

ADDENDUM: FINAL (REVISED) PROGRAM FOR



Multiscale Material Mechanics and Multiphysics and Sustainable Applications [International Symposium on Multiscale Material Mechanics in the 21st Century] ANTALYA, TURKEY, 4 - 9 October 2015



Dr. **Florian Kongoli** (CEO at FLOGEN Technologies Inc., USA/Canada: www.flogen.com), Professor **Stephane Bordas** (University of Luxembourg, Luxembourg: hdl.handle.net/10993/19425) and Professor **Yuri Estrin** (Monash University, Australia: www.eng.monash.edu.au/materials/about/people/profile/estriny), who are organizing the **Aifantis International Symposium** (Intl. Symp. on Multiscale Material Mechanics in the 21st Century) /www.flogen.org/sips2015/Multiscale, are kindly inviting you to join their symposium which will be held from 4-9 October 2015 at the all-inclusive extravagantly modern Cornelia Diamond Golf Resort and SPA in Antalya, Turkey: www.corneliadiamond.com/hotels.asp?hotelID=3&lang=EN

The abstract submission session is now open: www.flogen.org/sips2015/abstract_submission.php?step=1. You can find the steps on how submitting it here: www.flogen.org/sips2015/?gid=73

This major symposium is in honor of the distinguished work and lifetime achievements of Prof. Elias C. Aifantis. Professor Aifantis is a well-known figure for his deep impact in **multiscale material mechanics and multiphysics processes**, especially in their application for developing sustainable new technologies. He is author of almost 600 scientific papers. Throughout his career, his activity has impacted various fields, such as:

- Spatio-Temporal Instabilities in Deformation and Fracture
- Fracture Instabilities in Novel Materials and Processes
- Degradation and Instabilities in Geomaterials with Application to Hazard Mitigation
- Stress-assisted diffusion theories for hydrogen embrittlement and stress corrosion cracking
- Flow through double porosity media theories with applications to consolidation and subsidence in geomaterials
- Relocation of Maxwell's line and the derivation of transition, reversal and periodic solutions for fluid interfaces.
- First gradient plasticity theory to predict the thickness of shear bands and eliminate the mesh-size dependence of FE calculations in the strain softening regime
- Nanostructured materials; nanomechanics; dislocation patterning and material instabilities.
- Gradient elasticity (GradEla) model to eliminate singularities from dislocation lines and crack tips

The symposium is organized on the occasion of his 2 anniversaries in the same year: His age anniversary (he becomes 65 in October 2015) and scientific anniversary (in 2015 he reaches 40 years of continuous scientific contributions). Reflecting this rich activity, the symposium will feature plenary, keynote and invited lectures on multiscale material mechanics and multiphysics processes with applications ranging from modern engineering science and technology to biology and medicine. Additional lectures from young scientists and engineers are encouraged in related interdisciplinary research fields. These may include metals and alloys, polymers and composites, geomaterials and biomaterials, as well as novel materials in thin film and bulk configurations for high energy density storage, optoelectronics and biomedicine applications. Advanced multiscale models on elasticity, viscoelasticity, plasticity, and damage, as well as coupled thermomechanical, chemomechanical, electromechanical, and optomechanical theories are desirable.

Contributed Lectures and Posters are also invited on general material mechanics and material physics topics, such as: Generalized Continuum Mechanics; Gradient Elasticity; Gradient Viscoelasticity; Gradient Plasticity; Gradient Damage; Nanomechanics; Material Instabilities; Defects in Solids; Diffusion in Solids; Phase Transformations in Solids; Dislocation Patterning; Shear bands, Twins, Size Effects; Metals, Polymers, Ceramics; Soils, Rocks, Concrete; Novel Materials, Thin Films; Electronic, Magnetic, Thermoelectric, Photonic Materials; Cellular Materials, Metallic Glasses; Nanomaterials, Nanocomposites; High Density Energy Storage Materials; Biomaterials, Bio-inspired Materials; Material Fabrication/Forming Mechanics; Fracture Mechanics; Computational Mechanics; Stochastic Mechanics; Geomechanics; Biomechanics; Thermomechanics; Chemomechanics; Electromechanics; Magnetomechanics; Optomechanics; Discrete vs. Continuous Media Modeling; Fractal Media, Fractional Material Mechanics.

Specific thematic symposia are planned as follows:

- **Dislocation Patterning** organized by Professors Zaiser, El-Azab and Groma
- **Size Effects in Plasticity: from Small to Meso Scale** organized by Professors Ngan, De Hosson and Maas
- **Gradient Plasticity** organized by Professors Voyiadjis, Bammann and Zbib
- **Gradient Elasticity** organized by Professors Askes, Isaksson and Gutkin
- **Defects in Solids** organized by Professors Romanov, Ovidko and Capalungo
- **Multiscale Coupled Computational Continuum Mechanics** organized by Professors Bordas, Forest and Goddard
- **Experimental Nanomechanics** organized by Professors Chasiotis, Espinosa and Korsunsky

Round Table Discussion

A round table discussion open to everyone interested will be organized at a specific date and time with high level representatives of various technologies and industries to debate freely and without reservations all sensitive issues of all existing technologies identifying positive, neutral and negative points of all technologies in terms of sustainability.

You can find the flyer of the symposium here: www.flogen.org/sips2015/pdf/Aifantis_web.pdf

Contributed articles will be doubled peer-reviewed and will be published in Conference Official Proceedings having an ISBN and an ISSN number. Selected contributed articles will also be published in the Journal of Mechanical Behavior of Materials and other ISI Mechanics of Biomaterials/Biomaterials Journals.

An inspiring event with Prof. Dan Shechtman will serve as the "Curtain-Opening" event of the Summit (Sunday afternoon/evening, 4 October 2015) entitled "**Technological Entrepreneurship - Key to Sustainable World Peace and Prosperity**"



Besides being the 2011 Nobel Laureate in Chemistry, Professor Shechtman is known as one of the Pioneers of Technological Start-up Revolution (Financial Times, 2012). It is an inspiring accounting on his experience on the role of technological entrepreneurship on the sustainable world peace and prosperity with rich advises for success drawn from successful entrepreneurs he helped train.

You are kindly invited to actively participate, and we are looking forward to meeting you in the magnificent Cornelia Diamond Golf Resort and SPA in Antalya, one of the most beautiful beaches in the world.

Best Regards

Organizing Committee

2015 - Sustainable Industrial Processing Summit

symposiums@flogen.org

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AIFANTIS INTERNATIONAL SYMPOSIUM

FINAL PROGRAM*

General/Summit Plenary Lectures

- Nobel Laureate Dan Shechtman, Nobel Laureate Ei-ichi Negishi
- Professor Ruggero Santilli, Professor Brajendra Mishra

Monday, 5/10/15

8.00-9.40	E.C. Aifantis V. Berdichevsky
9.40-10.00	<i>Coffee Break</i>
10.00-12.30	SUMMIT PLENARY
12.30-13.30	<i>Lunch Break</i>
13.30-15.30	D. Bammann P. Neff T. Hochrainer S. Sandfeld
15.30-15.50	<i>Coffee Break</i>
15.50-17.30	A. Chattopadhyay M. Mousavi A. Madeo A. Kolesnikova R. Balieu
17.30-18.00	S. Georgiev S. Georgiev
18.00-22.00	<i>Pool & Dinner Party</i>

Tuesday, 6/10/15

8.00-9.40	J. De Hosson I. Groma
9.40-10.00	<i>Coffee Break</i>
10.00-12.30	SUMMIT PLENARY
12.30-13.30	<i>Lunch Break</i>
13.30-15.30	J. Kratochvil A. Ngan P. Ispanovity C. Qi
15.30-15.50	<i>Coffee Break</i>
15.50-17.30	K. Aifantis A. Konstantinidis I. Tsagrakis X. Zhang J. Rethore
17.30-18.00	D. Toennies E. Martinez Paneda
18.00-22.00	<i>Beach Cocktail</i>

Wednesday, 7/10/15

	<i>SESSION I</i>	<i>SESSION II **</i>
8.00-9.40	N. Morozov A. Romanov	
9.40-10.00	<i>Coffee Break</i>	
10.00-12.30	SUMMIT PLENARY	
12.30-13.30	<i>Lunch Break</i>	
13.30-15.30	R. Nowak L. Toth J. De Hosson I. Dafalias	E. Borodin B. Deliktas S. Kustov A. Glezer
15.30-15.50	<i>Coffee Break</i>	
15.50-17.30	V. Bougrov B. Klusemann E. Atroschenko K. Xu M. Dorogov	O. Aslan H. Ghasemi H. Yilmazer S. Patil F. Ojaghnezhad
17.30-18.00	S. Alexandrov E. Oterkus	L. Rapoport J. Jeon
18.00-22.00	GALA DINNER S. Balogiannis	

* Detailed program follows

** The Parallel SESSION II on Wednesday, 7/10/15 is tentative, as several of the speakers have not confirmed their definite participation (no preregistration and no travel plans communicated)

MONDAY OCT, 05 2015

08:00 AM:

Internal Length Gradient (ILG) Material Mechanics: From Metals/Rocks and Nanomaterials to Neural Cells

E.C. Aifantis^{1,2,3}; ¹Aristotle University of Thessaloniki, Thessaloniki, Greece; ²Michigan Technological University, Houghton, United States; ³ITMO University, St. Petersburg, Russian Federation

08:50 AM:

Which Macroscopic Parameters Characterize Dislocation Networks?

V. Berdichevsky¹; ¹Wayne State University, Detroit, United States

09:40 AM - 10:00 AM: Coffee Break

10:00 AM - 12:30 PM: SUMMIT PLENARY

12:30 PM - 13:30 PM: Lunch Break

13:30 PM:

Towards a Consistent Internal State Variable Theory of Inelasticity

D. Bammann¹; ¹Mississippi State University, Mississippi State, United States

14:00 PM:

Boundary Conditions in the Indeterminate Couple Stress Model: New Perspectives

P. Neff¹; ¹University Duisburg-Essen, Essen, Germany

14:30 PM:

Thermodynamically Consistent Continuum Dislocation Dynamics and Strain Gradient Terms in Small Scale Plasticity

T. Hochrainer¹; ¹Bremen University, Bremen, Germany

15:00 PM:

Mechanisms And Modelling Of Dislocation Patterns

S. Sandfeld¹; ¹Friedrich-Alexander University Erlangen-Nurnberg, Furth, Germany

15:30 PM - 15:50 PM: Coffee Break

15:50 PM:

Statistical And Stochastic Physics in Engineering and Biology

A. Chattopadhyay¹; ¹Aston University, Birmingham, United Kingdom

16:10 PM:

Antiplane Dislocation-based Fracture Mechanics Within Generalized Continua

M. Mousavi¹; ¹Aalto University, Espoo, Finland

16:30 PM:

Wave Propagation In Relaxed Micromorphic Continua: Modeling Meta-materials Exhibiting Frequency Band-gaps

A. Madeo¹; ¹INSAVALOR, Villeurbanne, France

16:50 PM:

Defects In Solids: Elastic Models And The Boundary-value Problems

A. Kolesnikova¹; A. Romanov²; ¹ITMO University, St. Petersburg, Russian Federation; ²Togliatti State University, Togliatti, Russian Federation

17:10 PM:

Multiplicative Finite Strain Elastoplastic Formulation Coupled To Anisotropic Damage

R. Balieu¹; N. Kringos¹; ¹KTH Royal Institute of Technology, Stockholm, Sweden

17:30 PM:

Iso-ito Calculus

S. Georgiev¹; ¹Sorbonne University, Paris, France

17:45 PM:

Iso-stochastic Differential Equations

S. Georgiev¹; ¹Sorbonne University, Paris, France

18:00 PM - 22:00 PM: Pool & Dinner Party

TUESDAY OCT, 06 2015

08:00 AM:

Intrinsic And Extrinsic Size Effects In Metallic Systems

J. De Hosson¹; ¹University of Groningen, Groningen, Netherlands

08:50 AM:

30 Years Of Gradient Terms

I. Groma¹; ¹Eotvos University Budapest, Budapest, Hungary

09:40 AM - 10:00 AM: Coffee Break

10:00 AM - 12:30 PM: SUMMIT PLENARY

12:30 PM - 13:30 PM: Lunch Break

13:30 PM:

Strain Gradient Model Of Mechanisms Controlling Evolution Of Deformation Band Substructure

J. Kratochvil¹; ¹Czech Technical University, Prague, Czech Republic

14:00 PM:

Plasticity Simulation Based On The Dynamics Of Full Dislocation-density Functions – Predicting Size Effect Of Strength And Dislocation Pattern Formation

A. Ngan¹; **H. Leung**²; **P. Leung**²; **B. Cheng**²; **K. Aifantis**³; ¹Univ. of Hong Kong, Pokfulam, Hong Kong; ²University of Hong Kong, Hong Kong; ³University of Arizona, Tucson, United States

14:30 PM:

Effects Of Elastic Anharmonicity And Dislocation Climb On Patterning

P. Ispanovity¹; **I. Groma**¹; ¹Eotvos University Budapest, Budapest, Hungary

15:00 PM:

Elasto-plastic Model Of Quasi-brittle Material Based On Gauge And Phase Transition Theories

C. Qi¹; ¹Beijing University of Civil Engineering and Architecture, Beijing, China

15:30 PM - 15:50 PM: Coffee Break

15:50 PM:

Interfaces In Gradient Plasticity

K. Aifantis¹; ¹University of Arizona, Tucson, United States

16:10 PM:

Gradient Plasticity Application For Modeling Size Effects At Various Scales

A. Konstantinidis¹; ¹Aristotle University of Thessaloniki, Thessaloniki, Greece

16:30 PM:

On The Role Of Strain Gradients In The Suppression Of Material Instabilities At Small Length Scales

I. Tsagrakis¹ ; ¹Aristotle University of Thessaloniki, Thessaloniki, Greece

16:50 PM:

Thermodynamically Consistent Strain Gradient Cyclic Plasticity Model, Applied In Torsion Of Thin Wires

X. Zhang¹ ; G. Kang² ; ¹Chengdu, China; ²Applied Mechanics and Structure Safety Key Laboratory of Sichuan Province, School of Mechanics and Engineering, Southwest Jiaotong University, Chengdu, China

17:10 PM:

Validation And Identification Of Gradient-elasticity From Fullfield-Measurements

J. Rethore¹ ; ¹LaMCoS INSA Lyon, CNRS, Villeurbanne, France

17:30 PM:

Exploring The Size-induced Brittle-to-ductile Transition In Small-scale Metallic Glasses With Gradient Plasticity Models

D. Toennies¹ ;C. Volkert¹ ;R. Maass¹ ; ¹Institute of Materials Physics, University of Goettingen, Goettingen, Germany

17:45 PM:

Fracture In Strain Gradient Plasticity

E. Martinez Paneda¹ ; ¹University of Oviedo, Gijon, Spain

18:00 PM - 22:00 PM: Beach Cocktail

WEDNESDAY OCT, 06 2015, SESSION I

08:00 AM:

Mechanics And Nanomechanics. The Problems Of Nanotechnology

B. Semenov¹ ; **N. Morozov**² ; ¹St. Petersburg State Polytechnical University, Saint Petersburg, Russian Federation; ²Saint Petersburg State University Faculty of Mathematics and Mechanics, Saint Petersburg, Russian Federation

08:50 AM:

Disclination Concept In Mechanics Of Materials

A. Romanov¹ ; ¹Togliatti State University, Togliatti, Russian Federation

09:40 AM - 10:00 AM: Coffee Break

10:00 AM - 12:30 PM: SUMMIT PLENARY

12:30 PM - 13:30 PM: Lunch Break

13:30 PM:

Mechanics Meets Electronics In Nanoscale

R. Nowak¹ ; ¹Nordic Hysitron Laboratory, Aalto University, Espoo, Finland

14:00 PM:

The Role Of Geometrically Necessary Dislocations In The Plastic Behavior Of Pure Copper At Extreme Large Strains

L. Toth¹ ; ¹Metz University, Metz, France

14:30 PM:

Advances In Nano-porous Materials: Metallic Muscles At Work

J. Dehossion¹ ; ¹Un. of Groningen, Groningen, Netherlands

15:00 PM:

Granular Fabric In Critical State Theory: From Discrete To Continuum

Y. Dafalias¹ ; ¹National Technical University of Athens and University of California at Davis, Athens, Greece

15:30 PM - 15:50 PM: Coffee Break

15:50 PM:

Threading Dislocations In Iii-nitride Structures For Optoelectronic Device Applications

V. Bougrov¹ ; ¹ITMO University, Saint-Petersburg, Russian Federation

16:10 PM:

Phase-mixture Modeling Of Nanocrystalline Materials Including Gradient Effects Of Higher Order

B. Klusemann¹; S. Bargmann²; Y. Estrin³; ¹Hamburg University of Technology, Institute of Continuum Mechanics and Material Mechanics, Hamburg, Germany; ²Hamburg University of Technology, Institute of Continuum Mechanics and Material Mechanics; Helmholtz-Zentrum Geesthacht, Institute of Materials Research, Hamburg, Germany; ³Monash University, Centre for Advanced Hybrid Materials, Clayton, Australia

16:30 PM:

Crack Propagation In Micropolar Materials With Defects

E. Atroshchenko¹; S. Bordas²; ¹Department of Mechanical Engineering, University of Chile, Santiago, Chile; ²University of Luxembourg, Kirchberg, Luxembourg

16:50 PM:

Influence Of Strain Gradient On Magnetoelectric Effect Of Multiferroic Composites

K. Xu¹; ¹Shanghai University, Shanghai, China

17:10 PM:

Formation Of The Internal Cavity In Icosahedral Small Copper Particles After Annealing

A. Vikarchuk¹; A. Priezheva¹; **M. Dorogov**¹; L. Dorogin²; A. Romanov¹; ¹Togliatti State University, Togliatti, Russian Federation; ²Institute of Physics, University of Tartu, Tartu, Estonia

17:30 PM:

Generation Of Fine Grain Layers In The Vicinity Of Frictional Interfaces In Metal Forming: Theory And Experiment

S. Alexandrov¹; R. Goldstein¹; ¹Institute for Problems in Mechanics, Moscow, Russian Federation

17:45 PM:

Peridynamic Modelling Of Granular Fracture In Polycrystalline Materials

E. Oterkus¹; D. De Meo¹; N. Zhu¹; C. Diyaroglu¹; ¹University of Strathclyde, Glasgow, United Kingdom

18:00 PM - 22:00 PM: GALA DINNER

Empedocles and Galen On The Human Brain

S. Balogiannis¹; ¹Aristotle University of Thessaloniki, Thessaloniki, Greece

WEDNESDAY OCT, 06 2015, SESSION II

13:30 PM:

Structural Model Of Mechanical Twinning And Its Application For Modeling Of Plate Collisions Problem And Dynamical Taylor Anvil On Rod Tests

E. Borodin¹; A. Mayer¹; ¹Chelyabinsk State University, Chelyabinsk, Russian Federation

14:00 PM:

Modeling Frictional Effects In Wear Of Metals Using Strain Gradient Plasticity

B. Deliktas¹; G. Voyiadjis²; I. Turtuk¹; ¹Uludag University, Bursa, Turkey; ²Louisiana State University, Baton Rouge, United States

14:30 PM:

Scaling Effects In Reversible Microplastic Strain

S. Kustov¹; V. Nikolaev²; ¹University of Balearic Islands, Palma de Mallorca, Spain; ²ITMO University, 197101, St. Petersburg, Russian Federation

15:00 PM:

The Nature Of Structure Evolution Upon Severe Plastic Deformation

A. Glezer¹; ¹National University of Science and Technology, Moscow, Russian Federation

15:30 PM - 15:50 PM: Coffee Break

15:50 PM:

Numerical Modeling Of Hydrogen Diffusion In Metals Accounting For Large Deformations

O. Aslan¹; ¹Atilim University, Ankara, Turkey

16:10 PM:

Analysis Of Anisotropic Finite Cracked Wedge Under Antiplane Shear Loading

H. Ghasemi¹; ¹Qazvin, Iran

16:30 PM:

Biomedical β -type Titanium Alloys: Nanostructuring And Biofunctionality

H. Yilmazer¹; B. Aksakal²; ¹Yildiz Technical University, Istanbul, Turkey; ²Department of Metallurgical and Materials Engineering, Yildiz Technical University, Istanbul, Turkey

16:50 PM:

Internal Structure Of Granular Media And Its Determination Problem

S. Patil¹; ¹Indian Institute of Science, Bangalore, India

17:10 PM:

Determination of Nanoscopic Parameters in Second Strain Gradient Elasticity

F. Ojaghnezhad¹; H. Shodja²; ¹Karaj, Iran; ² Sharif University of Technology, Tehran, Iran

17:30 PM:

Peculiarity of plastic deformation of α/β brass during friction

L. Rapoport¹; L. Meshi²; I. Lapsker³; A. Moshkovich³; V. Perfilyev³; ¹Holon Institute of Technology, Holon, Israel; ²Beer Sheva, Israel; ³Holon, Israel

17:45 PM:

Dislocation Network Formation in a Coherent Twin Boundary in Face-Centered Cubic Metals

J. Jeon¹; J. Kim²; W. Kim²; I. Baek²; E. Choi²; S. Kim²; M. Park²; ¹Korea Institute of Industrial Technology, Yangsan, South Korea; ²KITECH, Yangsan, South Korea

18:00PM - 22:00 PM: GALA DINNER

Empedocles and Galen On The Human Brain

S. Balogiannis¹; ¹Aristotle University of Thessaloniki, Thessaloniki, Greece

