

**The Fourth International Conference on Applications
of Mathematics and Informatics
in Natural Sciences and Engineering**

**PROGRAMS
OF
THE CONFERENCE
AND
SATELLITE
TICMI ADVANCED COURSES**

**on Mathematical Models of Piezoelectric Solids
and Related Problems**

**23 – 26 September, 2019
TBILISI, GEORGIA**

ORGANIZERS:

- I. Javakhishvili Tbilisi State University (TSU)
 - I. Vekua Institute of Applied Mathematics
 - Faculty of Exact and Natural Sciences
- Georgian Mechanical Union
 - Georgian National Committee of Theoretical and Applied Mechanics
- Tbilisi International Centre of Mathematics and Informatics (TICMI)

SPONSOR:



Shota Rustaveli National Science Foundation of Georgia [Grant number 217596, Construction and investigation of hierarchical models for thermoelastic piezoelectric structures]

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Address: I. Vekua Institute of Applied Mathematics of I. Javakhishvili Tbilisi State University, 2 University Str., 0186 Tbilisi, Georgia

Conference web-page: <http://www.viam.science.tsu.ge/aminse2019/>

Web-page of the Satellite TICMI Advanced Courses:

<http://www.viam.science.tsu.ge/ticmi/announcements/announcement/2019>

Scientific Program

Monday, 23 September, 2019

| | |
|--------------------|----------------------------------|
| <i>10:30-12:30</i> | <i>TICMI Advanced Courses</i> |
| <i>12:30-14:00</i> | <i>Lunch</i> |
| <i>14:00-14:25</i> | <i>Opening of the Conference</i> |
| <i>14:30-15:50</i> | <i>Opening Talks</i> |
| <i>15:50-16:15</i> | <i>Coffee Break</i> |
| <i>16:15-18:25</i> | <i>Conference Sessions</i> |

Tuesday, 24 September, 2019

| | |
|--------------------|-------------------------------|
| <i>10:30-12:20</i> | <i>TICMI Advanced Courses</i> |
| <i>12:30-14:00</i> | <i>Lunch</i> |
| <i>14:00-15:20</i> | <i>Conference Sessions</i> |
| <i>15:25-15:50</i> | <i>Coffee Break</i> |
| <i>15:50-17:10</i> | <i>Conference Sessions</i> |
| <i>20:00-22:00</i> | <i>Conference Dinner</i> |

Wednesday, 25 September, 2019

| | |
|--------------------|-------------------------------|
| <i>10:30-12:20</i> | <i>TICMI Advanced Courses</i> |
| <i>12:30-14:00</i> | <i>Lunch</i> |
| <i>14:00-15:20</i> | <i>Conference Sessions</i> |
| <i>15:25-15:50</i> | <i>Coffee Break</i> |
| <i>15:50-17:00</i> | <i>Conference Sessions</i> |

Thursday, 26 September, 2019

Excursion

The Fourth International Conference on Applications of Mathematics and Informatics in Natural Sciences and Engineering

I. Vekua Institute of Applied Mathematics of TSU, 2 University Str., Tbilisi, Georgia

Sections of the Conference:

Section 1. Natural Sciences

Section 2. Mathematics

Section 3. Informatics

Section 4. Engineering

Monday, 23 September, 2019

10:00 – 13:20 Registration (Room 131)

Ilia Vekua Lecture Hall

14:00 – 14:25 Opening

14:30 – 15:10 **Rolf Jeltsch (Switzerland)**. Recent Developments on Numerical Solutions for Hyperbolic Systems of Conservation Laws

15:10 – 15:50 **Ayech Benjeddou (France)**. Progress in Mathematical and Numerical Modelling of Piezoelectric Smart Structures

15:50-16:15 *Coffee Break*

Section 1. Natural Sciences

Ilia Vekua Lecture Hall

16:15 – 16:55 **Bernadette Miara (France)**. Modelling of Elastic Composites with Several Small Parameters

16:55 – 17:35 **George Jaiani (Georgia)**. On Hierarchical Models for Piezoelectric Bars

17:40 – 18:00 **Dmitrii Oshmarin, Maksim Iurlov (Russia)**. A FEM-Based Algorithm for Solving Natural Vibration Problems for Piezoelectric-Based Smart-Systems and Its Application to the Problem of Multimodal Vibration Damping

18:05 – 18:25 **George Bakuradze (Georgia)**. Hierarchical Models for Thermoelastic Kelvin-Voight Piezoelectric Prismatic Shells

Section 2. Mathematics

Room 115 (Council Meeting Room)

16:15 – 16:55 **Alice Fialowski (Hungary)**. Metric Lie Algebras and Applications

16:55 – 17:35 **Vaja Tarieladze, George Giorgobiani, Vakhtang Kvaratskhelia (Georgia)**. Induced Operators by Subgaussian Random Elements

Section 3. Informatics

Room 115 (Council Meeting Room)

17:40 – 18:00 **Nestan Kekelia, Temur Chilachava, George Pochkhua (Georgia)**. Nonlinear Mathematical Models of Settlement of Political Conicts and Problems of Minimization of Resources

18:05 – 18:25 **Ketevan Kutkhashvili (Georgia)**. Mathematical Model of Project Management

Section 4. Engineering

Room 133 (Library)

- 17:40 – 18:00 **Teimuraz Davitashvili (Georgia)**. Modeling of Extreme Events and Regional Climate Variability on the Territory of Caucasus (Georgia)
- 18:05 – 18:25 **Bakur Gulua, Roman Janjgava (Georgia)**. Some Basic Boundary Value Problems for Plane Theory of Elasticity for Materials with Voids

Tuesday, 24 September, 2019

Section 1. Natural Sciences

Ilia Vekua Lecture Hall

- 14:00 – 14:40 **Wolfgang Müller, Wilhelm Rickert (Germany)**. An Investigation of Electromagnetic Force Models: Electromagnetic Forces and Moments Acting on Spherical Magnets
- 14:40 – 15:20 **Mariam Avalishvili, Gia Avalishvili (Georgia)**. Variational Approach for Construction and Investigation of Hierarchical Models of Thermoelastic Piezoelectric Structures

Section 2. Mathematics

Room 115 (Council Meeting Room)

- 14:00 – 14:40 **Petre Babilua, Elizbar Nadaraia (Georgia)**. On the Limit Distribution of the Integral Square Deviation of a Nonparametric Estimator of the Bernoulli Regression Function for One Sample and Two Independent Samples
- 14:40 – 15:20 **Gerald Trutnau (South Korea)**. Well-posedness for a Class of Degenerate Itô-SDEs with Fully Discontinuous Coefficients

15:25-15:50 *Coffee Break*

Section 3. Informatics

Ilia Vekua Lecture Hall

- 15:50 – 16:30 **Maribel Fernandez (UK)**. Strategic Graph Rewriting in an Interactive Modelling Framework
- 16:30 – 17:10 **Teimuraz Kutsia (Austria)**. Proximity Constraint Solving

Section 4. Engineering

Room 115 (Council Meeting Room)

- 15:50 – 16:30 **Tamaz Vashakmadze (Georgia)**. To the Theory and Practice of Thin Walled Structures
- 16:30 – 17:10 **Omar Kikvidze (Georgia)**. The Flow of Nonlinear Viscous Strain-Hardening Material in Variable Section Passages
- 20:00-22:00 *Conference Dinner*

Wednesday, 25 September, 2019

Section 2. Mathematics

Ilia Vekua Lecture Hall

- 14:00 – 14:40 **Lucian Beznea (Romania)**. Connections between the Dirichlet and the Neumann Problem for Integrable Boundary Data

Section 3. Informatics

Room 115 (Council Meeting Room)

- 14:00 – 14:40 **Ramaz Botchorishvili (Georgia)**. Deep Residual Networks and Numerical Linear Advection
- 14:40 – 15:20 **Mircea Marin (Romania)**. Specification and Analysis of ABAC Policies in a Rule-Based Framework
- 15:25-15:50 *Coffee Break*

Section 1. Natural Sciences

Ilia Vekua Lecture Hall

- 15:50 – 16:10 **Khatuna Chargazia, Oleg Kharshiladze (Georgia)**. Anomalous Transport in the Space Plasmas
- 16:15 – 16:35 **Osman Özcan, Selçuk Sağır (Turkey), Tamaz Kaladze, David Kaladze (Georgia)**. Effect of Magnetic Declination on Refractive Index and Wave Polarization Coefficients of Electromagnetic Waves in Mid-Latitude Ionosphere
- 16:40 – 17:00 **Ali Yesil, Mustafa Inc (Turkey), Luba Tsamalashvili (Georgia), Kadri Kurt (Turkey)**. The Epliptic Polarization of

the Characteristic wave for the Cold Ionosphere Plasma in Northern Hemisphere

Section 2. Mathematics

Room 115 (Council Meeting Room)

- 15:50 – 16:10 **Leri Gogoladze (Georgia)**. On the Strong Angular Summability
- 16:15 – 16:35 **Jemal Rogava (Georgia)**. On Stability and Convergence of Three-layer Semi-discrete Scheme for Nonlinear Second Order Evolution Equation
- 16:40 – 17:00 **Besik Tabatadze, Temur Jangveladze (Georgia)**. On a Numerical Solution of One Two-Dimensional Nonlinear Model

Section 4. Engineering

Room 133 (Library)

- 15:50 – 16:10 **Nino Bliadze (Georgia)**. Some Problems for Elastic Double-Layer Bodies
- 16:15 – 16:35 **Sofia Bliadze (Georgia)**. Analysis on Strengths of Isotropic Cusped Beams
- 16:40 – 17:00 **Malkhaz Bediashvili, Gela Kipiani (Georgia)**. New Seismic Insulation Systems for Buildings to Protect Against Catastrophic Earthquakes

Thursday, 26 September, 2019

Excursion

The Satellite TICMI Advanced Courses
on
Mathematical Models of Piezoelectric Solids and Related Problems

I. Vekua Institute of Applied Mathematics of TSU, 2 University Str., Tbilisi, Georgia

Monday, 23 September, 2019

Room 115 (Council Meeting Room)

- 10:30 – 10:40 Opening Remarks
- 10:40 – 11:30 **Wolfgang H. Müller, Wilhelm Rickert, Felix Reich (Germany)**. An Examination of Elastic Deformation Predictions of Polarizable Media due to Various Electromagnetic Force Models
- 11:40 – 12:30 **Gia Avalishvili, Mariam Avalishvili (Georgia)**. On Variational Methods of Investigation of Mathematical Problems for Thermoelastic Piezoelectric Solids

Tuesday, 24 September, 2019

Room 115 (Council Meeting Room)

- 10:30 – 11:20 **Bernadette Miara (France)**. Homogenization and Control of a Piezoelectric Body
- 11:30 – 12:20 **David Natroshvili (Georgia)**. Dynamical Problems of Generalized Thermo-Electro-Magneto-Elasticity Theory

Wednesday, 25 September, 2019

Room 115 (Council Meeting Room)

- 10:30 – 11:20 **George Jaiani (Georgia)**. Piezoelectric Cusped Prismatic Shells
- 11:30 – 12:20 **Ayech Benjeddou (France)**. Piezoelectric Material, Effective and Structural Behaviours

Thursday, 26 September, 2019

Excursion