at Kyushu Inst. Tech., Kitakyushu, Japan from 1984 to 1987. He is an author of Theory of Elasticity useful for engineers and a co-author of Safety Engineering for Workers in Industry and other several books. He is a co-editor of Stress Intensity Factors Handbook, vol. 4 & 5, Advances in Finite Element Analysis for Computational Mechanics. He is a recipient of Outstanding Paper Medal of Japan Soc. Tech. Plasticity, Sokeizai Industry Technology award from

the Materials Process Tech. Ctr., a fellow of JSME (Japan Soc. Mech. Engrs.) and a fellow of JSAE (Soc. Automotive Engrs. Japan), JSMS Award for Academic Contribution and JSME Materials and Mechanics Division Award. He Achievements include researches in stress analysis for notched material testing specimens, and development for large ceramics structures used for steel manufacturing machinery and special bolt-nut connection improving anti-loosening and fatigue strength.

Abstract of the speech: Adhesive joints are extensively used for various manufacturing processes in different industrial sectors. However, different materials properties cause the singular stress field, whose intensity is depending on the adhesive joint geometry. Our previous studies showed that debonding strength can be expressed as a constant value of the critical intensity of singular stress field (ISSF) by using two-dimensional modeling. By considering the real specimen geometry, in this study, the ISSFs along the interface side of three-dimensional joints are shown by varying the adhesive thicknesses. A mesh-independent technique combined with three-dimensional finite element method (FEM) is shown to evaluate the three-dimensional ISSF. It is found that the critical ISSF considered 3D geometry is almost constant independent of the adhesive thickness. The validity of two-dimensional modelling is discussed with the effect of the corner radius on the ISSF. The usefulness of the proposed new evaluation method is shown for several adhesive joint geometries.

Keynote Speech 3: Hydrogen Embrittlement in the Presence of Cracks -- *A Tribute to John Ford, Antonio Machado and Thomas Stearns Eliot*

Speaker: Prof. Jesús Toribio

Fracture & Structural Integrity Research Group (FSIRG), University of Salamanca (USAL), Spain



Biography: Professor Jesús Toribio graduated in Civil Engineering in 1982 and then in Mathematics in 1986. In 1987 he was awarded his PhD in the Polytechnic University of Madrid (UPM) and turned into Associate Professor in that Institution. In 1992 he became Full Professor and Head of the Materials Science Department of the University of La Coruña (at the age of 32, thus being the youngest Full Professor in the area of Materials Science in Spain). In 2000 he moved to the University of Salamanca (USAL) where

is currently Full Professor of Materials Science and Head of the Fracture and Structural Integrity Research Group (FSIRG) of that Institution.

His research work is mainly concerned with fatigue and fracture mechanics, environmentally assisted cracking, stress corrosion cracking and hydrogen embrittlement/degradation/damage of metals and alloys (mainly cold drawn pearlitic steel wires for civil engineering and austenitic stainless steels for nuclear engineering and energy applications), covering theoretical, computational and experimental aspects. He actively participates in International Conferences, very often being member of the International Advisory Committee, organising Special Sessions/Symposia, being Session Chairman or delivering Plenary/Keynote/Invited Lectures. Professor Dr. Jesús Toribio has published more than 500 scientific papers, most of them in international books and journals.

He is the Chairman of the Technical Committee 10 (TC10): Environmentally Assisted Cracking of the European Structural Integrity Society (ESIS) and has been Director (2013-2017) of the International Congress of Fracture-The World Academy of Structural Integrity (ICF-WASI), being responsible of launching the Ibero-American Academy of Structural Integrity (IA2SI). Prof. Toribio has been awarded a variety of scientific research prizes and awards including: (i) UPM Young Scientist Award of the Polytechnic University of Madrid; (ii) METROTEC Award for the best Technological Research Project; (iii) Honour Medal of the Spanish Group of Fracture (GEF/SEIE) in recognition of his research achievements in the field of fracture mechanics; (iv) Fellow of the Wessex Institute of Technology (WIT) in recognition of leadership and outstanding work in engineering sciences; (v) Top Reviewer 2011 in recognition of an outstanding contribution to the quality of the Elsevier International Journal Engineering Fracture Mechanics; (vi) Fellow of the European Structural Society (ESIS Fellow) for his outstanding contributions to the art, science, teaching or practice of fracture mechanics and his service to the society; (vii) Honorary Member of the Italian Group of Fracture (IGF) in acknowledgement and appreciation of his outstanding achievements in the research field of fracture mechanics; (viii) Best

Paper and Presentation Award in the International Conference on Energy Materials and Applications (ICEMA 2017) held in 2017 in Hiroshima, Japan, with a paper entitled: Numerical Simulation of Hydrogen Diffusion in the Pressure Vessel Wall of a WWER-440 Reactor; (ix) María de Maeztu Scientific Award of the University of Salamanca (800th anniversary during 2018) in recognition of academic trajectory and excellence in scientific and technological research.

Abstract of the speech: Hydrogen embrittlement problems are relevant in structural materials. In this framework, hydrogen transport by diffusion is a key issue, since hydrogen and its isotopes may be present in the material due to nuclear reaction. In this matter, diffusion is a relevant transport mode to drive hydrogen to the prospective fracture nuclei, thus producing the damaging phenomenon of *hydrogen embrittlement* (or *hydrogen degradation*) in the material.

In this paper, a model of hydrogen diffusion assisted by both hydrostatic stress and plastic strain (*stress-and-strain assisted diffusion of hydrogen*) is formulated in terms of continuum mechanics variables, leading to a second-order parabolic-type partial differential equation that can be solved by numerical procedures. When cracks are present in the material and the stress intensity factor K is the key variable governing mechanics near the crack tip, an analysis is made of the validity of the ***K-dominance*** condition in hydrogen diffusion and ***the role of the far field (not dominated by K)***, as well as of diffusion equations in a ***moving crack*** to analyse ***the effect of history*** in the coupled process of hydrogenation and cracking. In the matter of the former analysis (*the role of the far field*) the article pays tribute to the American film director John Ford (“*far away*” in the movie “*She wore a yellow ribbon*”). With regard to the latter study (*the effect of history*) the paper is a tribute to Antonio Machado’s “*hoy es siempre todavía*” and, in the same sense, to Thomas Stearns Eliot’s “*and all is always now*”.

In addition, the paper offers a critical review of existing models of hydrogen diffusion accounting for different physical variables of both macroscopic nature (i.e., related to continuum mechanics, e.g., stress and strain) and microscopic characteristics (material microstructure, traps, etc.). To this end, the model of hydrogen diffusion assisted by the gradients of both hydrostatic stress and cumulative plastic strain (*stress-and-strain assisted diffusion of hydrogen*), proposed and frequently used by the authors of the present paper (Toribio & Kharin) is compared with other well-known models such as those proposed by (i) McNabb & Foster, (ii) Oriani, (iii) Leblond & Dubois, (iv) Sofronis & McMeeking, (v) Krom and Baker, analysing in detail their physical and mathematical differences and similarities to account for different physical variables. Emphasis is placed on the different approaches (*implicit and explicit*) to treat the *diffusion-with-trapping model*, i.e., the consideration of various hydrogen traps (both *reversible* and *irreversible*) in the different diffusion models.

Keynote Speech 4: The Bionic Functional Surface (BFS) Related to the Drag Reduction and Anti-Fouling

Speaker: Prof. Limei Tian

Key Laboratory of Bionic Engineering, Ministry of Education, Jilin University, China



Biography: Prof. Limei TIAN received her Ph. D. degree from Jilin University in 2005, then she has been working for the Key Laboratory of Bionic Engineering (Ministry of Education), Jilin University. She has been working as the Secretary-General of International Society for Bionics Engineering Youth Committee from 2017. In 2011–2012, she was a visiting scientist at University of Manchester, UK.

Her current research interest focuses on the development of bionic functional surfaces, which have the drag reduction and anti-fouling properties. She carried out a series of studies on the optimization design, and mechanisms of bionic functional surfaces. Since 2010, the research on drag reduction, wear resistance, anti-corrosion and anti-fouling characteristics of bionic coupling functional surfaces (morphology, structure, material, temperature coupling) has been carried out. Based on the above researches, she obtained 12 projects and nearly 20 million China yuan, including the China National Natural Fund and other provincial-ministerial projects. She has published more than 50 papers in Material Sci. and Eng. C, J. Bionic Eng., Bra. Soc. Mech. Sci, etc., and 20 Chinese or international patents were applied or authorized. One patent obtained the Gold Award of Jilin Province, and it was transformed in engineering, financing 19 million China yuan.

Abstract of the speech: The problem of drag reduction and antifouling has always been the main problem in fluid media, which are the major problems plaguing marine equipment and fluid machinery. Using bionic technologies to reduce the resistance of fluid equipment and prevent biofouling has green, efficient and long-term effect. The Research Group of Limei Tian, from Key Laboratory of Engineering Bionics Education, Jilin University, imitates the drag reduction and anti-fouling characteristics of typical biological, dolphins and corals, constructs bionic functional surfaces with drag reduction and anti-fouling functions. Then, the practical engineering application of the above functional surfaces on typical fluid machinery-pump products is studied. Results show that the drag reduction and synergism efficiency of the functional surfaces are remarkable. Inspired by the surface of dolphins and corals, the anti-fouling material was designed and constructed with harmonic effect and anti-fouling function. Based on physical anti-fouling mechanism, this anti-fouling surface obtain better anti-fouling effect in laboratory and the hanging plate test of actual ocean, which provided a new idea for the design of anti-fouling functional materials. Reporter will give a brief report on the design, construction, preparation, test and application of drag reduction and anti-fouling functional surfaces in the past five years.

Part III Poster Session

Materials Provided by the Conference Organizer:

- X Racks & Base Fabric Canvases (60cm×160cm, see the figure)
- Adhesive Tapes or Clamps



Materials Provided by the Presenters:

- Home-Made Posters

Requirement for the Posters:

- Material: not limited
- Size: 160cm (height) ×60cm (width)
- Content: for demonstration of the presenters' paper. Please make sure the poster presentation be clear and easy to be understood, explanation with figures is good

Requirement for the Presenters:

- Stand beside his/her Poster through the Session, and discuss with the readers about his/her paper

Time: 11:40-12:10, Tuesday, May 28

Location: 3F, Hall "Assembly"

| Paper ID | Paper Title | Presenter |
|----------|--|--------------------|
| MS1212 | New two dimensional Hermitian wavelet finite elements for structural analysis | Xiaofeng Xue |
| MS1216 | Influence of additional elements (Si, Ti and B) on the microstructure, mechanical properties and castability of aluminum alloys (A201) | Suzan Abd El Majid |
| MS1234 | Analysis of fatigue life of sander vibration bracket and its structure optimization | Jianrun Zhang |
| MS1254 | Evaluation method for performance of support based on equivalent damping | Changji Liang |
| MS1302 | Effect of process parameters on the microstructure and mechanical properties of medium-carbon steels for improving high-strain rate properties | Youngbeum Song |
| MS1313 | The experiment research on initiation and propagation mode of 3-D hollow crack under hydro-mechanical coupling | Bangxiang Li |

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| MS1325 | The aluminum-alloyed layer obtained on magnesium by electro spark deposition method | Sławomir Spadło |
| MS1335 | Research on brittle failure mechanisms of SiCp/Al by milling | Hongjun Zhang |
| MS1356 | Strength and fatigue life of autofrettaged thick-wall cylinder after low temperature heat soak under pressure loading | Huangjian Wen |
| MS1366 | An active actuator based on giant magnetostrictive composite pendulum for vibration isolation | Jiamin Chen |
| MS1375 | Experimental study on inductive method for online material loss detection with high debris concentration | Shaoping Wang |
| MS1379 | Influence of Y-doping on magnetic and electrical properties of $Ca_{3-x}Y_xCo_2O_6$ ceramics | Seong-Cho Yu |
| MS1384 | Fabrication and mechanical properties of Fe-28%Cu-12%Ni sinters produced by hot pressing | Borowiecka-Jamrozek Joanna |
| MS1391 | Analysis of vibration isolation performance of composite vibration isolator under blast loading | Zhizhong Li |
| MS1392 | Load effect analysis of explosion shock wave in large spherical explosive vessel | Luzhong Shao |
| MS1405 | Influence of morphology and particle size of alumina on wear resistance and mechanical properties of epoxy-polyester nanocomposite coatings | Haosheng Wang |
| MS1406 | Evaluation of dispersion stability on halloysite nanotube (HNT) reinforced polymer nanocomposites through moisture absorption characteristics | Soo-Jeong Park |
| MS1426 | Crack initiation and propagation in different specimen types under impact loading | Eugene Kondryakov |

Part IV Oral Presentations

Devices Provided by the Conference Organizer:

- Laptops (with MS-Office & Adobe Reader)
- Projectors & Screen
- Laser Sticks
- Microphones

Materials Provided by the Oral Presenters:

- PowerPoint (Note: Please show your paper ID as MS***** in the last page)

Duration of each Presentation (Tentatively):

- Invited Oral Session: 22 Minutes of Presentation, including 3 Minutes of Q&A
- Regular Oral Session: 12 Minutes of Presentation, including 3 Minutes of Q&A

Awarding for the Oral Presentation:

- We will hold a voting for the oral presentation, participants will get a vote to select the best 1-2 oral presentations in each session.
- Each session chair has 3 votes for the best oral presentations.
- Top elected presenters will each be awarded with a free ticket to MSAM2020.

NOTE:

All technical session rooms are equipped with laptop, LCD projectors, screens, laser pointers and microphones. For presenters who don't send the PowerPoint to the Conference Secretary, please have your presentation ready in a memory stick, and save it in the laptop of your corresponding session about **15 minutes** before the start time (08:15 for the morning sessions, and 13:15 for the afternoon sessions). You also need to tell the Session Chair (before the start of your Session) that you are present. Please kindly let us know in advance if you cannot be present.

Oral Session 1: Experimental Methods and Application

Session Chair: Prof. Masato Sone, Institute of Innovative Research, Tokyo Institute of Technology, Japan

Time: 13:30-17:55, Tuesday, May 28, 2019

Location: 3F, Hall “Assembly”

| Paper ID | Time | Paper Title | Presenter |
|----------|--------------------|---|--------------------|
| MS1387 | 13:30-13:45 | Crack tip shape effect on stress-strain fields in plastically compressible materials | Debashis Khan |
| MS1230 | 13:45-14:00 | Aero-thermal investigation of the flow pattern in turbine front stages | Wei Ba |
| MS1427 | 14:00-14:15 | State-of-the-art approaches to the fracture resistance analysis of nuclear reactor vessels | Kobelsky S.V. |
| MS1270 | 14:15-14:30 | Microstructure and wear behavior of hot-work tool steels 1.2343 and 1.2367 under thermo-mechanical loadings | Irfan Yousaf Malik |
| MS1287 | 14:30-14:45 | High structure stability Ti/Au multiple layer micro-cantilever and the temperature dependence | Hitomi Watanabe |
| MS1288 | 14:45-15:00 | Mechanical properties of gold micro-cantilevers with different thickness evaluated by micro-bending test | Kosuke Suzuki |
| MS1289 | 15:00-15:15 | Mechanical properties of electrodeposited gold-copper alloy by micro-compression test | Masato Sone |
| MS1280 | 15:15-15:30 | Zr61Ti2Cu25Al12 bulk metallic glass: Failure under torsional loading and Mode III fracture toughness | Jian Xu |
| | 15:30-15:45 | Coffee break | |
| MS1385 | 15:45-16:00 | Influence of hot isostatic pressing on mechanical response of as-built SLM titanium alloy | Michaela Roudnicka |
| MS1374 | 16:00-16:15 | Investigation on the Co-Cr-Ni-W-C based alloy processed by multiple rolling | Liyuan Sheng |
| MS1235 | 16:15-16:30 | Plastic strain correction in fatigue analysis of nuclear equipment | Xiaolong Fu |
| MS1223 | 16:30-16:45 | The study of limit load and plastic collapse load of straight pipe under combined loads | Ying Zhang |
| MS1331 | 16:45-17:00 | Fatigue crack growth analysis of surge line under thermal stratification conditions | Peng Tang |
| MS1393 | 17:00-17:15 | Multiscale CFD modelling of bath hydrodynamics in aluminum electrolysis process | Xiaozhen Liu |

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| MS1249 | 17:15-17:40 | Formation of weld defects in cold metal transfer arc welded 7075-T6 plates and its effect on joint performance | Gürel Cam (Invited) |
| MS1428 | 17:40-17:55 | Study of fracture behavior on the 3D printed Ti-alloy implant at HCF regime | Chong Wang |

Oral Session 2: Computational Methods and Modeling

Session Chair: Prof. Denis Benasciutti, Department of Engineering, University of Ferrara, Italy

Time: 13:30-17:55, Tuesday, May 28, 2019

Location: 2F, Hall “Mariinsky”

| Paper ID | Time | Paper Title | Presenter |
|----------|--------------------|--|-----------------------|
| MS1237 | 13:30-13:45 | Practical approaches for non-linear analysis of reinforced concrete beam-column joints with chamfers | Siu Shu Eddie Lam |
| MS1273 | 13:45-14:00 | Crack propagation in a mixed-mode specimen described via multi-parameter fracture mechanics | Lucie Malikova |
| MS1279 | 14:00-14:15 | Modeling of the transition between continuous and discontinuous slow crack growths of pipe grade polyethylene | Byoung-Ho Choi |
| MS1290 | 14:15-14:30 | A solution to the double crack’s J-integral in the plain plate | Huan Li |
| MS1291 | 14:30-14:45 | Compression simulation study of shape memory alloy lattice structure | Shaoyang Chu |
| MS1357 | 14:45-15:00 | Semi-active dampers placement and feedback design for structural control benchmark problem | Ido Halperin |
| MS1229 | 15:00-15:15 | Analysis of deformation characteristics of high-strength reinforced concrete beams under explosion load | Zhen Liao |
| MS1251 | 15:15-15:30 | Numerical study on instability of reactor vessel internals | Yoon Suk Chang |
| | 15:30-15:45 | Coffee break | |
| MS1265 | 15:45-16:00 | Numerical simulation of the percolation threshold in nanocomposites | Artem Plyushch |
| MS1376 | 16:00-16:15 | The effects of using metal granules on strength and stiffness | Niyazi Ugur Kockal |
| MS1388 | 16:15-16:30 | Applications of interpolated curvatures to detect stiffness losses in building frames | Jun-Yang Shi |
| MS1359 | 16:30-16:45 | An analytical method for j-resistance curve based on a new fracture criteria and finite element aided testing method | Di Yao |

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| MS1256 | 16:45-17:00 | Improving the reflective cracking resistance performance of asphalt concrete overlay on airfield pavement | Yongchao Xue |
| MS1277 | 17:00-17:15 | Thermal response analysis of reinforced concrete box girder during hot-mixed asphalt mixture paving | Dong Zheng |
| MS1398 | 17:15-17:30 | Dynamic response of gradient cellular materials under high velocity impact | Xuke Lan |
| MS1328 | 17:30-17:55 | Paradox, paradise and parasite of the BEM/BIEM | Jeng-Tzong Chen (Invited) |

Oral Session 3: Applied Mechanics, Materials, and Miscellaneous Problems

Session Chair: Prof. Bernard Haochih Liu, Laboratory for Micro/Nanofabrication and Nanoanalysis, Department of Materials Science and Engineering, National Cheng Kung University, Taiwan

Time: 13:30-17:50, Tuesday, May 28, 2019

Location: 3F, Hall “Forum”

| Paper ID | Time | Paper Title | Presenter |
|----------|--------------------|--|---------------------|
| MS1320 | 13:30-13:45 | Nanosopic biomechanics of bacteria in citric acid fluids controlled by a self-designed 3D-printed AFM fluid cell | Bernard Haochih Liu |
| MS1404 | 13:45-14:00 | A CFD study of thermal comfort of a building under a naturally ventilated environment in a hot climate | Shian Gao |
| MS1208 | 14:00-14:15 | Processing of surface modified nano boron carbide (B ₄ C) containing flexible composites as shielding materials | Cengiz Kaya |
| MS1274 | 14:15-14:30 | Modified fibre based structure for marine and safety applications | Cristian Lira |
| MS1319 | 14:30-14:45 | Scaling law for liquid splashing inside a container drop impact on a solid surface | Bohua Sun |
| MS1389 | 14:45-15:00 | Detuned resonances exemplified with planetary waves | Elena Tobisch |
| MS1343 | 15:00-15:15 | Effect of the length-diameter ratio on the initial fragment velocity of cylindrical casing | Yueguang Gao |
| MS1244 | 15:15-15:30 | Experimental investigation of the road performance of terminal blend rubber asphalt mixture with different dry-way additives | Qibo Huang |
| | 15:30-15:45 | Coffee break | |

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| MS1231 | 15:45-16:00 | Investigation into the differences of pull-out resistance between normal and osteoporotic cancellous bone | Yunhui Yan |
| MS1345 | 16:00-16:15 | Water entry behaviours of hemisphere-head projectiles with high velocity | Siyu Wu |
| MS1423 | 16:15-16:30 | Study on creep damage constitutive model of 16MND5 | Juan Du |
| MS1350 | 16:30-16:45 | Study on the protective properties of polyurethane foam for water-entry projectile | Yuqing Ye |
| MS1346 | 16:45-17:00 | Effect of the length-diameter ratio on the initial fragment velocity of cylindrical casing | Qi Huang |
| MS1425 | 17:00-17:25 | Load-carrying spacecraft and orbital station components: their strength and reliability optimization | Alexander Khotsianovsky (Invited) |
| MS1411 | 17:25-17:50 | Coupled structural mechanics for dynamic soil-structure interaction | Shi-Shuenn Chen (Invited) |

Invited Session 1: Experimental and Computational Methods

Session Chair: Prof. Abraham Marmor, Technion – Israel Institute of Technology, Israel

Time: 08:30-12:05, Wednesday, May 29, 2019

Location: 3F, Hall “Assembly”

| Paper ID | Time | Paper Title | Presenter |
|----------|--------------------|---|---------------------|
| MS1260 | 08:30-08:55 | On fatigue life distribution of large size foam material plate | Liyang Xie |
| MS1258 | 08:55-09:20 | Techniques to accelerate thermo-mechanical simulations in large-scale FE models with nonlinear plasticity and cyclic input | Denis Benasciutti |
| MS1327 | 09:20-09:45 | Super-hydrophobic Surfaces: from fundamentals to practical guidelines | Abraham Marmor |
| MS1407 | 09:45-10:10 | Halloysite clay reinforced nanocomposites for moisture stability to high temperature environment | Yun-Hae Kim |
| | 10:10-10:25 | Coffee break | |
| MS1358 | 10:25-10:50 | Mechanical characterization of mortars used in the restoration of historical buildings: an operative atlas for maintenance and conservation | Alessandro Grazzini |
| MS1362 | 10:50-11:15 | Reactive sintering and particle morphology control of double-oxide based water purification filters | Yoshikazu Suzuki |

| | | | |
|--------|-------------|--|------------------|
| MS1378 | 11:15-11:40 | Post lithium ion batteries; characterization of phosphorous and tin for potassium-ion anodes | Koichi Yamashita |
| MS1383 | 11:40-12:05 | Challenges in modeling of complex hydraulic fracture network propagation in fractured rock | Olga Kresse |

Invited Session 2: Applied Mechanics and Material Properties, Miscellaneous

Session Chair: Prof. Mikhail Itskov, Department of Continuum Mechanics, RWTH Aachen University, Germany

Time: 13:30-17:30, Wednesday, May 29, 2019

Location: 3F, Hall “Assembly”

| Paper ID | Time | Paper Title | Presenter |
|----------|--------------------|---|------------------------------|
| MS1397 | 13:30-13:55 | Advances of asymptotic procedures for cyclically loaded elastoplastic structures | Konstantinos V. Spiliopoulos |
| MS1255 | 13:55-14:20 | Wear mechanism and performance improvement of friction pairs under water lubrication | Ying Liu |
| MS1275 | 14:20-14:45 | A unique crack growth behavior of ultrafine grained copper processed by ECAP under cyclic stresses | Masahiro Goto |
| MS1282 | 14:45-15:10 | A new type of cluster magnetorheological finishing with dynamic magnetic fields for photoelectric crystal wafer | Qiusheng Yan |
| MS1286 | 15:10-15:35 | Pulling of B-DNA: emergence of new structural polymorphs and S-DNA | Ashok Garai |
| | 15:35-15:50 | Coffee break | |
| MS1292 | 15:50-16:15 | Modification of the structure in luminescent oxide family compounds | Jarosław Kaszewski |
| MS1305 | 16:15-16:40 | Recent development in contact mechanics of coated surfaces | Izhak Etsion |
| MS1322 | 16:40-17:05 | Wave dynamics in phononic and acoustic metamaterials with viscoelastic constituents | Anastasiia Krushynska |
| MS1232 | 17:05-17:30 | Multi-scale modeling of mechanoluminescence in elastomers | Mikhail Itskov |

Part V Conference Venue

Ukraine Hotel

Address: Institutskaya Street 4, Kiev, 01001, Ukraine

Website: <http://www.ukraine-hotel.kiev.ua/en/>

Access to Venue

1. From the International Airport Boryspil

Distance - 35km.

You can take a taxi from the airport or come by SKY BUS to the train station and then use another kind of public transport to get to Hotel Ukraine.

2. From the International Airport Kyiv

Distance - 8km

a) By taxi to the hotel.

b) By public transport. Below you can see list of transit routes or routes with Kyiv Airport as a final stop.

Trolleybus No. 22: from Kyiv Airport to Subway stations: Shuliavska, Dorohozhychi, Syrets than to the Subway stations Maydan Nezalezhnosti or Khreshchtyk;

Trolleybus No. 9: from Kyiv Airport - Subway stations: Lva Tolstogo Sq. than to the Subway stations Maydan Nezalezhnosti;

Minibus routes No. 169: Vishneve - Starovokzalna St. (near Main railway station);

Public transport runs from 06:30 till 22:30.

Part VI Field Visit

Schedule

08:20 Gathering at the lobby hall of Ukraine Hotel

8:30-12:00 Bus tour in Kiev, including historical places of Xth century (St.Sofia and Lavra)

12:00-14:00 Lunch and boat trip along Dnieper river (Changes may be made based on the weather)

14:10 Return to Ukraine Hotel

Kiev Pechersk Lavra

Kiev Pechersk Lavra is one of the biggest and greatest Orthodox churches. Together with the Saint Sophia Cathedral, it is inscribed as a UNESCO World Heritage Site. It was founded in 1051, when Reverend Anthony settled in one of the Varangian caves that is a part of the Far Caves nowadays ("pechera" means "cave"). Kiev-Pecherskaya Lavra still remains the sacred place and the center of pilgrimage of Orthodox Christians from all over the world.



Saint Sophia's Cathedral

As the main temple of the Kievan Rus founded by Yaroslav the Wise in 11th century, St. Sophia's Cathedral is not only the oldest cathedral in Kiev, but by far the most spectacular. It is the first heritage site in Ukraine to be inscribed on the World Heritage List along with the Kiev Cave Monastery complex. The cathedral is famous for its mosaics and frescos by Byzantine masters that date back to the 11th century. Notes and images on the walls and architectural details of St. Sophia Cathedral, known as Sophia graffiti, are of great historical value. About 300 graffiti relate political events of ancient days and historical personalities. Nowadays St. Sofia Cathedral is an architectural and historical preserve.



Boat Trip along Dnieper River

There are not many cities in the world with such a vast and accessible expanse of water as the Dnieper in the Kiev city centre. You can enjoy your time on board of the boat while watching breathtaking banks of the Dnieper River with the golden domes, parks and modern parts of the city. The Dnieper river boats trip is one of the favorite types of entertainment of Kiev residents and tourists visiting the capital of Ukraine. During your boat trip you will have opportunity to enjoy the stunning sights of Kiev such as Kiev-Pechersk Lavra, Arch of Friendship, Magdeburg Rights Column, Podol (Lower Town), Mariinsky Park, Metro Bridge, Darnitskiy Bridge, Trukhanov island and Hydropark.



Website



Contact Us

Ms. Li Chen
+86-18154309082
msam@msamconf.org
www.msamconf.org