

**XXXIII International Enlarged Sessions of the Seminar  
of Ilia Vekua Institute of Applied Mathematics (VIAM)  
of Ivane Javakhisvili Tbilisi State University (TSU)**

**April 23–25, 2019**



**PROGRAM**

**Opening - April 24, Wednesday, 14:00  
Ilia Vekua Lecture Hall in VIAM**

## Organizing Committee

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	Vepkhvadze Teimuraz

In the case of co-authors the speaker's name is underlined.

The peer-reviewed manuscripts will be published. The source tex and the corresponding pdf files of the English version of the talk, prepared using the template (information how to prepare an article, together with a LaTeX template is available for download from [http://www.viam.science.tsu.ge/en\\_ses.htm](http://www.viam.science.tsu.ge/en_ses.htm)) and not exceeding four A4-format pages should be uploaded in the system

<http://www.viam.science.tsu.ge/userspace/login>

before May 31, 2019.

Opening of the Seminar will start on April 24, 2019 at 14:00 at I. Vekua Institute of Applied Mathematics (University str. 2, 0186 Tbilisi, Georgia).

As usual on April 23 at 16:00 a visit to Mtatsminda Pantheon is planned, where Ilia Vekua is buried.

**Wednesday, April 24**  
**Ilya Vekua Lecture Hall (VIAM)**

**14:00 – 14:30      Opening**

# Section of Mathematical Logic and Foundations

Chairs: Alexander Kharazishvili, Roland Omanadze

Co-chair: Archil Kipiani

**Wednesday, April 24**

**Ilia Vekua Lecture Hall (VIAM)**

**10:30 - 10:50 Roland Omanadze**

Some properties of  $Q_{1,N}$ -reducibility

**10:55 - 11:15 Tengiz Tetunashvili**

On a new proof of the existence of  $\pi$ -set of cardinality  $(d+1)$  in  $\mathbb{R}^d$  space

**11:20 - 11:40 Mariam Beriashvili**

Set-theoretical characterization of some classes of measures

**11:45 - 12:05 Shalva Beriashvili**

The asymptotic behavior of extremal lower estimate of reconstruction of a linear order on a finite set

**12:10 - 12:30 Archil Kipiani**

Automorphism groups of partial mono-unary algebras and CH

**12:35 - 12:55 Antonio Di Nola (Italy), Revaz Grigolia**

Dynamic Lukasiewicz logic and dynamic MV-algebras

**13:00 - 13:20 Tamar Kasrashvili**

On extensions of certain point-sets

# Section of Applied Logics and Programming

Dedicated to Centenary of Shalva Pkhakadze

Chair: Matthias Baaz (Austria)

Co-chairs: Jemal Antidze, Khimur Rukhaia

**Wednesday, April 24**

**Room № 226 (VIAM)**

- 10:35 - 10:55 Besik Dundua, Temur Kutsia (Austria), Mircea Marin (Romania)**  
Variadic equational matching
- 11:00 - 11:20 Laleh Haghverdi (Germany)**  
Integrative analysis of multi-omics data
- 11:25 - 11:45 Mikheil Rukhaia**  
Maude-NPA and formal analysis of NTRU-based protocols
- 11:50 - 12:10 Merihan Hazem Anwar Labib Bishara (Egypt)**  
Hybrid approach for low-diameter graphs
- 12:15 - 12:35 Merium Hazem Anwar Labib Bishara (Egypt)**  
Solving some problems by the depth-first search algorithm
- 12:40 - 13:00 Jemal Antidze, Nana Gulua, Irakli Kardava, David Mishelashvili**  
Computer application of Georgian language
- 13:05 - 13:25 Konstantine Pkhakadze, Merab Chikvinidze, Giorgi Chichua, David Kurtskhalia, Shalva Malidze, Konstantine Demurchev**  
The trial versions of the new developing tools of the Georgian universal smart corpus

## Section of Number Theory, Algebra and Geometry

Chairs: Mikhail Amaglobeli, George Khimshiashvili; Teimuraz Vepkhvadze

Co-chair: Ketevan Shavgulidze

**Tuesday, April 23**

**Auditory № 133 (VIAM)**

**11:00 - 11:20 Mikheil Amaglobeli**

On the nilpotent and solvable MR-groups

**11:25 - 11:45 Ketevan Shavgulidze**

On the spaces of generalized theta-series with some quadratic forms of five variables

**11:50 - 12:10 Ilia Tavkhelidze, Johan Gielis (Belgium)**

" $d_i$ -knife" and the process of cutting of  $GRT_m^n$  bodies

**12:15 - 12:35 Teimuraz Vepkhvadze**

Positive integers not represented by a binary quadratic form

**12:40 - 13:00 Roland J. Etienne (Luxembourg)**

Generating functions and spectral asymptotics of self-similar fractal strings

## Section of Real Analysis

Chairs: Ushangi Goginava, Leri Gogoladze

Co-chair: Ana Danelia

**Tuesday, April 23**

**Ilia Vekua Lecture Hall (VIAM)**

**11:00 - 11:20 Lasha Baramidze**

Uniform convergence of double Vilenkin-Fourier series

**11:25 - 11:45 Alexander Meskhi**

Two-weight inequalities for multi(sub)linear strong fractional maximal functions

**11:50 - 12:10 Shakro Tetunashvili, Tengiz Tetunashvili**

On Cantor's  $\Lambda$  functionals

**12:15 - 12:35 Vakhtang Tsagareishvili**

Some particular properties of general orthonormal systems

**12:40 - 13:00 Gvantsa Shavardenidze**

On the convergence of Cesàro means of negative order of Vilenkin-Fourier series

**13:05 - 13:25 Leri Gogoladze, Vakhtang Tsagareishvili**

On the convergence of general Fourier series of differentiable functions

# Section of Complex Analysis and Applications

In memory of Bogdan Bojarski and Giorgi Manjavidze

Chair: Grigor Giorgadze

Co-chair: George Akhalaia

**Thursday, April 25**

**Ilia Vekua Lecture Hall (VIAM)**

**11:00 - 11:30 Grigori Giorgadze, Giorgi Akhalaia, Nino Manjavidze.**

The impact of Bojarski'S works on the theory of elliptic partial differential equations on the plane

**The works supported by Shota Rustaveli National Science Foundation grant N 17-96**

**11:30 - 11:50 Giorgi Akhalaia, Nino Manjavidze**

On the boundary value problem of generalized analytic vectors

**11:55 - 12:15 Grigori Giorgadze.**

On the Riemann-Hilbert problem with a shift

**12:20 - 12:40 Valerian Jiqia**

Special case of the linear conjugation nonhomogeneous boundary value problem for the Carleman-Vekua irregular equation

**12:45 - 13:05 George Makatsaria**

Representation of a general solution of elliptic systems of some classes

**13:10 - 13:30 Gega Gulagashvili**

On the type of splitting of vector fibration on the Riemann sphere induced by the hypergeometric equation

**Break**

**14:00 - 14:20 Nugzar Makhaldiani (Russia)**

Non perturbative extension of perturbative quantum chromodynamics

**14:25 - 14:45 George Kakulashvili**

On the parameters problem for the Schwarz-Christoffel mapping

**14:50 - 15:10 Vagner Jikia**

The Euler integral of the first kind and higher order singularities

**15:15 - 15:35 Nikoloz Avazashvili**

On elastic characteristics of the solid body



# Section of Ordinary Differential Equations and Optimal Control

Dedicated to the 85<sup>th</sup> birthday anniversary of Guram Kharatishvili

Chairs: Roman Koplataдзе, Tamaz Tadumadze

**Tuesday, April 23**

**Room № 256 (VIAM)**

**12:00 - 12:20 Tamaz Tadumadze**

On the representation of solution of the perturbed controlled differential equation with delay

**12:25 - 12:45 Tea Shavadze**

Necessary conditions of optimality for the nonlinear optimal control problem with several delays and the continuous and discontinuous initial conditions

**12:50 - 13:10 Medea Iordanishvili**

Local variation formulas of solution for the nonlinear differential equations with delay in the phase coordinates and controls

**13:15 - 13:35 Phridon Dvalishvili**

Optimization of one marketing relations model with delay

**13:40 - 14:00 Bezhan Gvaberidze**

Using multi-criteria partitioning and covering problems for solving some location problems

**Break**

**14:25 - 14:45 Akaki Gabelaia, Levan Gabelaia**

Population growth logistic model using possibilities for casting population size of Georgia

**14:50 - 15:10 Vladimer Odisharia, Paata Tsereteli**

On the general mathematical model of autoimmune diseases and its treatment

**15:15 - 14:35 David Lashkhia**

On the asymptotic behavior of solutions of nonlinear functional differential equations

**15:40 - 16:00 Natia Khachidze**

On oscillation of solutions of higher order nonlinear difference equation

**16:05 - 16:25 Roman Koplataдзе**

Almost linear differential equations with several deviating arguments

# Section of Partial Differential Equations

Chairs: Temur Jangveladze, Sergo Kharibegashvili, David Natroshvili

Co-chair: Zurab Kiguradze

**Wednesday, April 24**

**Ilia Vekua Lecture Hall (VIAM)**

**15:00 - 15:20 Temur Chilachava**

About the exact solution of the rotating three-axis gas ellipsoid which is in own gravitational field

**15:25 - 15:45 Jemal Rogava**

On the stability of bijection in the Banach space in case of non-linear perturbation

**15:50 - 16:10 Dazmir Shulaia**

The algorithm to construct the eigenfunctions of the multi-velocity transport theory

**16:15 - 16:35 Maia Mrevlishvil, David Natroshvili**

Investigation of multi-field problems for composed elastic structures by the integral equation method

**16:40 - 17:00 Sveta Gorgisheli**

Localized boundary-domain integral equations approach with piece wise constant cut-off function for the Dirichlet problem of the heat transfer equation with a variable coefficient

**17:05 - 17:25 Nugzar Kereselidze**

Fischer-Kolmogorov's boundary task in the model of informative confrontation

**Thursday, April 25**

**Auditory№ 133 (VIAM)**

**11:00 - 11:20 Temur Jangveladze**

On a nonlinear integro-differential equation of parabolic type

**11:25 - 11:45 Micheil Gagoshidze, Giorgi Tsulaia**

Linear stability of the steady state solution and numerical approximation of a nonlinear partial differential system

**11:50 - 12:10 Kazbek Khubiev (Russia)**

Bitsadze–Samarskii type problem for aloaded mixed equation with degeneration of order in the domain of hyperbolicity

**12:15 - 12:35 Murat Mamchuev (Russia)**

On the systems of equations with the partial derivatives of fractional order

**12:40 - 13:00 Arsen Pskhu (Russia)**

Schwarz problem for the fractional Cauchy-Riemann system

**13:05 - 13:25 Beslan Efendiev (Russia)**

Initial-value problem for ordinary distributed-order differential equation

# Section of Theory of Probability and Mathematical Statistics

Dedicated to the 80th anniversaries of Besarion Dochviri and Zurab Zerakidze

Chairs: Elizbar Nadaraia, Omar Purtukhia

**Wednesday, 24 April**

**TSU, XI building, the office of prof. Gvanji Mania № 335**

- 15:00 - 15:20** Petre Babilua, Elizbar Nadaraya  
On the limit distribution of integral square deviation of Walverton-Vagner type estimate
- 15:25 - 15:45** Petre Babilua, Elizbar Nadaraya  
On some goodness-of-fit tests based on Walverton-Vagner type estimate
- 15:50 - 16:10** Kachiashvili Kartlos  
An example of application of CBM to intersection-union hypotheses testing
- 16:15 - 16:35** Besarion Dochviri, Zaza Khechinashvili  
Option pricing for general pay off function

**Break**

- 17:00 - 17:20** Michael Mania, Revaz Tevzadze  
The change of variable formulas for differentiable non-anticipative functionals
- 17:25 - 17:45** Malkhaz Shashiashvili  
Explicit bound of the quadratic risk of the Grenander estimator
- 17:50 - 18:10** Vakhtang Kvaratskhelia, Vazha Tarieladze  
On sub-Gaussian Random elements in a Banach space
- 18:15 - 18:35** Besik Chikvinidze  
Necessary and sufficient condition for the uniform integrability of stochastic exponential

**Thursday, 25 April**

**TSU, XI building, the office of prof. Gvanji Mania №335**

- 15:00 - 15:20** Badri Mamporia, Vakhtang Jaoshvili, Omar Purtukhia  
Stochastic integral representation of Poisson functionals with an explicit form of the integrand
- 15:25 - 15:45** Badri Mamporia, Omar Purtukhia  
Banach space valued functionals of the Wiener process
- 15:50 - 16:10** Zurab Kvatadze, Tsiala Kvatadze, Alexander Maisuradze  
Limiting distribution of a sequence of functions defined on a Markov chain
- 16:15 - 16:35** Alexander Tkeshelashvili  
On statistical estimation of the initial probability distribution according to indirect observations

**Break**

- 17:00 - 17:20** Zurab Zerakidze, Lela Aleksidze, Laura Eliauri  
Bayesian consistent criteria for Wiener process
- 17:25 - 17:45** Djemal Kiria, Tengiz Kiria

Bayesian consistent criteria for stationary sequences with continuous time

**17:50 - 18:10 Gimzer Saatashvili**

Bayesian consistent criteria for stationary sequences

**18:15 - 18:35 Zurab Zerakidze, Malkhaz Mumladze**

Bayesian consistent criteria for hypotheses testing

# Section of Mechanics of Continua

Chairs: Tengiz Meunargia, George Jaiani

Co-chair: Natalia Chinchaladze

**Wednesday, April 24**

**Room № 115 (VIAM)**

**11:00 - 11:20** Gia Avalishvili, **Mariam Avalishvili**

On static one-dimensional models of thermoelastic piezoelectric bars

**11:25 - 11:45** **Lamara Bitsadze**

Boundary value problems for an infinite strip with voids

**11:50 - 12:10** **Salome Bitsadze**

Problems of statics of the linear thermoelasticity of the microstretch materials with microstructure and microtemperatures

**12:15 - 12:35** **Bakur Gulua**

On basic boundary value problems for the infinite plane with a circular hole with voids

**12:40 - 13:00** **Natela Zirakashvili**

Study of strength of a thick-walled circular cylinder by using static problems of elasticity

**13:05 - 13:25** **Giorgi Kapanadze**

A problem of determining equal strength contour in the case of axisymmetric stretching

**13:30 - 13:50** **Tinatin Kapanadze**

A representation formula of a general solution of the homogeneous system of differential equations for the microstretch materials with microstructure and microtemperatures

**Break**

**15:00 - 15:20** **Tengiz Meunargia**

I. Vekua's method for the nonlinear theory of non-shallow shells

**15:25 - 15:45** **Kosta Svanadze**

On a problem of the plane theory of elastic mixture with a partially unknown boundary

**15:50 - 16:10** **Ivane Tsagareli**

Dynamical problems for a porous nonelastic circle with double voids

**16:15 - 16:35** **George Jaiani**

On BVPs for piezoelectric transversely isotropic cusped bars

**16:40 - 17:00** **Natalia Chinchaladze**

On the variation formulation of BVPs for piezoelectric transversely isotropic cusped bars

**17:05- 17:25** **Roman Janjgava**

Approximate solution of some boundary value problems of tension-compression and bending of plates

**17:30- 17:50** **Maia Svanadze**

Potential method in the linear theory of viscoelasticity of binary mixtures with porous

# Section of Mathematical Modeling and Numerical Analysis

Chairs: Teimuraz Davitashvili, Jemal Rogava, Tamaz Vashakmadze

Co-chair: Archil Papukashvili

**Wednesday, April 24**

**Auditory № 133 (VIAM)**

- 11:00 - 11:20** Khatuna Chargazia, **Oleg Kharshiladze**, **Gaetano Zimbardo (Italy)**  
Superdiffusive transport in astrophysical plasmas with shear flows
- 11:25 - 11:45** **Tamaz Vashakmadze**  
On the realization by Gauss-Hermite approximate method for Cauchy problem
- 11:50 - 12:10** **Temur Chilachava**, **Giorgi Pochkhua**, Nestan Kekelia, **Zurab Gegechkori**  
Mathematical models of resolution of conflict by means of economic cooperation at bilateral or unilateral counteraction of government institutions
- 12:15 - 12:35** **Teimuraz Davitashvili**  
Identification of the better WRF's parameterizations set for showers prediction
- 12:40 - 13:00** Ekaterine Gulua, **Mikheil Gagoshidze**  
About numerical realization of the perturbation algorithm for the initial-boundary value problem for the parabolic equation
- 13:05 - 13:25** **Nino Khatiashvili**  
On the quantum properties of 3D carbon nanostructures

**Break**

- 13:30 - 13:50** **Giorgi Geladze**  
About numerical modeling of Smog
- 13:55 - 14:15** **Jemal Peradze**, Zviad Kalichava, **Zviad Tsiklauri**  
On the accuracy of a difference scheme for a nonlinear dynamic beam problem
- 14:20 - 14:40** Archil Papukashvili, **Giorgi Papukashvili**, **Meri Sharikadze**  
On a numerical realization for a Timoshenko type one nonlinear beam equation
- 14:45 - 15:05** **Sergo Rekhviashvili**, **Arsen Pskhu**  
Application of the fractional oscillator model to describe damped vibrations