

Workshop Program (ver. 10.07.2018)

8th „Georgian – German School and Workshop in Basic Science“

GGSWBS'18

August 19 – August 25, Tbilisi, Georgia

– Science at Multidisciplinary SMART|Labs in Georgia –

Topics:

- Symmetries in Subatomic Physics (T- and CP- Violations)
- Electric Dipole Moment (EDM) Searches (e.g. JEDI project)
- Standard Model and Beyond (Theory, HEP Experiments)
- Atmospheric Chemistry and Climate Research
- Numerical Schemes and Modeling
- Nuclear Medicine and Chemistry
- Medical Imaging and Biomarkers
- Complementary Imaging Methods: Hybrid MRI-PET
- Engineering Sciences (Simulation, Instrumentation, Electronics)
- **Satellite topical lecturing/training courses for students**

Venue and general schedule of the meeting:

Sun, August 19: Arrival (*early morning*); Tbilisi Tour (14:00 – 18:30)
Registration & Welcome Reception (19:30 – 22:00)
(*MUZA, 'Kus Tba' road, Tbilisi*)

Mon, Tue (August 20, 21): Ivane Javakhishvili Tbilisi State University (**TSU**)
(*Chavchavadze ave. 1, Main building*)

Wed, August 22: Social program (9:30 – 21:00)
(*Excursion: Day trip to Khaketi*)

Thu, Fri (August 23,24): (TSU, AUG)
(*Chavchavadze ave. 1; Agmashenebeli alley 240*)

Sat, August 25: Departure (*after midnight*)

August 20, Monday (Workshop, TSU) 10⁰⁰ – 19⁰⁰

Existing and Future Cooperation

Plenary opening session (auditorium 107) (10:00 – 11:00)

- Welcome/Opening Address**
- Mikheil Chkhenkeli, Minister of Education and Science
 - Alexander Tevzadze, Deputy Minister of Education and Science
 - Giorgi Sharvashidze, Rector of TSU
 - Alexander Tsiskaridze, Vice-Rector of TSU
 - Representative of German Embassy in Georgia
 - Manana Mikaberidze, Director General of SRNSF
 - Hans Ströher, Director of IKP/FZJ: „Scope of the Workshop“

Plenary session 1 (auditorium 107): Convener – Alexander Tsiskaridze (11:00 – 13:30)

- Hans Ströher (FZJ/IKP) – *Frontiers of Fundamental Physics* (30')
- Jon Shah (FZJ/INM) – *Medical Imaging (Hybrid MRI-PET)* (30')

12:00 – 12:30 Coffee break (+ conference photo)

- Andreas Wahner (FZJ) – *Atmospheric Chemistry (common project with TSU)* (30')
- Bernd Neumaier (FZJ) – *Radiotracers for PET App's. (perspectives for collabor.)* (30')

13:30 – 15:00 Lunch break

Plenary session 2 (auditorium 107): Convener – Hans Ströher (15:00 – 16:30)

- Akaki Rusetsky (Bonn) – *Hadron Physics in the Era of Big Computers* (30')
- Gergely Barnafoldi (Budapest) – *Theor. and Exp. Invest. of the Strongly Interacting Matter* (30')
- Sabine Dues (FZJ/ICS) – *Structural Biochemistry projects (overview of ICS-6)* (30')

16:30 – 17:00 Coffee break

Awarding Ceremony (auditorium 107): Convener – Giorgi Sharvashidze (17:00 – 18:00)

- **Public Lecture – Prof. Ulf-G. Meißner (Bonn/FZJ):**
Life on Earth - an Accident ? (40')
- **Discussion, Conversation and Get-Together (reception/photo session/interviews)**

19³⁰ – 21³⁰ **Social program** (TSU Welcome dinner, „Shadow of Metekhi“ restaurant)

August 21, Tuesday (**Workshop, TSU**) 9⁰⁰ – 18⁰⁰

Existing and Future Cooperation

Plenary session 3 (auditorium 107): Convener – **Andreas Wahner (09:00 – 13:00)**

- **Astrid Kiendler-Scharr (FZJ/IEK)** – *Climate Change: current knowledge (30')*
- **Hendrik Elbern (FZJ/IEK)** – *Atmospheric Models with Data (30')*
- **Ghaleb Natour (FZJ/ZEA-1)** – *Technology for Excellent Science (30')*
- **Stefan van Waasen (FZJ/ZEA-2)** – *Advanced Computing (30')*

11:00 – 11:30 Coffee break

- **Thomas Kress (RWTH Aachen)** – *High Energy Physics experiments at CERN (30')*
- **Harald Glueckler (FZJ/ZEA)** – *Spectrometer and detector const./design/fabric. (30')*
- **Jörg Mauler (FZJ/INM-4)** – *MR Spectroscopy (30')*
- **David Arutinov (FZJ/ZEA-2)** – *Development of a new PET-MRI prototype (30')*

13:00 – 14:30 Lunch break

Science at SMART|EDM_Lab

Parallel session 1 (auditorium 06): Convener – **Mikheil Nioradze (14:30 – 18:00)**

- **Jörg Pretz (FZJ/IKP)** – *JEDI project at COSY/Juelich (30')*
- **Zurab Berezhiani (L'Aquila, Italy)** – *Puzzling neutron: window to new physics ? (30')*
- **Zara Bagdasarian (FZJ/IKP)** – *Neutrino hunters around the world (30')*

16:00 – 16:30 Coffee break

- **Vakhtang Kartvelishvili (Lancaster)** – *Quarkonium spectroscopy in ATLAS (30')*
- **Jambul Gegelia (FZJ/TSU)** – *Eff. field theory and derivation of Salam-Weinberg model (30')*

Science at SMART|Atmo_Sim Lab

Parallel session 2 (auditorium 107): Convener – **Bezhan Chankvetadze (14:30 – 18:00)**

- **Giorgi Jibuti (TSU)** – *Project overview: smart platform-sensors and drones (30')*
- **R. Botchorishvili (TSU)** – *Proj. overview: numerical modelling, measur.'s and machine learning*
- **Marine Arabidze (NEA, Georgia)** – *Air quality monitoring system in Georgia: challenges and perspectives (30')*

16:00 – 16:30 Coffee break

- **Hanno Scharr (FZJ/IBG-2)** – *Computer vision crash course (part 1, 90')*

Science at SMART|Medical (MRI + BioMed) Lab

Parallel session 3 (auditorium 101): Convener – **(J. Shah & B. Neumaier) (14:30 – 18:00)**

- **Ezequiel Farrher (FZJ/INM-4)** – *Quantitative MRI (Methods) (30')*
- **Elene Iordanishvili (FZJ/INM-4/GTU)** – *Quantitative MRI (Application) (30')*
- **Jon Shah (FZJ/INM-4)** – *MR-PET (30')*

16:00 – 16:30 Coffee break

- **Mikheil Kelenjeridze (INM-5)** – *Develop. of an MRI antenna array for MR-PET imaging (30')*
- **Swen Humpert (FZJ/INM-5)** – *¹⁸F-labeled peptides for diagnosis of Alzheimer's disease (30')*
- **Revaz Shanidze (TSU)** – *Nuclear Medicine Physics in TSU (30')*

19³⁰ – 22³⁰ Dinner at Hotel „Tbilisi Orion“

August 23, Thursday (School Part at TSU) 9³⁰ – 18⁰⁰

Ongoing projects at SMART|EDM_Lab

Parallel session 4 (II build., EDM_Lab, #047): Convener – Hans Ströher (09:30 – 13:00)

- **Irakli Keshelashvili (FZJ/IKP)** – *Work in Juelich (det. & target) (overview) (30')*
- **David Mchedlishvili (TSU)** – *Work in Tbilisi (overview) (30')*
- **Fabian Mueller (FZJ/IKP)** – *Polarimetry for srEDM measurements (30')*

11:00 – 11:30 Coffee break

- **David Arutinov (FZJ/ZEA-2)** – *3D chip (introductory lecture) (30')*
- **Dito Shergelashvili (TSU, PhD)** – *Polarimeter electronics and data readout (20')*
- **Otari Javakhishvili (AUG, Master)** – *Power supply developments for polarimeter (20')*
- **Giorgi Kvantrishvili (TSU, Master)** – *Axion search: plans at COSY (20')*

13:00 – 14:30 Lunch break

Parallel session 5 (II build., EDM_Lab, #047): Convener – Hans Ströher (14:30 – 18:00)

- **Practical for students: Detlev Gotta, Gogi Macharashvili, Irakli Keshelashvili** – *Detector Physics and Simulations in Experimental Particle Physics*

Ongoing projects at SMART|Atmo_Sim Lab

Parallel session 6 (auditorium 06): Convener – Astrid Kiendler-Scharr (09:30 – 13:00)

- **Robert Wegener (FZJ/IEK)** – *Diurnal and annual cycle of Nitrogen Oxides (35')*
- **Iulia Gensch (FZJ/IEK)** – *The hydrocarbon clock: a tool to distinguish between mixing and reaction during the atmospheric transport (35')*
- **Tako Janelidze (FZJ/IEK)** – *Novel adjoint advection schemes for Atmo Chemistry (25')*

11:00 – 11:30 Coffee break

- **Ketevan Kharashvili (TSU)** – *Current projects at AtmoSim_lab (25')*
- **Ana Dolidze (TSU)** – *Studying advection schemes of EURAD-IM model (25')*
- **Robert Wegener (FZJ/IEK)** – *Introduction to atmospheric modelling (lecture, 40')*

13:00 – 14:30 Lunch break

Parallel session 7.1 (II build., comp. class #344): Convener – Giorgi Jibuti (14:30 – 18:00)

- **Practical for students: Robert Wegener** – *Atmospheric modeling*

Parallel session 7.2 (auditorium 06): Convener – Ramaz Botchorishvili (14:30 – 18:00)

- **Lectures for students: Hanno Scharr** – *Computer vision crash course (part 2)*

Work planned for SMART|Medical_Lab's

Parallel session 8 (auditorium 101): Convener – Alexander Tsiskaridze (09:30 – 13:00)

- **Jon Shah (FZJ/INM-4)** – *SMART lab in frame of National Imaging Facility (NIF) (30')*
- **Bernd Neumaier (FZJ/INM-5)** – *SMART lab in cooperation with TSU ? (30')*
- **Tamar Khechiashvili (FZJ/INM-4/GTU)** – *My experience in Juelich as a PhD*
- **Ana Gogishvili (FZJ/INM-4/GTU)** – *My experience in Juelich as a Master student*

13:00 – 14:30 Lunch break

Parallel session 9 (auditorium 101): Convener – Revaz Shanidze (14:30 – 18:00)

- **Practical for students: Jon Shah, Bernd Neumaier** – *Lecturing & students presentations*

19³⁰ – 22⁰⁰ Social program (Banquet of the Workshop, „Kopala“ restaurant)

August 23, Thursday (School Part at AUG) 9³⁰ – 18⁰⁰

Program for Agricultural University of Georgia (AUG)
(SMART|Engineering_Lab)

9:30 Departure to AUG

Participants:

- School of Engineering and Technology
- Department of Chemistry
- Department of Biology
- FZJ guests: Ghaleb Natour, Harald Glueckler, Stefan van Waasen, Sabine Dues
- LONZA Cologne GmbH: Claus-Dietmar Pein (director of the company)

Welcome:

- 10:30 – 11:00 – Welcome meeting of guests from FZJ with the management of AUG
– Signing of the Internship Agreement/Declaration between AUG-ZEA (-1,-2)
- 11:00 – 12:00 – Tour in the Kakha Bendukidze campus of AUG/FUT:
Visiting laboratories, research facilities, library and museum

Parallel session 10 (AUG, Engineering dep.): Convener – Zaza Metreveli (12:00 – 16:30)
Students presentations:

12:00 – 13:00 **Department of Mechanical Engineering**

- Giorgi Gvasalia, Beqa Sanodze – Turbo Jet Engine (15+5')
- Davit Togonidze, Mirian Bejitadze – Robotic Arm (15+5')
- Luka Janjghava, Dudu Mamatsashvili – Hydraulic Excavator (15+5')

13:00 – 14:30 Lunch break (at the culinary academy of AUG)

14:30 – 15:30 **Department of Electrical and Computer Engineering**

- Nino Anasova – Portable low frequency spec. analyzer for biomedical purposes (10+5')
- Avtandil Lomidze – Psycho emotional cond. estim. system for operators in industry (10+5')
- Aleksandre Kalandadze – Intellectual device for the fast charging of electric cars, adopted for the conditions in Georgia (10+5')
- Rati Chkhetia – Automated device for animal monitoring in national parks (10+5')

15:30 – 16:00 **Department of Chemistry**

- Nodar Dumbadze – Synthesis of novel ion-conducting mat's for fuel cell applicator (10+5')
- Tamar Khatisashvili, Elene Gabodze – Green Chemistry (10+5')

16:00 – 16:30 **Department of Biology**

- Nato Kuljanishvili – In vitro testing of in silico designed cationic antimicrobial peptides (20)
- Eka Kelenjeridze – Metabolic Characteristics of the Archaea (10+5')

18:00 Arrival at Hotel

19³⁰ – 22⁰⁰ **Social program** (Banquet of the Workshop, „Kopala“ restaurant)

August 24, Friday (School Part at TSU) 9³⁰ – 18⁰⁰

Presentations by students

Students session 1 (auditorium 107): Convener – Ramaz Botchorishvili (09:30 – 11:00)

Introductory information – “How to prepare presentations ?” (Hans Ströher) (10')

- Giga Aptsiarui, Salome Shekiladze – Processing measurements using deep learning (10')
- Salome Kakhaia, Mariam Razmadze – Shape parameter for radial basis functions (10')
- Tamaz Sepiashvili, Mari Jananashvili – Coupled Horn-Shunk & Lucas-Kannade for images 10'
- Giorgi Svanadze, David Jokhadze – Vehicle type, quantity and velocity from video (10')
- Pavle Tsotskolauri – Reaction time & operation accuracy measurement and training device (10')
- Demetre Dzmanashvili: – Comparing diffusion models for image processing (10')

11:00 – 11:30 Coffee break

Students session 2 (auditorium 107): Convener – Bezhan Chankvetadze (11:30 – 13:00)

- Tamar Khatiasvili – Nitrous oxides pollution in Tbilisi (10')
- Lasha Giunashvili – Carbon monoxide and dioxide pollution in Tbilisi (10')
- Salome Pantsulaia – Methane pollution in Tbilisi (10')
- Nana Khundadze – Contamination gradients for air pollutants in space (10')
- Mariam Maisuradze – Contamination gradients for air pollutants in time (10')
- Natia Porchkhidze (ISU) – GCR and climate change (10')

13:00 – 14:15 Lunch break

Students session 3 (auditorium 107): Convener – David Mchedlishvili (14:15 – 15:30)

- Tamar Zakareishvili – Studies of ATLAS hadronic calorimeter response (10')
- Gogita Papalashvili – Neutrino research at intermediate energies with KM3NeT/ORCA
- Revaz Beradze – Physics beyond SM and precision tests of the neutron beta-decay (10')
- Alexandre Gurchumelia – Physical applications of the non-compact G2 (10')
- Mariam Chitishvili – Study of metastable vacuum decay with gravity (10')
- Goga Suknidze – Axion search experiments (10')
- Vano Zurabashvili – Landau quantization in quantum mechanics (10')
- Sopiko Kurdadze (ISU) – Rock lizards-Gene flow and hybridization within species of „mixtra“(10)

Students session 4 (auditorium 107): Convener – Ketevan Kotetishvili (15:30 – 16:40)

- Tatia Gonashvili (GTU) – Radiotherapy techniques (10')
- Natia Beriashvili (GTU) – Medical imaging technologies (10')
- Richard Kibler (GTU) – PET/MRI (10')
- Davit Sebuia, Elene Lortkipanidze (GTU) – Radiation therapy (10')
- Lazare Kvirtia (GTU) – M1 Abrams (10')
- Zurab Saralidze (GTU) – Nuclear process in medicine (10')
- Lika Sichinava (GTU) – Detectors, elementary particles (10')

16:40 – 17:00 Coffee break

- Summarizing the students presentations (17:00 – 17:30)
- Certificates & Internships (awarding ceremony for students) (17:30 – 18:00)
- Concluding remarks

18⁰⁰ End of Workshop