6th International Conference "Nanotechnology" 4 – 7 October 2021, Tbilisi, Georgia

GTUnano2021

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 Gurgenidze

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 Petriahsvili, 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 Thermotherapy

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 Region, 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 Illyashenko

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

Plasma-assisted preparation of nano-ZrC@C composites from Zr-loaded sulphonated styrene-divinylbenzene co-polymers

Alejandro Martiz, Zoltan Karoly, Laszlo Trif, Miklos Mohai, Laura Bereczki, Peter Nemeth, Zsombor Molnar, Szilvia Klebert, Laszlo Kotai

Budapest University of Technology and Economics, Budapest, Hungary

Research Centre for Natural Sciences, Institute of Materials and Environmental Chemistry, Budapest, Hungary

Research Institute of Biomolecular and Chemical Engineering, University of Pannonia, Veszprem, Hungary

13:00 - 13:20 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

13:20 - 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, Otar 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. Hruzevyich *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 excitationin 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 Bi_{1-x}La_xFe_{1-x}Ga_xO₃

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 Bi₂Fe₄O₉

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

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 Region, Russia

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

National Research University of Technology (BMSTU), Moscow, Russia

15:15 – 15:20 Poster Presentation

Influence of the magnetic field gradient on the optical density of an aqueous dispersion containing biological material and carbon nanotubes

L. P. Ichkitidze, A. G. Markov, A. Yu. Gerasimenko, D. V. Telyshev, S. V. Selishchev

National Research University of Electronic Technology (MIET), Zelenograd, Moscow Region, Russia I. M. Sechenov First Moscow State Medical University, Moscow, Russia

15:20 – 15:25 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 Region, Russia I. M. Sechenov First Moscow State Medical University, Moscow, Russia

15:25 – 15:30 Poster Presentation

Surface plasmon resonance wavelength of noble metal nanoparticles

Ludmila Illyashenko

Kharkiv National University of Radio Electronics, Kharkiv, Ukraine

15:30 – 15:35 Poster Presentation

Terbium monotelluride nanofilms technology of and some electrophysical properties

Z. U. Jabua, A. V. Gigineishvili

Georgian Technical University, Tbilisi, Georgia

15:35 – 15:40 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

15:40 – 15:45 Poster Presentation

Miracles of carbon on the nanoscale

David Tomanek

Michigan State University, East Lansing, Michigan, USA

15:45 – 15:50 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

15:50 – 15:55 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*

15:55 – 16:00 Poster Presentation

Effect of BN additive on thermoelectric properties of Bi₂Sr₂Co_{1.8}O_y ceramicS lamze Kvartskhava, Nikoloz Margiani, Giorgi Mumladze, Vakhtang Zhghamadze

Institute of Cybernetics, Georgian Technical University, Tbilisi, Georgia

16:00 – 16:05 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

16:05 – 16:10 Poster Presentation

Synthesis of bioactive silver nanoparticles using extracts of "hairy" roots of medicinal plants

Nadiia Matvieieva, Dmytro Klymchuk, Olena Khainakova, Anatolij Shakhovsky, 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

16:10 – 16:15 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

16:15 – 16:20 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

16:20 – 16:25 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

16:25 – 16:30 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

16:30 – 16:35 Poster Presentation

Dielectric properties of ceramics on the basis of perovskites of type $A(R_{0.5}B_{0.5})O_3$ ($A: Ba^{2+}, Sr^{2+}, Ca^{2+}; R: Nd^{3+}, Sm^{3+}; B: Nb^{5+}, Ta^{5+}$)

Halina Sauchuk, Tatiana Shitchkova

Belarusian National Technical University, Minsk, Belarus Belarusian State Technological University, Minsk, Belarus

16:35 – 16:40 Poster Presentation

Synthesis of BiFeO₃ ferroelectric from Bi₂₅FeO₃₉ precursor and Fe₂O₃ oxide

Tatiana Shitchkova, Anna Glinskaya

Belarusian State Technological University, Minsk, Belarus

16:40 – 16:45 Poster Presentation

Low temperature magnetic properties of solid solutions based on lantanum 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