

6th International Conference “Nanotechnology”
4 – 7 October 2021, Tbilisi, Georgia
G T U n a n o 2 0 2 1

in memory of **Prof. Alex Gerasimov** (1936 – 2019) –
initiator of Georgian Technical University’s nanoconferences

Virtual Meeting
Program

All presentation time indicated are local – Tbilisi time

Invited Presentation: 20 min

Oral Presentation: 10 min

Poster Presentation: 5 min

Monday, 4 October 2021

11:00 – 11:15 *Opening*

David Gurgenedze

Rector of the Georgian Technical University

11:15 – 11:20 *Opening*

Tamar Lominadze

Dean of the Faculty of Informatics and Control Systems

11:20 – 11:30 *Welcoming Statements & Announcements*

Session 1 Chairs: **Levan Chkhartishvili** & **Mikheil Chikhradze**

11:30 – 11:50 *Invited Presentation*

Life path and scientific work of Alex Gerasimov

George I. Japaridze

Ilia State University, Tbilisi, Georgia

11:50 – 12:00 *Oral Presentation*

Prospects for Gerasimov’s molecular-potential approach to nanotechnology

Levan Chkhartishvili

Georgian Technical University, Tbilisi, Georgia

12:00 – 12:20 *Invited Presentation*

Microstructural characterization of structural phase transformations in shape memory alloys

Osman Adiguzel

Firat University, Elazig, Turkey

12:20 – 12:30 *Oral Presentation*

Modification of clay rocks for obtaining a highly active pozzolanic admixture

Elena Shapakidze, Rajden Skhvitaridze, Izolda Kamushadze, Lamara Gabunia, Ioseb Gejadze, Tamar Petriashvili

A. Tvalchrelidze Caucasian Institute of Mineral Resources, I. Javakhishvili Tbilisi State University, Tbilisi, Georgia

Georgian Technical University, Tbilisi, Georgia

12:30 – 12:40 *Oral Presentation*

Adsorption and photodegradation of quinoline yellow, ponceau 4R and brilliant blue FCF onto ZnAl LDH-LDO / PVA nanocomposite

Ofeliya Oqtay Balayeva

Baku State University, Baku, Azerbaijan

12:40 – 12:50 *Oral Presentation*

Ultra-fast single-photon detectors in the near future

Armen Kuzanyan, Vahan Nikoghosyan, Astghik Kuzanyan

Institute for Physical Research, National Academy of Sciences of Armenia, Ashtarak, Armenia

12:50 – 13:00 *Oral Presentation*

Spiropyrans with negative photochromism for nanotechnology

Lali Devadze, Gia Petriashvili, Shorena Akhobadze, Tsisana Zurabishvili, Nino Sepashvili
V. Chavchanidze Institute of Cybernetics, Georgian Technical University, Tbilisi, Georgia

13:00 – 13:20 *Invited Presentation*

Nanocomposite hydrogels and its application for environmental remediation

Haldun Kurama

Boron Application and Research Center, Eskisehir Osmangazi University, Eskisehir, Turkey

13:20 – 13:30 *Oral Presentation*

Biosynthesis of luminescent Ag₂S quantum dots and study of their optical features and genotoxic effects

Mariya Borova, Inna Horiunova, Svitlana Plokhovska, Olga Kapush, Nadia Pushkarova, Alla Yemets
Institute of Food Biotechnology and Genomics, National Academy of Sciences of Ukraine, Kyiv, Ukraine

V. E. Lashkaryov Institute of Semiconductor Physics, National Academy of Sciences of Ukraine, Kyiv, Ukraine

13:30 – 13:50 *Invited Presentation*

On the model of bactericidal action of UV radiation

Volodymyr Chumakov, Oksana Kharchenko

Kharkiv National University of Radioelectronics, Kharkiv, Ukraine

13:50 – 15:00 *Break*

Session 2 Chairs: **Paata Kervalishvili & Ivane Murusidze**

15:00 – 15:20 *Invited Presentation*

Unconventional metallic phases in a quantum wire with modulated spin-orbit coupling

George I. Japaridze

Ilia State University, Tbilisi, Georgia

15:20 – 15:30 *Oral Presentation*

Preparation of graphene oxide composites containing nanosized silver, copper, and titanium oxide and study of their biocidal properties

Tamar Dundua, **Tamar Sachaneli**, Giorgi Kvartskhava, Nino Gamkrelidze, Sopho Meladze, Ketevan Sarajishvili, Maia Japharidze, Irma Jinikhashvili

Georgian Technical University, Tbilisi, Georgia

P. Melikishvili Institute of Physical and Organic Chemistry, I. Javakhishvili Tbilisi State University, Tbilisi, Georgia

Tbilisi State Medical University, Tbilisi, Georgia

15:30 – 15:40 *Oral Presentation*

New Achievements in Thermo-therapy

Giorgi Gavashelishvili, Giorgi Nabakhtiani

Georgian Technical University, Tbilisi, Georgia

15:40 – 15:50 *Oral Presentation*

Peculiarities of nonlinear waves localization in structured anharmonic media with two metasurfaces

Igor V. Gerasimchuk, Victor S. Gerasimchuk

Institute of Magnetism, National Academy of Sciences of Ukraine, Kyiv, Ukraine

Igor Sikorsky Kyiv Polytechnic Institute, Kyiv, Ukraine

15:50 – 16:00 *Oral Presentation*

On the quantification of the striatum neurochemical profile using STEAM MRS: A comparison of 3T versus 7T in a cohort of elderly subjects

Ana Gogishvili, Christopher E. J. Doppler, Ezequiel Farrher, Aline Seger, Michael Sommerauer, Ketevan Kotetishvili, N. Jon Shah

Georgian Technical University, Tbilisi, Georgia

Institute of Neuroscience and Medicine 3, Forschungszentrum Julich, Julich, Germany

Institute of Neuroscience and Medicine 4, Forschungszentrum Julich, Julich, Germany

Institute of Neuroscience and Medicine 11, Forschungszentrum Julich, Julich, Germany

University Hospital Cologne, University of Cologne, Cologne, Germany

JARA Brain Translational Medicine, RWTH Aachen University, Aachen, Germany

Faculty of Medicine, RWTH Aachen University, Aachen, Germany

16:00 – 16:10 *Oral Presentation*

Pseudo-protein-based nanoparticles show promise as carriers for ophthalmic drug delivery

Temur Kantaria, Wenliang Zhang, Tengiz Kantaria, Nicole Eter, David Tugushi, Ramaz Katsarava, Peter Heiduschka

Institute of Chemistry and Molecular Engineering, Agricultural University of Georgia, Tbilisi, Georgia
Medical School, University of Münster, Münster, Germany

16:10 – 16:20 *Oral Presentation*

Magnetoexcitons in novel two-dimensional materials in monolayers, bilayer, and van der Waals heterostructures

Roman Ya. Kezerashvili, Anastasia Spiridonova

The City University of New York, New York, USA

16:20 – 16:30 *Oral Presentation*

The sonochemical synthesis of PVA/Mg–Al–OH layered double hydroxide nanocomposite film

Khazangul Ibrahimova, Abdulsaid Azizov, Ofeliya Balayeva, Sevinj Mammadyarova

Baku State University, Baku, Azerbaijan

16:30 – 16:40 *Oral Presentation*

Composite bionanomaterial for creating a strain sensor

Levan Ichkitidze, Alexander Gerasimenko, Dmitry Telyshev, Eugene Kitsyuk, Vladimir Petukhov, Sergei Selishchev

National Research University of Electronic Technology (MIET), Zelenograd, Moscow, Russia

I. M. Sechenov First Moscow State Medical University, Moscow, Russia

16:40 – 16:50 *Oral Presentation*

Penetration depth of electromagnetic wave in nanoparticles

Ludmila Ilyashenko

Kharkiv National University of Radio Electronics, Kharkiv, Ukraine

16:50 – 17:00 *Oral Presentation*

Branched ZnO microcrystals. A scanning electron microscopy study

Alexander Jishiashvili, Zeinab Shiolashvili, Nino Makhatadze, **David Jishiashvili**, Archil Chirakadze

V. Chavchanidze Institute of Cybernetics, Georgian Technical University, Tbilisi, Georgia

17:00 – 17:10 *Oral Presentation*

Silicon-graphene based solar elements

Tamar Berberashvili, Lali Chakhvashvili, Habibollah Bakhtiari, Gela Goderdzishvili, Paata Kervalishvili

Georgian Technical University, Tbilisi, Georgia,

17:10 – 17:30 *Invited Presentation*

Progress in water desalination: Insight from *ab initio* studies

David Tomanek, Andrii Kyrylchuk

Michigan State University, East Lansing, Michigan, USA

17:30 – 17:50 *Invited Presentation*

Exciton and polariton phases in buckled two-dimensional materials

Matthew N. Brunetti, **Oleg L. Berman**, Roman Ya. Kezerashvili

The City University of New York, New York, USA

Tuesday, 5 October 2021

Session 3 Chairs: **George Japaridze** & **David Jishiashvili**

11:00 – 11:10 *Oral Presentation*

Single-photon thermoelectric detector with Bi(Pb)–2223 superconducting thin film layers

Astghik Kuzanyan, Giorgi Mumladze, Vahan Nikoghosyan, Nikoloz Margiani, Armen Kuzanyan

Institute for Physical Research, National Academy of Sciences of Armenia, Ashtarak, Armenia

V. Chavchanidze Institute of Cybernetics, Georgian Technical University, Tbilisi, Georgia

11:10 – 11:30 *Invited Presentation*

General characteristics of nanoparticles formed in iron-based systems and perspectives their biomedical application

Olena Lavrynenko, Olesia Pavlenko

I. N. Frantsevich Institute for Problems of Material Science, National Academy of Sciences of Ukraine, Kyiv, Ukraine

11:30 – 11:50 *Invited Presentation*

Silver–silver sulphide hybrid nanowires: Fabrication, structure and physical properties

M. B. Muradov, Jiseok Kim, R. M. Mirsultanova, G. M. Eyazova, Z. A. Aghamaliyev

Nano Research Center, Baku State University, Baku, Azerbaijan

11:50 – 12:10 *Invited Presentation*

Beyond the Dirac cones: Zero effective mass carriers in 2D materials with hyperboloid conduction bands

Ivane G. Murusidze

Institute of Applied Physics, Ilia State University, Tbilisi, Georgia

12:10 – 12:30 *Invited Presentation*

Laser technologies of nanosystems preparation

Paata J. Kervalishvili

Georgian Technical University, Tbilisi, Georgia,

12:30 – 12:40 *Oral Presentation*

Synthesis of nanostructure high entropy alloys in Fe–W–Al–Ti–Ni–C–B system

Mikheil Chikhradze, Guram Abashidze, Akaki Gigineishvili, Nikoloz Chikhradze, Davit Tsverava

G. Tsulukidze Mining Institute, Tbilisi, Georgia

Georgian Technical University, Tbilisi, Georgia

12:40 – 13:00 *Invited Presentation*

Carbon nanotubes and graphene hybrid materials systems for multifunctional applications in energy and environment

Fernand D. S. Marquis

San Diego State University, San Diego, USA

13:00 – 14:00 *Break*

Session 4 Chairs: **Levan Chkhartishvili** & **Mikheil Chikhradze**

14:00 – 14:20 *Invited Presentation*

Morphologically designed novel nanocarbon materials derived from highly stable SWCNT inks

Katsumi Kaneko

Research Initiatives for Supra-Materials, Shinshu University Wakasato, Nagano, Japan

14:20 – 14:25 *Poster Presentation*

Development of compositions of geopolymer binders based on rocks of Georgia

Elena Shapakidze, Marina Nadirashvili, Vera Maisuradze, Marina Avaliani, Ioseb Gejadze, Tamar Petriashvili

A. Tvalchrelidze Caucasian Institute of Mineral Resources, I. Javakhishvili Tbilisi State University, Tbilisi, Georgia

R. Agladze Institute of Inorganic Chemistry and Electrochemistry, I. Javakhishvili Tbilisi State University, Tbilisi, Georgia

14:25 – 14:30 *Poster Presentation*

Joint synthesis of boron carbide matrix ceramic modifiers and grain growth inhibitors with low-cost compounds

Natia Barbakadze, Lili Nadaraia, Levan Chkhartishvili, Arhcil Mikeladze, Otari Tsagareishvili, Manana Buzariashvili, Irma Jinikashvili, Roin Chedia

P. Melikishvili Institute of Physical and Organic Chemistry, I. Javakhishvili Tbilisi State University, Tbilisi, Georgia

Republic Center for Structure Researches of Georgia, Georgian Technical University, Tbilisi, Georgia

F. Tavadze Metallurgy and Materials Science Institute, Georgia

14:30 – 14:35 *Poster Presentation*

Statistical and Fourier analysis of the autocatalytic formation and dynamics of spatiotemporal vortex structures in fluids near a magnetized surface

Dmytro O. Derecha, Yury B. Skirta, Igor V. Gerasimchuk, Andrii V. Hruzevych
Institute of Magnetism, National Academy of Sciences of Ukraine, Kyiv, Ukraine
Igor Sikorsky Kyiv Polytechnic Institute, Kyiv, Ukraine
Trypilska TPP, Ukrainka, Ukraine

14:35 – 14:40 *Poster Presentation*

Localized nonlinear waves and their stability in a linear medium with combined linear and nonlinear metasurface

Victor S. Gerasimchuk, **Igor V. Gerasimchuk**, Valentin V. Dromov
Igor Sikorsky Kyiv Polytechnic Institute, Kyiv, Ukraine
Institute of Magnetism, National Academy of Sciences of Ukraine, Kyiv, Ukraine

14:40 – 14:45 *Poster Presentation*

Localization of nonlinear spin waves in a five-layer ferromagnetic structure

Victor S. Gerasimchuk, **Igor V. Gerasimchuk**
Igor Sikorsky Kyiv Polytechnic Institute, Kyiv, Ukraine
Institute of Magnetism, National Academy of Sciences of Ukraine, Kyiv, Ukraine igor.gera@gmail.com

14:45 – 14:50 *Poster Presentation*

Harmonic generation at low-energy particle-hole excitation in bilayer graphene

Armenuhi Ghazaryan, Hrant Matevosyan, Khachik Sedrakian
Centre of Strong Fields, Yerevan State University, Yerevan, Armenia
Institute of Radiophysics and Electronics, National Academy of Sciences of Armenia, Ashtarak, Armenia

14:50 – 14:55 *Poster Presentation*

High harmonic generation in plane graphene quantum dots with different shapes and edges

B. R. Avchyan, **A. G. Ghazaryan**, K. A. Sargsyan, Kh. V. Sedrakian
Centre of Strong Fields, Yerevan State University, Yerevan, Armenia

14:55 – 15:00 *Poster Presentation*

High harmonic generation at particle-hole multiphoton excitation in gapped bilayer graphene

H. Avetissian, A. Avetissian, **A. Ghazaryan**, G. Mkrtchian, Kh. Sedrakian
Centre of Strong Fields, Yerevan State University, Yerevan, Armenia

15:00 – 15:05 *Poster Presentation*

Sensing properties of solid solutions $\text{Bi}_{1-x}\text{La}_x\text{Fe}_{1-x}\text{Ga}_x\text{O}_3$

Anna Glinskaya, Gennady Petrov, Nikolay Lubinskii, Natalie Krasutskaya
Belarusian State Technological University, Minsk, Belarus
Belarusian State Agrarian Technical University, Minsk, Belarus

15:05 – 15:10 *Poster Presentation*

Photocatalytic properties of solid solutions based on $\text{Bi}_2\text{Fe}_4\text{O}_9$

Anna Glinskaya, Gennady Petrov, Valentin Romanovskii
Belarusian State Technological University, Minsk, Belarus
Institute of General and Inorganic Chemistry, National Academy of Sciences of Belarus, Minsk, Belarus

15:10 – 15:15 *Poster Presentation*

Research in the optical density changes of aqueous dispersion in bionanomaterials

Levan Ichkitidze, Aleksandr Markov, Alexander Gerasimenko, Sergei Selishchev, Dmitry Telyshev
National Research University of Electronic Technology (MIET), Zelenograd, Moscow, Russia
I. M. Sechenov First Moscow State Medical University, Moscow, Russia

15:15 – 15:20 *Poster Presentation*

Optical density changes of aqueous dispersion for biological materials and carbon nanotubes with action gradient magnetic field

Levan P. Ichkitidze, Aleksandr Markov, Aleksandr Yu. Gerasimenko, Dmitry V. Telyshev, Sergey V. Selishchev
National Research University of Electronic Technology (MIET), Zelenograd, Moscow, Russia
I. M. Sechenov First Moscow State Medical University, Moscow, Russia

15:20 – 15:25 *Poster Presentation*

Superconducting nanostructured concentrator in combined magnetic field sensor

Levan P. Ichkitidze, Mikhail V. Belodedov, Dmitry V. Telyshev, Sergey V. Selishchev
National Research University of Electronic Technology (MIET), Zelenograd, Moscow, Russia
I. M. Sechenov First Moscow State Medical University, Moscow, Russia
National Research University of Technology (BMSTU), Moscow, Russia

15:25 – 15:30 *Poster Presentation*

Influence of the surface magnetic barrier on the critical current in niobium films and the possibility of creating a highly sensitive angular displacement sensor

Levan P. Ichkitidze, Dmitry V. Telyshev, Sergey V. Selishchev
National Research University of Electronic Technology (MIET), Zelenograd, Moscow, Russia
I. M. Sechenov First Moscow State Medical University, Moscow, Russia

15:30 – 15:35 *Poster Presentation*

Surface plasmon resonance wavelength of noble metal nanoparticles

Ludmila Ilyashenko
Kharkiv National University of Radio Electronics, Kharkiv, Ukraine

15:35 – 15:40 *Poster Presentation*

Terbium monotelluride nanofilms technology of and some electrophysical properties

Z. U. Jabua, A. V. Gigineishvili
Georgian Technical University, Tbilisi, Georgia

15:40 – 15:45 *Poster Presentation*

Efficient and continuous generation of electricity from triboelectric nanogenerators operated in the contact-separation mode by a scotch yoke system

Jiseok Kim, Reyhan Mirsultanova, Orxan Gulahmadov, **Mustafa M. Muradov**
Nano Research Center, Baku State University, Baku, Azerbaijan

15:45 – 15:50 *Poster Presentation*

Miracles of carbon on the nanoscale

David Tomanek
Michigan State University, East Lansing, Michigan, USA

15:50 – 15:55 *Poster Presentation*

InGaAs alloys for use in thermoelectricity

Tengiz Qamushadze, **Elza Khutsishvili**, Zurab Chubinishvili, Nana Kobulashvili
F. Tavadze Metallurgy and Materials Science Institute, Tbilisi, Georgia

15:55 – 16:00 *Poster Presentation*

Thermoelectric properties of layered calcium cobaltite doped by particles of cobalt, copper, and their oxides

Andrei Klyndyuk, Ekaterina Chizhova, Roman Latypov, Svetlana Shevchenko
Belarusian State Technological University, Minsk, Belarus

16:00 – 16:05 *Poster Presentation*

Effect of BN additive on thermoelectric properties of $\text{Bi}_2\text{Sr}_2\text{Co}_{1.8}\text{O}_y$ ceramicS

Iamze Kvartskhava, Nikoloz Margiani, Giorgi Mumladze, Vakhtang Zhghamadze
Institute of Cybernetics, Georgian Technical University, Tbilisi, Georgia

16:05 – 16:10 *Poster Presentation*

Electroluminescence in molecular photodiode with applied gate potential

Volodymyr Leonov, Elmar Petrov, Yevhen Shevchenko
M. M. Bogolyubov Institute for Theoretical Physics, Kyiv, Ukraine

16:10 – 16:15 *Poster Presentation*

Synthesis of bioactive silver nanoparticles using extracts of “hairy” roots of medicinal plants

Nadiia Matvieieva, Dmytro Klymchuk, Olena Khainakova, Anatolij Shakhovskiy, Volodymyr Duplij, Natalia Kobylinska, Mykola Kuchuk
Institute of Cell Biology and Genetic Engineering, National Academy of Sciences of Ukraine, Kyiv, Ukraine
M. G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, Kyiv, Ukraine
University of Oviedo, Oviedo, Spain
Taras Shevchenko National University of Kyiv, Kyiv, Ukraine

16:15 – 16:20 *Poster Presentation*

Influence of temperature in the growth process of Cd_xZn_{1-x}S/PVA nanocomposites through silar METHOD

Mustafa Muradov, Lala Gahramanli, Ofeliya Balayeva, Goncha Eyvazova

Nano Research Center, Baku State University, Baku, Azerbaijan

16:20 – 16:25 *Poster Presentation*

Structural and optical characterization of Ni/NiO nanochains

S. J. Mammadyarova, M. B. Muradov, A. M. Maharramov, G. M. Eyvazova, Z. A. Aghamaliyev,

O. O. Balayeva

Baku State University, Baku, Azerbaijan

16:25 – 16:30 *Poster Presentation*

Effect of colloidal metal nanoparticles on biosynthetic activity of liquid-cultured *Inonotus Obliquus* (ACH.: PERS.) pilat

Nataliia Poyedinok, Oksana Mykhaylova, Nataliia Sergiichuk, Nadiia Matvieieva

Igor Sikorsky Kyiv Polytechnic Institute, Kyiv, Ukraine

M. G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, Kyiv, Ukraine

Open International University of Human Development "Ukraine", Kyiv, Ukraine

Institute of Cell Biology and Genetic Engineering, National Academy of Science of Ukraine, Kyiv, Ukraine

16:30 – 16:35 *Poster Presentation*

Peculiarities of the binding of cationic meso-substituted porphyrins to poly(P) and synthetic polynucleotides

Olga Ryazanova, Igor Voloshin, Alexander Glamazda, Larysa Dubey, Mykola Ilchenko, Igor Dubey, Victor Karachevtsev

B. Verkin Institute for Low Temperature Physics and Engineering, National Academy of Science of Ukraine, Kharkiv, Ukraine

Institute of Molecular Biology and Genetics, National Academy of Science of Ukraine, Kyiv, Ukraine

16:35 – 16:40 *Poster Presentation*

Dielectric properties of ceramics on the basis of perovskites of type $A(R_{0.5}B_{0.5})O_3$ (A : Ba²⁺, Sr²⁺, Ca²⁺; R : Nd³⁺, Sm³⁺; B : Nb⁵⁺, Ta⁵⁺)

Halina Sauchuk, Tatiana Shitchkova

Belarusian National Technical University, Minsk, Belarus

Belarusian State Technological University, Minsk, Belarus

16:40 – 16:45 *Poster Presentation*

Synthesis of BiFeO₃ ferroelectric from Bi₂₅FeO₃₉ precursor and Fe₂O₃ oxide

Tatiana Shitchkova, Anna Glinskaya

Belarusian State Technological University, Minsk, Belarus

16:45 – 16:50 *Poster Presentation*

Low temperature magnetic properties of solid solutions based on lanthanum indate

Elena Yukhno, Gennady Petrov

Belarusian State Technological University, Minsk, Belarus

16:45 – 16:50 *Poster Presentation*

Boron carbide and nitride nanoparticles as ¹⁰B-isotope delivering agents in boron-neutron-capture-therapy

Shio Makatsaria, Levan Chkhartishvili, Roin Chedia, Otar Tsagareishvili

Georgian Technical University, Tbilisi, Georgia

Deltamed Georgia, Siemens Healthcare Diagnostics in Georgia, Tbilisi, Georgia

P. Melikishvili Institute of Physical and Organic Chemistry, I. Javakhishvili Tbilisi State University, Tbilisi, Georgia

F. Tavadze Metallurgy and Materials Science Institute, Tbilisi, Georgia

16:50 – 16:55 *Poster Presentation*

Thermoelectric materials based on the layered sodium cobaltite

Natalie Krasutskaya, **Anna Glinskaya**

Belarusian State Technological University, Minsk, Belarus

16:55 – 17:00 *Closing Remarks*