



8TH GEORGIAN – GERMAN SCHOOL AND WORKSHOP
IN BASIC SCIENCE (GGSWBS‘ 18)

SCIENCE AT MULTIDISCIPLINARY SMART | LABS IN GEORGIA

August 20 – 25, 2018 • Tbilisi, Georgia



WORKSHOP PROGRAM

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 Javakishvili 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)

EXISTING AND FUTURE COOPERATION

auditorium 107

PLENARY OPENING SESSION

WELCOME/OPENING ADDRESS

- 10:00 Giorgi Sharvashidze, *Rector of TSU*

Representative of Ministry of Education and Science

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

CONVENER: ALEXANDER TSISKARIDZE

- 11:00 Hans Ströher (FZJ/IKP), *Frontiers of Fundamental Physics*

11:30 Jon Shah (FZJ/INM), *Medical Imaging (Hybrid MRI-PET)*

12:00 Coffee break (conference photo)

- 12:30 Andreas Wahner (FZJ), *Atmospheric Chemistry (common project with TSU)*

13:00 Bernd Neumaier (FZJ), *Radiotracers for PET App's. (perspectives for collabor.)*

13:30 Lunch break

PLENARY SESSION 2

CONVENER: HANS STRÖHER

- 15:00 Akaki Rusetsky (Bonn), *Hadron Physics in the Era of Big Computers*

15:30 Gergely G. Barnafoldi (Budapest), *Theoretical and Experimental Investigations of the Strongly Interacting Matter*

16:00 Sabine Dues (FZJ/ICS), *Structural Biochemistry projects (overview of ICS-6)*

16:30 Coffee break

AWARDING CEREMONY

CONVENER: GIORGI SHARVASHIDZE

- 17:00 **Public Lecture**
Prof. Ulf-G. Meißner (Bonn/FZJ): *Life on Earth – an Accident ?*

17:40 **Discussion, Conversation and Get-Together**
(reception/photo session/interviews)

19:30 SOCIAL PROGRAM

TSU Welcome dinner „Shadow of Metekhi“ restaurant

EXISTING AND FUTURE COOPERATION

auditorium 107

PLENARY SESSION 3

CONVENER: ANDREAS WAHNER

9:00 Astrid Kiendler-Scharr (FZJ/IEK), *Climate Change: current knowledge*

9:30 Hendrik Elbern (FZJ/IEK), *Atmospheric Models with Data*

10:00 Ghaleb Natour (FZJ/ZEA-1), *Technology for Excellent Science*

10:30 Stefan van Waasen (FZJ/ZEA-2), *Advanced Computing*

11:00 Coffee break

11:30 Thomas Kress (RWTH Aachen), *High Energy Physics experiments at CERN*

12:00 Harald Glueckler (FZJ/ZEA), *Spectrometer and detector construction, design and fabrication*

12:30 Jörg Mauler (FZJ/INM-4), *MR Spectroscopy*

13:00 David Arutinov (FZJ/ZEA-2), *Development of a new PET-MRI prototype*

13:30 Lunch break

SCIENCE AT SMART | EDM_LAB

auditorium 06

PARALLEL SESSION 1

CONVENER:
MIKHEIL NIORADZE

14:30 Jörg Pretz (FZJ/IKP),
JEDI project at COSY/Jülich

15:00 Zurab Berezhiani (L'Aquila, Italy),
Puzzling neutron: window to new physics?

15:30 Zara Bagdasarian (FZJ/IKP),
Neutrino hunters around the world

SCIENCE AT SMART | ATMO_SIM LAB

auditorium 107

PARALLEL SESSION 2

CONVENER:
BEZHAN CHANKVETADZE

14:30 Giorgi Jibuti (TSU),
Project overview: smart platform-sensors and drones

15:00 Ramaz Botchorishvili (TSU),
Project overview: numerical modeling, measur.'s and machine learning

15:30 Marine Arabidze (NEA, Georgia),
Air quality monitoring system in Georgia: challenges and perspectives

SCIENCE AT SMART | MEDICAL_LAB (MRI + BIOMED)

auditorium 101

PARALLEL SESSION 3

CONVENER:
J. SHAH AND B. NEUMAIER

14:30 Ezequiel Farrher (FZJ/INM-4),
Quantitative MRI (Methods)

15:00 Elene Iordanishvili (FZJ/INM-4/GTU),
Quantitative MRI (Application)

15:30 Jon Shah (FZJ/INM-4),
MR-PET

16:00 Coffee break

16:30 Vakhtang Kartvelishvili (Lancaster),
Quarkonium spectroscopy in ATLAS

17:00 Jambul Gegelia (FZJ/TSU),
Eff. field theory and derivation of Salam-Weinberg model

16:30 Hanno Scharr (FZJ/IBG-2),
Computer vision crash course (part 1)

16:30 Mikheil Kelenjeridze (FZJ/INM-4/GTU),
Develop. of an MRI antenna array for MR-PET imaging

17:00 Swen Humpert (FZJ/INM-5),
¹⁸F-labeled peptides for diagnosis of Alzheimer's disease

18:00 Revaz Shanidze (TSU),
Nuclear Medicine Physics in TSU

19:30 DINNER

at Hotel „Tbilisi Orion“

AUGUST 23, THURSDAY SCHOOL PART AT TSU

ONGOING PROJECTS AT SMART | EDM_LAB

II build., EDM_Lab, #047

PARALLEL SESSION 4:
CONVENER:
HANS STRÖHER

9:30 Irakli Keshelashvili (FZJ/IKP),
Work in Juelich (det. & target) (overview)

10:00 David Mchedlishvili (TSU),
Work in Tbilisi (overview)

10:30 Fabian Müller (FZJ/IKP),
Polarimetry for srEDM measurements

ONGOING PROJECTS AT SMART | ATMO_SIM LAB

auditorium 06

PARALLEL SESSION 6:
CONVENER:
ASTRID KIENDLER-SCHARR

9:30 Robert Wegener (FZJ/IEK),
Diurnal and annual cycle of Nitrogen Oxides

10:05 Iulia Gensch (FZJ/IEK),
The hydrocarbon clock: a tool to distinguish between mixing and reaction during the atmospheric transport

10:40 Tako Janelidze (FZJ/IEK),
Novel adjoint advection schemes for Atmo Chemistry

WORK PLANED FOR SMART | MEDICAL_LAB'S

auditorium 101

PARALLEL SESSION 8:
CONVENER:
ALEXANDER TSISKARIDZE

9:30 Jon Shah (FZJ/INM-4),
SMART lab in frame of National Imaging Facility (NIF)

10:00 Bernd Neumaier (FZJ/INM-5),
SMART lab in cooperation with TSU ?

10:20 Tamar Khechiashvili (FZJ/INM-4/GTU),
My experience in Juelich as a PhD

10:40 Ana Gogishvili (FZJ/INM-4/GTU),
My experience in Juelich as a Master student

11:00 Coffee break

11:30 David Arutinov (FZJ/ZEA-2), <i>3D chip (introductory lecture)</i>	11:30 Ketevan Kharashvili (TSU), <i>Current projects at AtmoSim_lab</i>	11:30 Discussions/Students presentations
12:00 Dito Shergelashvili (TSU, PhD), <i>Polarimeter electronics and data readout</i>	11:55 Ana Dolidze (TSU), <i>Studying advection schemes of EURAD-IM model</i>	
12:20 Otari Javakhishvili (AUG, Master), <i>Power supply developments for polarimeter</i>	12:20 Robert Wegener (FZJ/IEK), <i>Introduction to atmospheric modelling (lecture)</i>	
12:40 Giorgi Kvantrishvili (TSU, Master), <i>Axion search: plans at COSY</i>		

13:00 Lunch break

14:30 II build., EDM_Lab, #047	14:30 II build., comp. class #344	auditorium 06	14:30 auditorium 101
PARALLEL SESSION 5 CONVENER: HANS STRÖHER	PARALLEL SESSION 7.1 CONVENER: GIORGI JIBUTI	PARALLEL SESSION 7.2 CONVENER: RAMAZ BOT-CHORISHVILII	PARALLEL SESSION 9 CONVENER: REVAZ SHANIDZE
Practical for students: Detlev Gotta, Gogi Macharashvili, Irakli Keshelashvili, <i>Detector Physics and Simulations in Experimental Particle Physics</i>	Practical for students: Robert Wegener, <i>Atmospheric modeling</i>	Lectures for students: Hanno Scharr, <i>Computer vision crash course (part 2)</i>	Practical for students: Jon Shah, Bernd Neumaier, <i>Lecturing & students presentations</i>
18:00	18:00		18:00

19:30 SOCIAL PROGRAM

(Banquet of the Workshop, „Kopala“ restaurant)

AUGUST 23, THURSDAY SCHOOL PART AT AUG

PROGRAM FOR AGRICULTURAL UNIVERSITY OF GEORGIA (AUG) (SMART | ENGINEERING_LAB)

AUG, Engineering department

WELCOME

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

PARALLEL SESSION 10

CONVENER: ZAZA METREVELI

Students presentations: Department of Mechanical Engineering (15+5')

- 12:00 Giorgi Gvasalia, Beqa Sanodze, *Turbo Jet Engine*
- 12:20 Davit Togonidze, Mirian Bejitadze, *Robotic Arm*
- 12:40 Luka Janjghava, Dudu Mamatsashvili, *Hydraulic Excavator*

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

Students presentations: Department of Electrical and Computer Engineering (10+5')

- 14:30 Nino Anasova, *Portable low frequency spec. analyzer for biomedical purposes*
- 14:45 Avtandil Lomidze, *Psycho emocional cond. estim. system for operators in industry*
- 15:00 Aleksandre Kalandadze, *Intellectual device for the fast charging of electric cars, adopted for the conditions in Georgia*
- 15:15 Rati Chkhetia, *Automated device for animal monitoring in national parks*

Students presentations: Department of Chemistry (10+5')

- 15:30 Nodar Dumbadze, *Synthesis of novel ion-conducting mat's for fuel cell applicator*
- 15:45 Tamar Khatisashvili, Elene Gabodze, *Green Chemistry*

Students presentations: Department of Biology

- 16:00 Nato Kuljanishvili, *In vitro testing of in silico designed cationic antimicrobial peptides*
- 16:20 Tamar Khatisashvili, Elene Gabodze, *Green Chemistry*

18:00 Arrival at Hotel

19:30 SOCIAL PROGRAM

(Banquet of the Workshop, „Kopala“ restaurant)

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)

AUGUST 24, FRIDAY SCHOOL PART AT TSU

auditorium 107

STUDENTS SESSION 1

CONVENER: RAMAZ BOTCHORISHVILI

- 09:30 **Introductory information “How to prepare presentations?”** Hans Ströher
09:40 Giga Aptsiarui, Salome Shekiladze, *Processing measurements using deep learning*
09:50 Salome Kakhaia, Mariam Razmadze, *Shape parameter for radial basis functions*
10:00 Tamaz Sepiashvili, Mari Jananashvili, *Coupled Horn-Shunk & Lucas-Kannade for images*
10:10 Giorgi Svanadze, David Jokhadze, *Vehicle type, quantity and velocity from video*
10:20 Pavle Tsotskolauri, *Reaction time & operation accuracy measurement and training device*
10:30 Demetre Dzmanashvili: *Comparing diffusion models for image processing*

11:00 Coffee break

STUDENTS SESSION 1

CONVENER: BEZHAN CHANKVETADZE

- 11:30 Tamar Khatiashvili, *Nitrous oxides pollution in Tbilisi*
11:40 Lasha Giunashvili, *Carbon monoxide and dioxide pollution in Tbilisi*
11:50 Salome Pantsulaia, *Methane pollution in Tbilisi*
12:00 Nana Khundadze, *Contamination gradients for air pollutants in space*
12:10 Mariam Maisuradze, *Contamination gradients for air pollutants in time*
12:20 Natia Porchkhidze (ISU), *GCR and climate change*

13:00 Lunch break

STUDENTS SESSION 3

CONVENER: DAVID MCHEDLISHVILI

- 14:15 Tamar Zakareishvili, *Studies of ATLAS hadronic calorimeter response*
14:25 Gogita Papalashvili, *Neutrino research at intermediate energies with KM3NeT/ORCA*
14:35 Revaz Beradze, *Physics beyond SM and precision tests of the neutron beta-decay*
14:45 Alexandre Gurchumelia, *Physical applications of the non-compact G2*
14:55 Mariam Chitishvili, *Study of metastable vacuum decay with gravity*
15:05 Goga Suknidze, *Axion search experiments*
15:15 Vano Zurabashvili, *Landau quantization in quantum mechanics*
15:25 Sopiko Kurdadze (ISU), *Rock lizards-Gene flow and hybridization within species of „mixtra“*

STUDENTS SESSION 4

CONVENER: KETEVAN KOTETISHVILI

- 15:35 Tatia Gonashvili (GTU), *Radiotherapy techniques*
15:45 Natia Beriashvili (GTU), *Medical imaging technologies*
15:55 Richard Kibler (GTU), *PET/MRI (10')*
16:05 Davit Sebuia, Elene Lortkipanidze (GTU), *Radiation therapy*
16:15 Lazare Kvirtia (GTU), *M1 Abrams (10')*
16:25 Zurab Saralidze (GTU), *Nuclear process in medicine*
16:35 Lika Sichinava (GTU), *Detectors, elementary particles*

16:45 Coffee break

17:00 Summarizing the students presentations

17:30 **Certificates & Internships** (awarding ceremony for students)

18:00 Concluding remarks

PUBLICATION DETAILS

Published and printed by: Forschungszentrum Jülich GmbH · 52425 Jülich · Germany

Photo: Andro Kacharava/Forschungszentrum Jülich

