

10th International Congress on Thermal Stresses

TS2013

Organized by



State Key Laboratory of Mechanics and Control of Mechanical Structures, NUAU

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May 31- June 4, 2013
Nanjing, China



Conference Program

TECHNICAL PROGRAM

PLENARY LECTURES

1. Lars-Erik Lindgren, A Lundbäck, M Fisk, Thermo-mechanics and Microstructure Evolution in Manufacturing Simulations.
2. Tong-Yi Zhang, Grain Boundary Segregation and Stress-Induced Solubility in Nanograined Materials.
3. Michele Ciarletta, Stan Chirita, Some Non-standard Problems Related with the Mathematical Model of Thermoelasticity with Microtemperatures.
4. Erasmus Carrera, M. Cinefra, Fiorenzo Adolfo Fazzolari. Some Results on Thermal Stress of Layered Plates and Shells by Using Unified Formulation.
5. Weiqliu Chen, General Solution for Magneto-electro-thermoelasticity and Its Applications.

REGULAR SESSIONS

- S1: Thermo-elasticity and Viscoelasticity (I)
S2: Thermal Stresses and Deformations (I)
S3: Thermal Induced Fracture of Materials and Structures (I)
S4: Experimental Studies on Thermo-mechanics Problems
- S5: Thermal Stresses in Smart Materials and Structures (I)
S6: Analysis of Stresses in Thermal Structures (I)
S7: Thermal Vibration and Shock
S8: Optimization of Thermal Structures
- S9: Launching Ceremony of Books
- S10: Computational Methods in Thermo-mechanics
S11: Thermal Instability and Localization
S12: Thermal Stresses and Deformations (II)
S13: Thermal Induced Fracture of Materials and Structures (II)
- S14: Thermo-elasticity and Viscoelasticity (II)
S15: Analysis of Stresses in Thermal Structures (II)
S16: Thermal Stresses in Smart Materials and Structures (II)
S17: Thermal Stresses in Plate Structures

Program Overview

Time		Conference Program	Venue
May 31	10:00-22:00	Registration	Lobby of Yuyuan Hotel
	18:00-20:00	Reception	1 st Floor of Yuyuan Hotel
June 1	08:00-	Registration	Y.F. Hall
	09:00-09:40	Opening Ceremony	Lecture Room, Y.F. Hall
	09:40-12:00	Plenary Lectures	Lecture Room, Y.F. Hall
	12:00-14:00	Lunch	Taoliyuan (3 rd Floor)
	14:00-18:00	Parallel Sessions	Room A-B, Y.F. Hall
June 2	08:00-12:00	Parallel Sessions	Room A-B, Y.F. Hall
	12:00-14:00	Lunch	Taoliyuan (3 rd Floor)
	14:00-15:40	Plenary Lectures	Lecture Room, Y.F. Hall
	15:40-17:30	Launching Ceremony of Books	Lecture Room, Y.F. Hall
	18:00-20:30	Banquet	Grand Metropark Hotel(3 rd floor)
June 3	08:00-12:00	Parallel Sessions	Room A-B, Y.F. Hall
	12:00-13:00	Lunch	Taoliyuan (3 rd Floor)
	13:00-18:00	City Tour	Nanjing City
	18:00-19:30	Dinner	Restaurant near Confucius Temple
June 4	08:00-11:40	Parallel Sessions	Room A-B, Y.F. Hall
	11:40-12:00	Closing Ceremony	Room A
	12:00-13:00	Lunch & Farewell	Taoliyuan (3 rd Floor)

Conference Program
June 1, Saturday

June 1, Saturday

09:00-09:40	Opening Ceremony & Photo (Venue: Lecture Room, Y.F. Hall) Chairman: Ji Wang	
	Plenary Lectures (Venue: Lecture Room, Y.F. Hall)	
09:40-10:20	Plenary Lecture 1: Thermo-Mechanics and Microstructure Evolution in Manufacturing Simulations Speaker: <u>Lars-Erik Lindgren</u> (Luleå University of Technology) Chairman: Richard B. Hetnarski	
10:20-10:40	Coffee Break	
10:40-11:20	Plenary Lecture 2: Grain Boundary Segregation and Stress-Induced Solubility in Nanograined Materials Speaker: <u>Tong-Yi Zhang</u> (Hong Kong University of Science and Technology) Chairman: Naotake Noda	
11:20-12:00	Plenary Lecture 3: Some Non-standard Problems Related with the Mathematical Model of Thermoelasticity with Microtemperatures Speaker: <u>Michele Ciarletta</u> (University of Salerno) Chairman: Fumihiro Ashida	
12:00-13:00	Lunch	
	Sessions (Venue: Rooms A-B)	
	S1: Thermoelasticity and Viscoelasticity (I) Room A Chairmen: C.K. Chao & Masayuki Ishihara	S2: Thermal Stresses and Deformations (I) Room B Chairmen: Yongzhong Huo & Junhui Hu
14:00-14:20	Coupled Thermoelasticity-Problem for A Space <u>Richard B. Hetnarski</u>	One-Dimensional Unsteady Thermal Stresses in Sheet Glass Bonded With Heat-Ray Absorbing Film <u>Yoshitaka Iyama</u> , Yoshihiro Obata
14:20-14:40	Potential Method in the Theory of Thermoelasticity with Microtemperatures for Microstretch Solids <u>Merab Svanadze</u> , Antonio Scalia	MAC Models in Thermoelasticity <u>Igor Neygebauer</u>
14:40-15:00	Transient Thermoelastic Analysis for a Functionally Graded Hollow Circular Disk with Piecewise Power Law due to Asymmetric Heating <u>Yoshihiro Ootao</u> , <u>Masayuki Ishihara</u>	Temperature-dependent Elastic Properties of Single-walled Carbon Nanotubes with Arbitrary Chirality <u>S. Ahmad Fazelzadeh</u> , Esmaeel Ghavanloo

15:00-15:20	<p>Thermoviscoelastic Analysis of Stress in Composite Structures- a Micro-to-structural Approach</p> <p><u>Liri Ben-Porat</u>, Jacob Aboudi, Rami Eliasi, David Livshits</p>	<p>Effect of Fuel Particle Sizes on the Thermo-mechanical Behaviors in the Rod-Type Dispersion Nuclear Fuel Elements</p> <p><u>Yi Cui</u>, Xinchun Ni, Shurong Ding, Yongzhong Huo</p>
15:20-15:40	<p>General Solutions of Three-dimensional Thermo-elastic Problems for Two-dimensional Quasicrystals</p> <p>Lianzhi Yang, <u>Yang Gao</u></p>	<p>Measuring the Thermal Deformation of the Thermal Protection Structure</p> <p><u>Ding Chen</u>, Junhui Bu Peng Liu, Hongqiang Ma</p>
15:40-16:00	<p>One-Dimensional Unsteady Thermal Stress In Heat-Ray Absorbing Sheet Glass - Influence of a Sudden Weather Change</p> <p><u>Tomohiko Hachiya</u>, Yoshihiro Obata</p>	<p>Thermoelastic Bending and Buckling Behaviors of Nanobeams</p> <p><u>Zhi-Qiao Wang</u>, Jian-Guo Lv Ya-Pu Zhao, Si Li</p>
16:00-16:20	Coffee Break	
	S3: Thermal-Induced Fracture of Materials and Structures (I), Room A Chairmen: Yuriy Tokovyy & Yang Gao	S4: Experimental Studies on Thermo-Mechanics Problems, Room B Chairmen: Yoshihiro Obata & Chaofeng Lü
16:20-16:40	<p>Effect of Microstructure on Fatigue Properties of Bi-brass Material at Various Temperatures</p> <p>S. Ishihara, S. Yamamoto, <u>K. Masuda</u> Y. Kousaka, T. Okada</p>	<p>Experimental Research of the Steady and Transient Heating Effects on the Structure Modal Characteristics</p> <p><u>Hao Cheng</u>, Hai-bo Li, Wei Zhang Zhen-qiang WU, Jing Guo</p>
16:40-17:00	<p>Thermal Stress Analysis of a Cracked Half-plane under Thermal Shock using the Dual-phase-lag Theory</p> <p><u>Zengtao Chen</u>, Keqiang Hu</p>	<p>Experimental Investigation of Pre-loaded Aluminum Alloys Irradiated by CO₂ Laser Beam</p> <p><u>Lianchun Long</u>, Liting Liu Tingting Wang, Rongshi Xiao</p>
17:00-17:20	<p>Influences of the Thermomechanical Properties on the Thermal Intensity Factors in Nonhomogeneous Materials</p> <p>Fengnan Guo , Licheng Guo, Hongjun Yu, <u>Kai Huang</u></p>	<p>A New Method on Temperature/Heat Flux Measurements</p> <p><u>Xuejun Zhao</u>, Chang Zhao, Yuanhong Ma</p>

17:20-17:40	Effect of Electrical Boundary Condition of Crack on the Nonlinear Electromechanical Behavior of Ferroelectric Single Crystal <u>Hong-liang Gu</u> , Jie Wang	Numerical and Experimental Procedure for Measuring Transient Heat Transfer between Fluid and Control Rod Surface Artur Cebula, <u>Jan Taler</u>
17:40-18:00	Crack Arresting of Alloy Steel 40CrNiMo by Discharging Pulse Yuming Fu, <u>Junli Wang</u> , Lijuan Zheng	A Theoretical and Experimental Study of the Thermal Buckling Behavior of the Fully-clamped Sandwich Panel with Metal-truss Core Wu Yuan, Xi Wang <u>Hongwei Song</u> , Chenguang Huang

Conference Program
June 2, Sunday

June 2, Sunday

Sessions (Venue: Rooms A-B)		
	S5: Thermal Stresses in Smart Materials and Structures (I), Room A Chairmen: Zengtao CHEN & Licheng Guo	S6: Analysis of Stresses in Thermal Structures (I), Room B Chairmen: Baolin Wang & Jan Taler
08:00-08:20	Control of Transient Thermal Stress in a Smart Piezo-composite Disk <u>Fumihiko Ashida</u> , Sei-ichiro Sakata Sei-ichiro Sakata, Tsuyoshi Yamada	Three-dimensional Thermal Stresses in a Solid Elastic Cylinder of Finite Length <u>Yuriy Tokovyy</u> , Chien-Ching Ma
08:20-08:40	Finite Element Simulation on Thermal Fatigue of a Turbine Blade with Thermal Barrier Coatings <u>Y. C. Zhou</u> , L. Yang, Q. X. Liu W. G. Mao, C. Lu	Temperature-responsive Bending of Multilayer Elastomeric Gels <u>Takuya Morimoto</u> , Fumihiko Ashida
08:40-09:00	Pyroelectric Effect on Dynamic Response of Coupled Distributed Piezothermoelastic Composite Plate <u>Fariborz Heidary</u>	Thermal Stress Analysis for Nonlinear Composite Panel <u>Yu E Ma</u>
09:00-09:20	Nonlinear Coupling Between Heat and Moisture Diffusion in One-dimensional Porus Media in a Steady State <u>Masayuki Ishihara</u> , Yoshihiro Ootao Yoshitaka Kameo	A Method for Modifying the Thermal Stress of a Composite Structure <u>Ying Wang</u> , Ding Chen, Fengjing Shen Yan Zhang, Hongqing Ma
09:20-09:40	Nanoscale Thermocapillary Flows for Creating Semiconducting Arrays of SWCNTs <u>Chaofeng Lü</u>	Thermal Analysis of the Langevin-type Ultrasonic Transducer with a Heat Dissipation System <u>Hanmin Peng</u> , Jinjuan Zhou, Junhui Hu
09:40-10:00	Ambient Temperature Effects on Characteristics of Piezoelectric Motors <u>Xiaolong Lu</u> , Junhui Hu Lin Yang, Chunsheng Zhao	Optimum Temperature Changes During Heating of Pressure Components with Holes <u>Jan Taler</u> , Piotr Dzierwa
10:00-10:20	Coffee Break	

	S7: Thermal Vibration and Shock (I) Room A Chairmen: Xuejun Zhao & Tingfeng Ma	S8: Optimization of Thermal Structures Room B Chairmen: Takuya Morimoto & Haopeng Song
10:20-10:40	<p>Finite Element Analysis of Frequency-temperature Relations of SC-cut Quartz Crystal Plates with the Corrected Mindlin Plate Theory</p> <p><u>Ji Wang</u>, Guijia Chen, Wunjun Wang Jianke Du, Huimin Jing, Lihong Wang</p>	<p>Optimization of Material Composition to Minimize Thermal Stresses in a Functionally Graded Hollow Sphere with Piecewise Power Law</p> <p>Yoshihiro Ootao, Akihiro Kakiuchi <u>Yoshitaka Kameo</u>, Masayuki Ishihara</p>
10:40-11:00	<p>Thermally Included Parametric Vibration of Graphene Sheets via Bi-Helmholtz Nonlocal Elasticity</p> <p><u>Andrzej Tylikowski</u></p>	<p>Heuristic Design Optimization for Thermal Error Reduction Using Thermal Modes</p> <p><u>E.C. Hooijkamp</u>, J. Dugge F. van Keulen, J. van Eijk</p>
11:00-11:20	<p>Analysis of Structural Vibration Characteristics with the Influence of Thermal Stresses</p> <p><u>Song Wu</u>, Buyun Zhang Xudong He, Huaihai Chen</p>	<p>Optimization of Transient Thermal Regimes in Thermosensitive Solids under Plastic Deformation Constrains</p> <p>Roman Kushnir, Anatoliy Yasinskyy, <u>Yuriy Tokovyy</u></p>
11:20-11:40	<p>Thermal Stress Analysis of Electro-thermal Anti-ice System Embedded in Helicopter Composite Rotor Blade Undergoing Vibration Load</p> <p><u>Dongdong Cao</u>, Yong Liu</p>	<p>Optimal Design of Actively-cooled Panels Strengthened with Various Cellular Materials</p> <p><u>Mingjun Li</u>, Hongwei Song Chenguang Huang</p>
11:40-12:00	<p>Mechanical Properties of Multicrystal Semiconductor after Thermal Shock</p> <p><u>Yoshihito Ozawa</u>, Le Thanh Thien Vu Daisuke Fujii, Kazuhito Koshimizu</p>	<p>Free Vibration Analysis in Axisymmetric Functionally Graded Thermoelastic Spheres</p> <p><u>J N Sharma</u></p>
12:00-14:00	Lunch	
	Plenary Lectures (Venue: Lecture Room, Y.F. Hall)	
14:00-14:40	<p style="text-align: center;">Plenary Lecture 4: Some Results on Thermal Stress of Layered Plates and Shells by Using Unified Formulation Speaker: <u>Erasmus Carrera</u> (Politecnico di Torino)</p> <p style="text-align: center;">Chairman: Y.C.Zhou</p>	

14:40-15:20	<p style="text-align: center;">Plenary Lecture 5: General Solution for Magneto-Electro-Thermoelasticity and Its Applications Speaker: <u>Weiqiu Chen</u> (Zhejiang University)</p> <p style="text-align: center;">Chairman: C.K. Chao</p>
15:20-15:40	Coffee Break
15:40-17:30	<p style="text-align: center;">Section 9: Launching Ceremony of Books</p> <p style="text-align: center;">Chairmen: Li Shen & Richard B. Hetnarski</p>
18: 00-20:30	Banquet

Conference Program
June 3, Monday

June 3, Monday

Sessions (Venue: Rooms A-B)		
	S10: Computational Methods in Thermo-Mechanics, Room A Chairmen: Roman Kushnir & Haijing Wang	S11: Thermal Instability and Localization Room B Chairmen: Ryuusuke Kawamura & Tianhu He
08:00-08:20	The Dual Reciprocity Singular Boundary Method for Thermoelastic Problems <u>Wenzhen Qu</u> , Wen Chen, Xing Wei	Thermoelastic Damping in an Auxetic Plate <u>B.T. Maruszewski</u>
08:20-08:40	Finite Element Method to a Two-dimensional Generalized Thermoelastic Problem with Diffusion Tianhu He, <u>Shuanhu Shi</u>	Convective Instability and the Appearance of Structured Flows for Diffusion in Multicomponent Gas Mixtures <u>V. N. Kossov</u> , O.V. Fedorenko E.A. Dyachenko
08:40-09:00	Direct Simulation of Heat Transfer in Open-cell Foams <u>Jine Li</u> , Baolin Wang	Thermal Shock Analysis of a Functionally Graded Material Plate with Multiple Cracks Yanyan Zhang, <u>Licheng Guo</u> , Xiaoming Bai Kai Huang, Yubo Feng
09:00-09:20	Efficient Mathematical Methods for Analysis of Thermoelastic Equilibrium of Homogeneous and Non-homogeneous Solids Roman Kushnir, <u>Yuriy Tokovyy</u>	Borehole Stability Analysis for Steam Injection Based on Thermo- Hydro- Mechanical Coupling Shifeng Xue, <u>Haijing Wang</u> , Cun-Fa Gao
09:20-09:40	A Numerical Study of Free Convection Heat and Mass Transfer in a Viscoelastic Flow past an Impulsively Started Vertical Plate with Variable Temperature and Concentration Rajneesh Kumar, Ibrahim A. Abbas <u>Veena Sharma</u> , Radhe Shyam	Stress Relaxation Analysis of One-Dimensional Structure with Interface Thermal Contact Resistance Liu Donghuan, Li Dongzhe, <u>Shang Xinchun</u>
09:40-10:00	Variational Finite Element Approach to Study Cold Stress and Tissue Damage in Human Body Peripherals <u>M. A. Khanday</u>	Effects of Thermo-Mechanical Loads on the Aeroelastic Instabilities of Metallic and Composite Panels <u>E. Carrera</u> , M. Cinefra, E. Zappino, L. Succi
10:00-10:20	Coffee Break	

	S12: Thermal Stresses and Deformations (II) Room A Chairmen: Yuriy Ivanovich Nyashin & Xiaogeng Tian	S13: Thermal-Induced Fracture of Materials and Structures (II), Room B Chairmen: Keqiang Hu & Yoshitaka Kameo
10:20-10:40	Modeling of Metal Deposition in Ti-6Al-4V <u>Andreas Lundbäck</u> , Lars-Erik Lindgren Bijish Babu, Corinne Charles	Solutions of Thermoelastic Crack Problems in Tri-material Composite C.K. Chao, <u>L.M. Lu</u> , A. Wikarta
10:40-11:00	Mathematical Analysis of Plane Axisymmetric Transient Heat Conduction and Thermal Stresses of a Compound Circular Plate Subjected to Concentrated Sunlight <u>Ryuusuke Kawamura</u> , Yoshinori Nagase Shigeki Tomomatsu, Fumiya Tokumaru	Biomechanical Design of Orthopedic Apparatus for Treatment of the Congenital Cleft of the Hard Palate <u>V. Lokhov</u> , O. Dolganova
11:00-11:20	Analysis on Thermal Stresses and Deformation of Multi-nozzle Injector <u>Fengjing Shen</u> , Junhui Bu, Ding Chen Tiejing Wang, Tao Sun	Thermo-Elastic Analysis of a Cracked Functionally Graded Layer under Thermal Impact Loading: Using Hyperbolic Heat Conduction Theory <u>Keqiang Hu</u> , Zengtao Chen
11:20-11:40	Thermal Stress Analytic Solution and Numerical Simulation of Local Heated Circular Plate <u>Lianchun Long</u> , Wenwen Qi	Analysis of Crack Problem Based on Polarization Saturation Model in Thermopiezoelectric Materials <u>Aibing Zhang</u> , Baolin Wang
11:40-12:00	Thermal/Mechanical Analysis of DNA-Microcantilevers <u>Zou-Qing Tan</u> , Wei-Lie Meng Neng-Hui Zhang	Acoustic Emission Evaluation of Fracture Characteristics in Thermal Barrier Coatings under Bending <u>L. Yang</u> , Z. C. Zhong J. You, Y. C. Zhou
12:00-14:00	Lunch	
14:00-18:00	City Tour	
18:00-19:30	Dinner	

Conference Program
June 4, Tuesday

June 4, Tuesday

Sessions (Venue: Rooms A-B)		
	S14: Thermo-Elasticity and Viscoelasticity (II) Room A Chairmen: Michal Kuciej & Shifeng Xue	S15: Analysis of Stresses in Thermal Structures (II), Room B Chairmen: Juan Jimenez & Ismail. M. Tayel
08:00-08:20	Plane Harmonic Waves in the Theory of Thermoviscoelastic Materials with Voids Ciro D'Apice, <u>Stan Chirita</u>	Role of Thermal Stresses in the Degradation of High Power Laser Diodes <u>J.Jimenez</u> , J.Anaya, J. Souto
08:20-08:40	Influence of Thermoelastic Coupling on Velocities of Generalized Thermoelastic Waves <u>Xiao-Geng Tian</u> , Qi-Lin Xiong Wei Hu, Yanlong Xu	Prediction Techniques of Transient Radiation Heating Environment during Thermalmechanical Tests for Aero-craft Composite Structures <u>Liu Baorui</u> , Kong Fanjin, Zhang Wei Wu Zhenqiang, Cheng Hao
08:40-09:00	Thermal Stress and Theorem on Decomposition of Eigenstrain V. Lokhov, <u>Y. Nyashin</u>	Effect of Thermal Stress on Supersonic Nozzle Structure <u>Junhui Bu</u> , Ding Chen Fengjing Shen, Tao Sun
09:00-09:20	Some Transient Heat Problems of Friction with Generalized Boundary Conditions A. A. Yevtushenko, <u>Michal Kuciej</u>	Thermoelastic Thick Plate under Illumination of a Laser Beam with Two Relaxation Times Ezzat. F. Henain, Amin. F. Hassan Fouad. Megahed, <u>Ismail. M. Tayel</u>
09:20-09:40	Making Applications for Education of Mechanics of Materials by Using a Tablet Computer <u>Tomoaki Tsuji</u> , Yuta Matsuzawa	3D Elasticity Solutions of Simply Supported Laminated Rectangular Plates in Uniform Temperature Field <u>Hai Qian</u> , Ding Zhou Weiqing Liu, Hai Fang
09:40-10:00	Study on the Propagation of Finite Thermal Wave in a Functionally Graded thick Plate <u>M. Kanoria</u> , Abhik Sur	Thermal Stresses in Functionally Graded Euler-Bernoulli Beams <u>Y D Sharma</u> , J N Sharma
10:00-10:20	Coffee Break	

	S16: Thermal Stresses in Smart Materials and Structures (II), Room A Chairmen: Andras SZEKERES	S17: Thermal Stresses in Plate Structures Room B Chairmen: Gang Yan
10:20-10:40	Hygrothermal Stresses in Magnetoelastic Cylinders A.H. Akbarzadeh, <u>Z.T. Chen</u>	Elasticity Solution of Simply Supported Laminated Plate Subjected to Uniform Temperature Loading <u>Hai Qian</u> , Ding Zhou, Weiqing Liu
10:40-11:00	Temperature Dependence of the Coefficient of Friction and Wear Rate in a Pad/Disc Brake System A. A. Yevtushenko, <u>A. Adamowicz</u> , P. Grzes	The Generalized 2D Thermal-Electro-Elastic Solution for the Cracked-Half-Elliptical-Hole Problem in a Half-infinite Plate <u>Yongjian Wang</u> , Cunfa Gao
11:00-11:20	Hermo-Hygro-Mechanics (THM) and Engineering <u>Andras Szekeres</u> , Balazs Fekete Pier Marzocca	Thermal Stress Analysis of a Finite Functionally Graded Material Plate with a Circular Hole Under a Uniform Heat Flow Quanquan Yang, Cun-Fa Gao, Hao-Peng Song
11:20-11:40	Analytical Thermal Stress Model for Terabyte Volume Holographic Optical Disk Ephraim Suhir, Claire Gu, <u>Liangcai Cao</u>	In-plane Vibrations in Clamped Thermoelastic Solid Disks <u>P.K. Sharma</u> , J N Sharma
11:40-12:00	Closing Ceremony (Venue: Room A, Y.F. Hall) Chairman: Zhenhua Qian	
12:00-13:00	Lunch and Farewell	