

# REPORT ON LITHUANIA ASSOCIATE MEMBERSHIP AT CERN

2017–2018

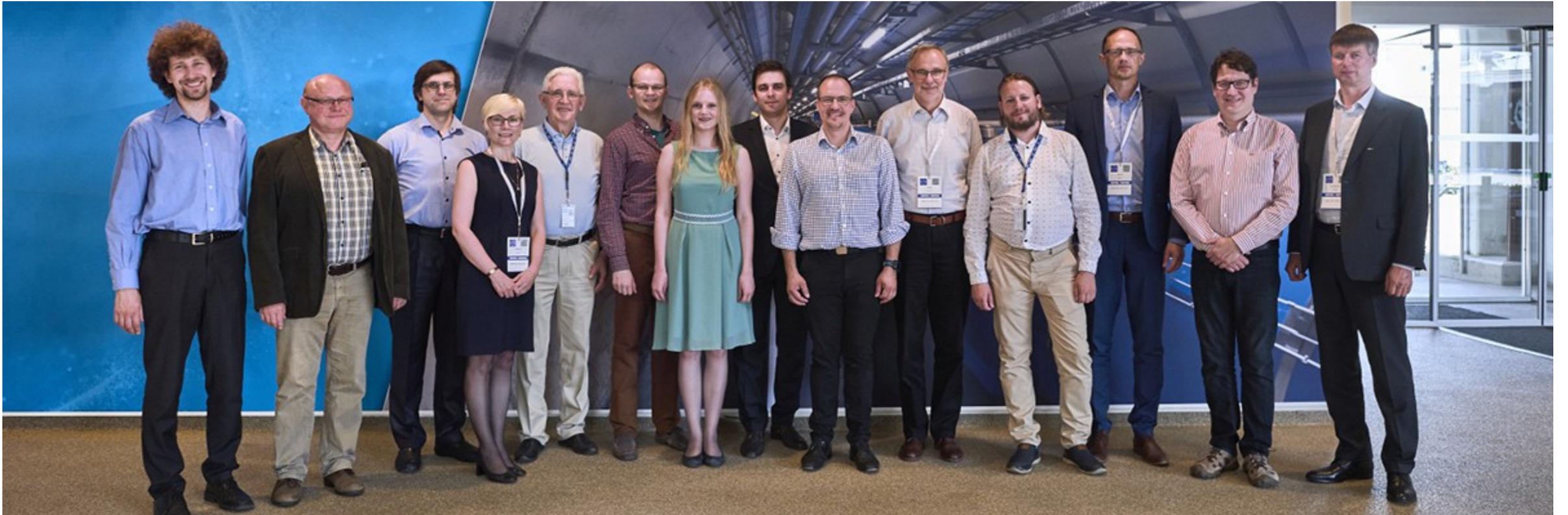
prepared by the CERN Coordination Committee  
in Lithuania

In 2016 the National Strategic Council for Research, Development and Innovation, chaired by the Prime Minister approved the Action Plan on CERN Associated Membership 2017–2021, appointing the Ministry of Education, Science and Sport as the main coordinator and the Ministry of Economy and Innovation in charge of industrial networking and establishment of CERN BIC.

In 2018 the Confederation of Lithuanian Industrialists was nominated as Liaison Office for CERN in industry and Academy of Sciences – Liaison Office for CERN in research, development and innovation. Also national committee for CERN activities under the Academy of Sciences was established.

During the recent years strong partnership has been maintained between the President Office, the Government, business and academic stakeholders to enhance the activities in CERN related areas. Moreover the collaboration with Latvia and Estonia regarding CERN areas of interests and the share of best practices has been developed. With the endorsement of CERN and in cooperation with the higher education institutions of Estonia and Latvia, the CERN Baltic Group (CBG) was established aiming to foster particle physics and accelerator technology research and education community in the Baltic states. Two major Lithuanian universities – Kaunas University of Technology (KTU) and VU – signed the CBG Memorandum of Understanding (MoU) in May 2018 at CERN.

# CERN Baltic Group



The first year of CERN associated membership showed that both academic and business sectors have many challenges in absorbing the possibilities of membership. It should be acknowledged that the performance of research and industry in CERN related areas remains one of priorities at political agenda.

The financial duty of year 2018 for CERN was fulfilled.

# Research and development in 2018

The research and development related to CERN programmes is supported according to the Action plan for a period of 2018-2020 approved by the Minister of Education, Science and Sport. The Lithuanian Academy of Sciences is authorized to coordinate implementation of high quality research projects. Six research groups applied for and obtained funding to carry out their CERN-related R&D projects. Four of those are from Vilnius University (VU), investigating the radiation damage of Si detectors, developing fast scintillation detectors, theoretically investigating the CMS detector data, and developing CMS software. One group from Kaunas University of Technology (KTU) deals with the improvement of the coatings used in accelerators at CERN. One more group, from the Lithuanian University of Health Sciences in Kaunas, investigates the tumour resistance to radiation therapy. The groups have applied for the funding of their research projects till 2020.

In addition to state budgetary funding, other funding sources are being sought and allocated for participation in the CERN activities:

- Data Analysis and Semiconductor Research groups participated in a project application “Silicon and Gas Radiation Detector Development Exchange Programme for High Energy Physics Instrumentation and Societal Detector Applications” (PI Archana Sharma, CERN) under call H2020-MSCA-RISE-2018. The consortium consisted of 30 participants from around the world, including CERN. The project CAPSTONE was not funded.

- Photoelectrical Phenomena and Semiconductor Optoelectronics research groups participated in HORIZON 2020 project No 654168 “Advanced European Infrastructures for Detectors at Accelerators – AIDA-2020” (WP14 – Infrastructure for advanced calorimeters; WP15 – Upgrade of the beam and irradiation tests infrastructure); also, in a project supported by the Central Agency of the Project Management (CPVA LR) 01.2.2-CPVA-K-703-02 “Centre of technologies of the contactless and remote detection of ionizing radiations” (2018–2021).

•Semiconductor Optoelectronics research group participated in preparing two Letters of Intent for Horizon 2020 program (project leader Barbara Erasmus): “PbWO4 – ultrafast scintillator for picosecond timing” (spokesperson: Carlos Munoz Camacho, IPN Orsay, France) and “Search for fast and radiation hard new scintillators” (spokesperson: Kai-Thomas Brinkmann, Justus-Liebig-Universität, Gießen, Germany) in application with CERN and other partners for a project of programme ATTRACT. Currently, the group has two projects funded by the EU structural Funds via the Lithuanian Research Council: “Neutron flux detection system with optical readout” (no. 01.2.2-LMT-K-718-01-0041), 2018-2022, and “Fast scintillators for radiation detectors; FARAD” (no. 09.3.3-LMT-K-712-01-0013) 2018-2022. The group was a member of the COST Action FAST ended in 2018. During the implementation of this project, the group hosted 7 short term scientific missions (STSM) from partner institutions, PhD student Augustas Vaitkevičius participated in three STSMs to Fondazione Bruno Kessler, Trento, Italy, and Justus-Liebig-University, Giessen, Germany.

- Photoelectrical Phenomena research group is a member of CERN RD50 collaboration and participated in LMT supported project of the call “Toward Future Technologies” LAT-01/2016 “Development of the MOCVD GaN based technology for fabrication of position and spectrum selective detectors of ionizing radiations”; LMT supported project 01.2.2-LMT-K-718-01-0013 “Creation of the prototype wide-spectrum dosimetry system for various purpose monitoring of irradiations” (2018-2022); in agreement of the bilateral collaboration Vilnius University – IMEC (Belgium) “On characterization of the MOCVD GaN grown on Si”; in bilateral collaboration projects with Belarus University (Belarus), with University of Helsinki (Finland) on implementation of the CERN RD50 project tasks; in bilateral collaboration with Ammono-Unipress (Poland) on characterization of the HVPE-AT grown GaN materials and detector structures.

- Seeking to build stronger cooperation with the partner institutions and to accelerate the development of research capabilities of academic institutions, Vilnius university, CERN and Institut Laue–Langevin in Grenoble submitted a Twinning proposal under Horizon 2020 programme. It is expected that institutions with longer experience and a higher scientific impact will teach VU how to boost scientific performance and how to be more efficient in scientific work. The proposal is currently under evaluation.

# University studies

The Experimental Nuclear and Particle Physics Centre (Centre) was established at Vilnius University in the beginning of 2017 as national centre to strengthen the research in experimental and particle physics in Lithuania and also as a prerequisite to signing the Associate Membership agreement. It operates on the funds allocated on a yearly basis by the Ministry of Education and Science (Ministry of Education, Science and Sports, as of January 1, 2019). The Centre has an interim Chair and an administrative officer (part-time). It is planned that in 2019 the Centre will become a coordinating body of institutional network between Kaunas (Kaunas University of Technology, Lithuanian University of Health Sciences, Lithuanian Energy Institute) and Vilnius (Vilnius University, Vilnius Gediminas Technical University, Centre for Physical Sciences and Technology) and the joint research activities will strengthen not only research but also higher education in CERN related areas.



# VILNIUS UNIVERSITY FACULTY OF PHYSICS

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## CERN

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- » History
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### Experimental nuclear and particle physics center

Over the past decade Lithuania has worked to strengthen and diversify its involvement with CERN through several avenues. Now as Lithuania is approaching the associate membership at CERN, the Centers was founded to strengthen the experimental high energy physics related research at Vilnius University. The main duties of the Center are foreseen:

- » Raise the public awareness for fundamental physics such as the current understanding of the Universe and its origin in a form that is suitable for a broad audience;
- » coordinate the research activities in theoretical and experimental high energy physics, material and computer science and medical applications relevant to CERN research fields;
- » facilitate the involvement of researchers at Vilnius University into the programmes and experiments conducted at CERN;
- » organize teaching and training of students and young researchers in particle physics, particle detector techniques, data processing and related fields.

Ad Interim Chair - Prof. Dr. Sc. Juozas Vidmantis Vaitkus

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Saulėtekio al. 3, LT-10257

Vilnius, Lithuania

Phone: +370 (5) 2234503

E-mail: [cern@ff.vu.lt](mailto:cern@ff.vu.lt)

Five new courses in experimental and theoretical particle physics and closely-related IT subjects were introduced at bachelor level. These courses became a part of the ordinary study program offered to students who entered the university in the fall of 2017, and they run in 2018 according to the curriculum requirements.

Courses “Materials research” and “Materials science” were improved with added parts and laboratory training tasks related to radiation damage and measurement of parameters of defects created by irradiation in semiconductors were delivered for students as well. The “Electronics” course was elaborated by adding the pulse processing used in HEP.

Students performed research on experimental particle physics (CMS data analysis) in 2018, under the training program “Promotion of Students’ Scientific Activities” supported by the Lithuanian Research Council. Special scholarships at Centre have been established to support the students who actively participate in CERN-related projects. Three students at the Faculty of Physics and one at the Faculty of Chemistry and Geosciences have received them.

VU Faculty of Physics has one PhD student in theoretical particle physics and during 2016–2018, three PhD students defended their thesis on photoelectrical phenomena research relevant to CERN areas of interests,

Four students of physics attended the course “Particle interaction with matter and the detector design principles“ delivered by prof. Christoph Schäfer (CERN) at VU and visited CERN CMS under supervision of dr. A. Juodagalvis in 2017. These students continue their studies at PhD level at Vilnius university and also the Master studies at Vilnius University, University of Bergen and at the University of Oxford, respectively.

The Centre also supported few students to participate in the school “CERN Spring Campus 2018” (Riga, Latvia).

# Education and outreach

The Outreach group of the Centre conducted several events in 2018. Among those, the “International MasterClass: Hands on Particle Physics 2018” (organized by IPPOG) was moderated together with the Vilnius Gediminas Technical University (VGTU) staff, and around 80 participants, mainly schoolchildren, could visit laboratories of the Centre for Physical Sciences and Technology (FTMC). Three introductory lectures were given, and the students analyzed real CMS data events. The findings were discussed in the videoconference with 4 other international universities and CERN moderators. The CMS virtual visit for Lithuania was hosted by KTU in 2018 as part of the European Researchers’ Night event. For education and outreach 12 Wilson cloud chambers were constructed, and a web page for requesting them was set up, see

<http://www12002.vu.lt/cern/mokslinink-grupes/daleli-fizikos-sklaidos-grupe> .

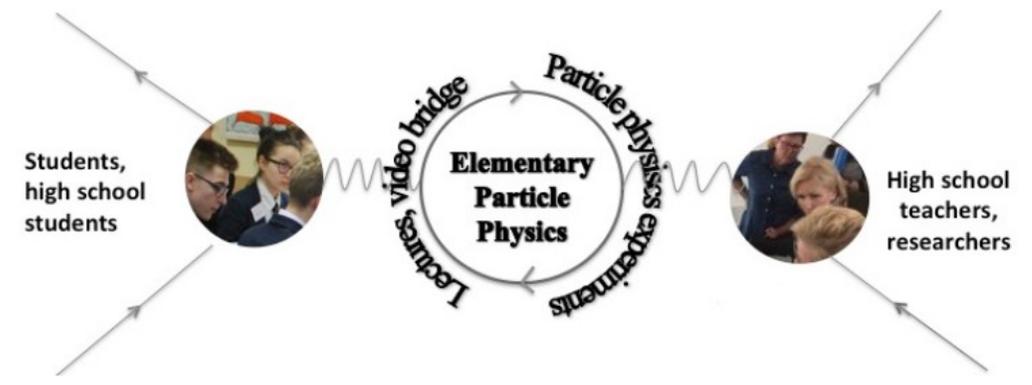
**CERN**

- » Experimental nuclear and particle physics center
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# Particle physics outreach group

- About
- Our team**
- Day at the Center
- Lectures
- Particles traces
- Resources
- News

The nucleus and elementary particle outreach center operates within Experimental nuclear and particle center of the Faculty of Physics (FP) at Vilnius University (VU). It organizes educational activities for the general public. High school students and their teachers are welcome to visit our centre, to take part in particle physics experiments, attend a lecture on CERN activities and research, or participate in a video bridge. Students will deepen their knowledge in the field of nuclear and elementary particles, learn scientific work and learn how to apply their knowledge in a new situation. Teachers can raise their qualifications by sharing experiences and ideas.



Our Center aims to attract students to the field of physics, to motivate them during excursions and experiments, to demonstrate simple and easy experiments. Our current suggestions for school teachers and students are:

Day at the Center	Lectures	Particles traces
<p><i>The day at the center, with lectures and an experiment, reserving the time of the session.</i></p>	<p><i>45 min. lecture on thawed topics after reserving the time of the session.</i></p>	<p><i>60 min. experiment for student groups after reserving the time of the session</i></p>
		

The lectures with a stress on fundamental research specific to CERN were delivered for different audiences during national science festival “Spaceship Earth”, at the Lithuanian Academy of Sciences, at secondary schools and business clubs both in 2017 and 2018.

An interim chair of the VU Centre prof. Juozas V. Vaitkus delivered a series of lectures on CERN related activities, achievements and challenges at secondary schools in Vilnius, at conferences of LITNET and “Leaders’ club anniversary”, at advanced physics school “Physics Olympus”, for Vilnius university students. The activities of Lithuania in CERN related projects were presented during a symposium at University of Florida and for the IUPAP Governing board and Commissions’ chairs meeting in Vilnius on November 1, 2018.

The smart TV screens on the 2nd floor of National Centre of Physical and Technological Sciences are installed and display live footage from CERN ATLAS and CMS experiments. The exhibition of CERN related activities is in preparation at the same location.



# Visatos grožis

Mėginimas suvokti pasaulio prigimtį

Nobelio fizikos premijos laureatas

**Frank Wilczek**



Seeking to strengthen science for citizens activities in Lithuania, a book by Frank Wilczek “A Beautiful Question: Finding Nature’s Deep Design” was recommended to the Lithuanian Academy of Sciences for its popular science bestsellers translation program, and recently the book (under the title in Lithuanian “The Beauty of Universe”) has been published and is distributed free of charge.

VU portal has published six news articles at <http://naujienos.vu.lt/tag/cern/> regarding CERN in 2018, with portions contributed by dr. A. Juodagalvis.



### CERN



#### CERN kviečia moksleivius atlikti eksperimentus su greitintuvais

2018-10-11 13:22 - Vilniaus universitetas - Komentarų: 0

Europos branduolinių mokslinių tyrimų organizacija (CERN) penktus metus iš eilės viso pasaulio moksleivius kviečia dalyvauti konkurse „Dalelių...

[Toliau](#)



#### Lietuvos studentai kviečiami jungtis prie CERN kolektyvo

2018-07-31 16:23 - Vilniaus universitetas - Komentarų: 0

Europos branduolinių mokslinių tyrimų organizacija (CERN) studentus iš Lietuvos kviečia dirbti, stažuotis ir praktikuotis didžiausioje pasaulyje dalelių...

[Toliau](#)



#### CERN prasidėjo Didžiojo hadronų greitintuvo tobulinimo darbai



#### Pagrindiniai Baltijos šalių universitetai įsteigė CERN Baltijos grupę

2018-06-04 11:28 - Vilniaus universitetas - Komentarų: 0

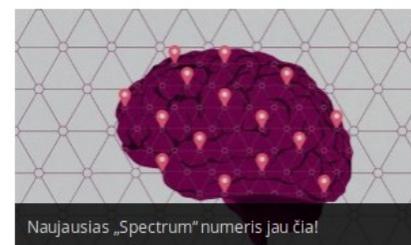
### MOKSLO SRIUBA



### KNYGŲ LENTYNA



### ŽURNALAS SPECTRUM



A journalist of the Lithuanian National Broadcaster (LRT) Algirdas Acus visited CERN and authored two 40 min interview episodes about CERN in his TV clip series “Beyond here and now” (“Anapus čia ir dabar”). Recordings are available at <https://www.lrt.lt/mediateka/irasas/1013703605/anapus-cia-ir-dabar> (>1100 views, with prof. Christoph Schäfer), <https://www.lrt.lt/mediateka/irasas/1013707445/anapus-cia-ir-dabar> (> 900 views, with prof. John Ellis).



Programa

Vilniuje: -8°C

Įkelti naujieną

Prisijungti

AA+

BENDRAUKIME

Apie LRT

Paieška

LT

Naujienos

Mediateka

Vaikams

Televizija

Radijas

Projektai

Mediateka

LRT Gyvai

Pasivyk

Įrašai

Grojaraičiai

Asmenybės

Prenumerata

Mediateka > Įrašas

# Anapus čia ir dabar



2018-10-04 23:23

1139

Įvertinimas: 0

Dalintis nuo:

00:00:00

iki

00:42:43

https://www.lrt.lt/mediateka/irasas/1013703605/anapus-cia-ir-dabar

Patinka 4



Daugiau

## LAIDOS ĮRAŠAI



2019-01-03 09:45

Anapus čia ir dabar.

Atvira visuomenė. Camille Riquier

352



2018-12-27 00:08

Anapus čia ir dabar. Anti-genderizmas. Agnieszka Graff

808



2018-12-20 00:08

Anapus čia ir dabar

405



2018-12-13 00:03

Anapus čia ir dabar : Geopolitiniai skersvėjai, Anne Applebaum

437



2018-12-06 23:28

Anapus čia ir dabar

1285





Programa

Vilniuje: -8°C

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Radijas

Projektai

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LRT Gyvai

Pasivyk

Įrašai

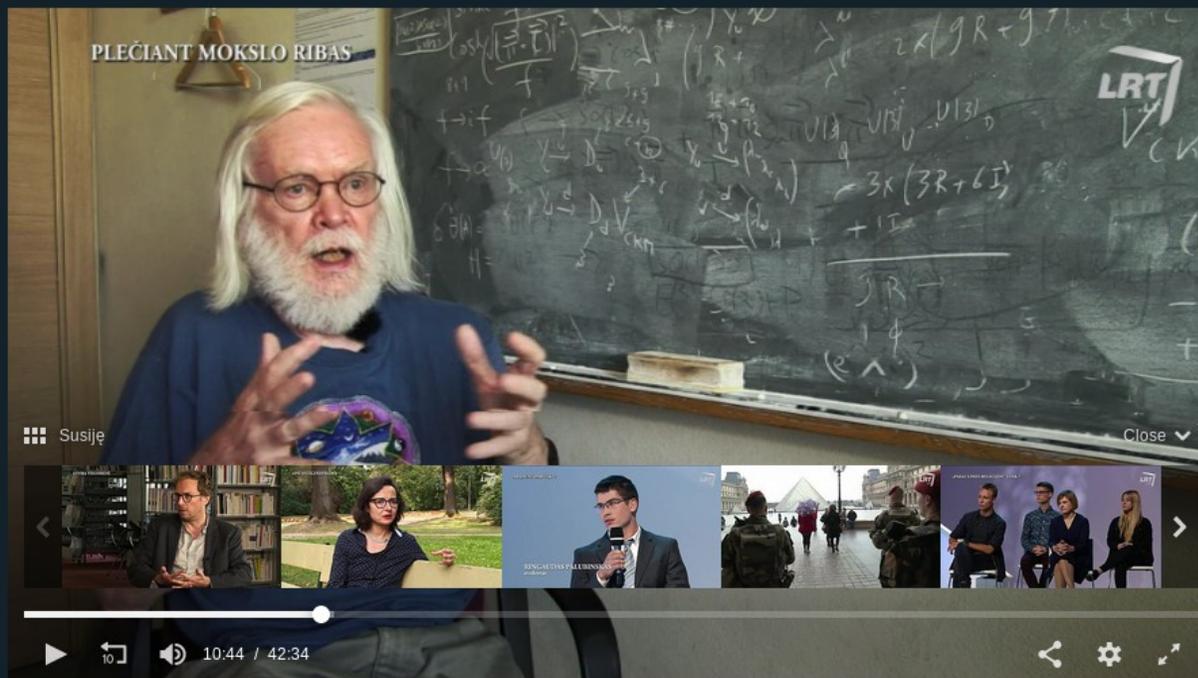
Grojaraščiai

Asmenybės

Prenumerata

Mediateka &gt; Įrašas

## Anapus čia ir dabar Plečiant mokslu ribas; John Ellis



2018-11-29 23:29

902

Įvertinimas: 0

Dalintis nuo:

00:00:00

iki

00:42:34

<https://www.lrt.lt/mediateka/irasas/>

Patinka 69



### LAIDOS ĮRAŠAI



2019-01-03 09:45

Anapus čia ir dabar.

Atvira visuomenė. Camille Riquier

352



2018-12-27 00:08

Anapus čia ir dabar. Anti-genderizmas. Agnieszka Graff

808



2018-12-20 00:08

Anapus čia ir dabar

405



2018-12-13 00:03

Anapus čia ir dabar : Geopolitiniai skersvėjai, Anne Applebaum

437



2018-12-06 23:28

Anapus čia ir dabar

1285

Daugiau

Mokslinė fantastika ne tiek apie mokslą, kiek apie visuomenę – sako vienas žymiausių šiuolaikinių fizikų iš

CEBNO žemaičio Džonas Elisas. Laidos anapus čia ir dabar mokslas plečia mūsų ribas ir kas iš to žiūplaišiai

Svetainėje naudojami slapukai, kurie padeda užtikrinti jums teikiamų paslaugų kokybę. Tęsdami naršymą, jūs sutinkate su Lrt.lt slapukų naudojimo tvarka ir taisyklėmis.



On November 6, 2018 the CERN Honorary Member François Flückiger participated in the *Annual Economic Forum '18* conference organized by the Confederation of Lithuanian Industrialists and delivered a lecture *Business and Science Cooperation in Information Technology: The CERN Case*.

A group of Lithuanian teachers will go to CERN on March 5-9, 2019. The CERN Baltic Teachers Programme event will host teachers from Estonia, Latvia, and Lithuania. Participation is coordinated by Education Development Center (UPC).

## **Co-operation and other activities within CERN areas of interests**

VU hosted a CERN Baltic Group – CBG – working group for studies meeting (in July). The advanced courses for master students are discussed under the CBG initiative. Student training at CERN is among the topics discussed with the representatives from KTU. A joint Baltic program in particle physics, accelerator and related technologies is considered. The nearest general CBG meeting will take place in Tallinn at the end of January 2019. The CBG working group on CMS topics had a kick-off meeting chaired by dr. Aurelijus Rinkevičius: topics of mutual present and possible future interest for Baltic researchers were discussed. CBG web page is <http://indico.cern.ch/category/10023/> .



## CERN Baltic Group

[Create event](#)[Parent category](#)

This is a group of Latvian, Estonian and Lithuanian research institutions which are involved in CERN activities. The group is designed to meet regularly and to coordinate activities between Baltic countries and CERN.

The main objectives of the CERN Baltic Group are:

1. Coordination of the Baltic research institutions activities towards CERN and related Collaborations/experiments
2. Strengthening and development of Baltic High Energy Physics community
3. Development of the Baltic international multidisciplinary masters/doctoral lever study programme in High Energy Physics and Accelerator Technologies

The main principles of the CERN Baltic Group are: transparency, honesty, sharing and collaboration

### January 2019

29 Jan - 30 Jan [3rd CERN Baltic Group General Meeting](#)

### September 2018

13 Sep - 14 Sep [CMS Baltic Group meeting](#)

There are 3 events in the past. [Show](#)

### Managers

[Mario Kadastik](#)

[Toms Torims](#)

Representatives of Lithuania – the Ambassador Andrius Krivas, prof. Jūras Banys, prof. Eugenijus Butkus, prof. Leonas Valkūnas, dr. Andrius Juodagalvis, dr. Aurelijus Rinkevičius – regularly participated in the sessions of CERN Council and meetings of its committees. The concise reports on the topics discussed and actions approved at the meetings are available in the Lithuanian language on the Lithuanian Academy of Sciences web page <http://www.lma.lt/ataskaitos>.



# LIETUVOS MOKSLŲ AKADEMIJA

[Apie LMA](#)[Dokumentai](#)[Sudėtis](#)[Veikla](#)[Renginiai](#)[ES SF projektai](#)[Konkursai](#)

## Lietuva ir CERN

[LIT](#) > [Lietuva ir CERN](#) > [Dalyvavimas CERN valdyme](#)[Atgal](#)

### Dalyvavimas CERN valdyme

### Bendradarbiavimo finansavimas

### Naujienos

## Dalyvavimas CERN valdyme

### Posėdžio data: 2018 m. gruodžio 13–14 d. CERN tarybos 191-oji uždaroji sesija

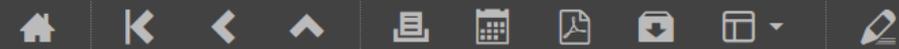
Susirinkime buvo išklaustyti CERN tarybos prezidento ir generalinės direktorės pranešimai. Pabrėžta, kad mokslo muziejaus statybai iš reikalingų 65 milijonų jau yra surinkta 55 milijonai, taip kad 2019 metais jau bus skelbiami konkursai. 2022 metai siūlomi skelbti Fundamentinių mokslų metais (*Basic science for development*). Susirinkime taip pat buvo išklaustytos finansų ir mokslo politikos komitetų ataskaitos, pateiktas 2019 metų CERN'o biudžetas, išklaudyta audito ataskaita. Tarptautinis valiutos fondas pakvietė CERN generalinę direktorę dalyvauti darbo grupės, skirtos fundamentinio mokslo vaidmeniui didinti, veikloje (*The role of fundamental research as driver of innovation and development*). Išsamus pranešimas buvo skirtas taikymams medicinoje. CERN'e ruošiamasi 2019 m. kovo mėnesį minėti 30 interneto metų (www). Didelį dėmesį CERN skiria atviros prieigos publikacijoms. Pažymėtina, kad 2019 m. sausio 8 d. sueis metai, kai Lietuva yra asocijuota CERN narė.

Parengė akad. Jūras Banys

### Posėdžio data – 2018 m. gruodžio 12 d.

366-tasis CERN Finansų komiteto posėdis vyko vieną dieną. Patvirtinus praeito posėdžio protokolo projektą, buvo aptarti

VU IT engineers continue to play an important role in CMS computing and infrastructure operations. The number varies, but there are about 10 of them based at CERN. Most are recruited as CERN associated members of personnel (MPA) in a joint program between CMS experiment and VU after successfully completing their BS practice at CERN under the EU Erasmus+ scheme. IT engineers together with dr. A. Juodagalvis and dr. A. Rinkevičius established a specific Lithuanians-at-CERN mailing group during preparation for the Associate CERN membership accession. Both online and live discussions of common topics are on its agenda <https://indico.cern.ch/category/7701/>, the group web page is <http://lithuanians-at-cern.github.io/> and the Facebook account is <https://www.facebook.com/lithuanians.at.cern/> .



# LT@CERN monthly meeting #24

Friday 7 Dec 2018, 16:00 → 17:00 Europe/Zurich

31-S-023 (CERN)

Aurelijus Rinkevicius (Cornell University (US)), Mantas Stankevicius (Fermi National Accelerator Lab. (US))

## Description

### Naujienos

- Dvidešimt ketvirtas susirinkimas!
- Lapkričio 16 d. CERN'e vyko pirmas "Lithuanian Professionals Club in Switzerland" klubo susirinkimas. <https://www.linkedin.com/groups/13607372/>
- Lapkričio 27 d. vyko konsulato Ženevoje atidarymas
- Gruodžio 3 d. sustabdytas LHC dviems metams
- CERN uždaromas 2018 m. gruodžio 22 d. - 2019 m. sausio 6 d. (imtinai)
- Naujienos iš ACCU susirinkimo (Aurelijus)

### Naujienos iš atstovybės

- Konsulas iš Berno persikėlė į Ženevos atstovybę

### TODO

- Puslapio status update: <https://lithuanians-at-cern.github.io/>
- Suplanuoti prisistatymus "kas ką dirba"
- Round-table

### Darbo skelbimai, praktikos, informavimas



#### NAUDINGOS NUORODOS

[Konferencijos](#)  
[Darbo skelbimai](#)  
[Stažuotės](#)  
[Pranešimai](#)

#### Naujausi įrašai

### [Šveicarijos profesionalų klubas \(GLL diaspora\) susirinko CERNe](#)

🕒 mažiau nei 1 min. skaitymo

Šiomet startavęs Lietuvių profesionalų klubas Šveicarijoje (kaip GLL diaspora) pirmą kartą susirinko CERNe. Tiek Lietuviams CERNe, tiek lietuvos profesionala...

### [Tyrėjų naktis CERNe 2018](#)

🕒 mažiau nei 1 min. skaitymo

Tai antrasis toks renginys, kuriame lietuvos moksleiviai ir studentai virtualiu būdu aplankė CMS eksperimentą CERNe tyrėjų nakties metu! CERNo lietuviai buvo...

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Lithuanians at CERN  
 @lithuanians.at.cern

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Community

**Community** [See All](#)  
 118 people like this  
 126 people follow this

**About** [See All](#)  
 Community

People >  
 118 likes

Related Pages

**Gytaute Akstinaite**  
 Photographer

According to information provided by CERN HR department on January 7th, 2019, 39 Lithuanians hold MPA in collaboration (MPAc) contracts, 1 Lithuanian has MPA training contract (MPAt), and there is 1 fellowship appointment. In 2018 there was one additional technical student (MPAt). 1 Lithuanian is a CERN staff member since 2018. 3 Lithuanians were selected for CERN summer programme in 2018.

The appointed industrial liaison officer (ILO) initially was Mrs. Gražina Tarvydienė from the Confederation of Lithuanian Industrialists (LPK), who recently left her position at LPK and the new nomination is pending.

According to information from CERN Industry, Procurement and Knowledge transfer department, in 2018 Lithuanian companies directly or indirectly provided supplies for approximately 70 kCHF.

# Planning the future activities

Lithuania recently hosted the CERN experts for evaluation of Lithuanian possibilities to establish CERN BIC in 2019. It is planned that Lithuanian CERN BIC will be located in Vilnius and Kaunas. The final discussions will be arranged during CERN-Lithuania meeting in January 2019.

In 2018 the International Advisory Board elected dr. Aurelijus Rinkevičius as a new Chair of the VU Centre. It is expected that he will take duties starting February 1, 2019.

Dr. A. Rinkevičius, due to his research work so far and after relevant inquiry, assures that CERN together with the CMS experiment (drs. Tiziano Camporesi and Stefano Mersi) identify the tracker project as the most prominent future project for Lithuania in terms of detectors, detector construction, commissioning, and data acquisition (DAQ). Tracker project supervises the Tracker Extended Pixels (TEPX) subproject that is envisaged as an excellent bridge for the future CMS needs and Lithuania's growing capacity. Further detailed discussions are ongoing, including those with ETH Zurich, PSI and Zurich University.

Also it is considered that the Centre in 2019 is becoming a national networking body for academic and business institutions operating in the areas of CERN research interests. Recently, Lithuanian Innovation Centre (LIC) was assigned with the responsibility to enhance technology transfer, therefore it is expected that LIC in cooperation with stakeholders and Lithuanian Confederation of Industrialists will strengthen academic and business cooperation, develop further an industry platform in the areas of CERN interests.



# Appendix 1 – Awards and publications in 2018

Rokas Mačiulaitis received the CMS achievement award (joining a number of other Lithuanians throughout the years): “for his excellent contributions to the Facilities group in Software and Computing”, nominated by assoc. prof. Markus Klute (MIT).

VU researchers are co-authors of 140 CMS papers published in 2018. In addition, a number of papers by individual VU groups have been published, the list is presented below.

## *HEP theory group*

- 1) The Participants of the European Neutrino Town Meeting [from Lithuania: D. Jurčiukonis], Future Opportunities in Accelerator-based Neutrino Physics, European Neutrino “Town” meeting and ESPP 2019 discussion (Oct 22-24, 2018, Geneva, Switzerland). arXiv:1812.06739 [hep-ex].
- 2) D. Jurčiukonis and L. Lavoura, The three- and four-Higgs couplings in the general two-Higgs-doublet model, JHEP 12 004 (2018).
- 3) D. Jurčiukonis and L. Lavoura, Lepton mixing and the charged-lepton mass ratios, JHEP 1803 152 (2018).
- 4) V. Dūdėnas and T. Gajdosik, “Gauge dependence of tadpole and mass renormalization for a seesaw extended 2HDM,” Phys. Rev. D 98 (2018) no.3, 035034; doi:10.1103/PhysRevD.98.035034; [arXiv:1806.04675 [hep-ph]].

## *IT group*

- 1) J.-M. André, A. Mecionis, V. Rapsevicius, M. Stankevicius et al. Presentation layer of CMS Online Monitoring System. CHEP 2018, accepted (2018).
- 2) M. Stankevičius, V. Marcinkevičius, & V. Rapševičius. Comparison of supervised machine learning techniques for CERN CMS offline data certification. Joint Proceedings of Baltic DB&IS 2018 Conference Forum and Doctoral Consortium Co-located with the 13th International Baltic Conference on Databases and Information Systems (Baltic DB&IS 2018), Trakai, Lithuania, July 1–4, 2018, 170–176 (2018).

## *Photoelectrical Phenomena research group*

- 1) E. Gaubas, T. Ceponis, L. Deveikis, D. Meskauskaite, J. Pavlov, V. Rumbauskas, J. Vaitkus, M. Moll, F. Ravotti, Anneal induced transformations of defects in hadron irradiated Si wafers and Schottky diodes, *Materials Science in Semiconductor Processing* 75 (2018) 157–165.
- 2) D. Meskauskaite, E. Gaubas, T. Ceponis, J. Pavlov, V. Rumbauskas, Characteristics of 1.6 MeV proton-irradiated GaN-based sensors, *Radiation & Applications*, doi: 10.21175/RadJ.2017.02.025.
- 3) L.F. Makarenko, S.B. Lastovskii, A.S. Yakushev, E. Gaubas, E. Pavlov, M. Moll. Impurity content influence on forming of interstitial bistable defect in Si. *Actual problems of solid state physics (in Russian)*, Vol. 3 (2018) 280-283.
- 4) L.F. Makarenko, S.B. Lastovskii, E. Gaubas, J. Pavlov, M. Moll, H.S. Yakushevich, L.I. Murin, Injection annealing of the self di-interstitial – oxygen complex in p-type silicon, *Proceedings of the National Academy of Sciences of Belarus. Physics and Mathematics series*, 2018, vol. 54, no. 2, pp. 220–228 (in Russian).

- 5) J. Vysniauskas and E. Gaubas, Simulation of dynamic characteristics of GaN p-i-n avalanche diode operating as particle detector with internal gain Lithuanian Journal of Physics 58 (2018), 177–187.
- 6) E. Gaubas, T. Čeponis, D. Dobrovolskas, J. Mickevičius J. Pavlov, V. Rumbauskas, J.V. Vaitkus, N. Alimov, and S. Otajonov, Study of polycrystalline CdTe films by contact and contactless pulsed photo-ionization spectroscopy, Thin Solid Films 660 (2018) 231–235.
- 7) E. Gaubas, T. Ceponis, J. Mickevicius et al, Pulsed photo-ionization spectroscopy in carbon doped MOCVD GaN epi-layers on Si, Semicond. Sci. Technol. 33 (2018) 075015. 1.
- 8) E. Gaubas; T. Ceponis,; L. Deveikis,; et al., Electrical characterization of HVPE GaN containing different concentrations of carbon dopants, Semicond. Sci. Technol. 33(12) 125024, 2018.

## *Semiconductor Optoelectronics research group*

- 1) M.T. Lucchini, O. Baganov, E. Auffray, P. Bohacek, M. Korjik, D. Kozlov, S. Nargelas, M. Nikl, S. Tikhomirov, G. Tamulaitis, A. Vaitkevicius, K. Kamada, A. Yoshikawa, Measurement of non-equilibrium carriers dynamics in Ce-doped YAG, LuAG, and GAGG crystals with and without Mg-codoping, J. Lumin. 194, 1-7 (2018).
- 2) E. Auffray, R. Augulis, A. Fedorov, G. Dosovitskiy, L. Grigorjeva, V. Gulbinas, M. Koschan, M. Lucchini, C. Melcher, S. Nargelas, G. Tamulaitis, A. Vaitkevičius, A. Zolotarjovs, and M. Korzhik, Excitation Transfer Engineering in Ce-Doped Oxide Crystalline Scintillators by Codoping with Alkali-Earth Ions. Phys. Status Solidi A, 215, 1700798 (2018).
- 3) E. Trusova, A. Vaitkevicius, Y. Tratsiak, M. Korjik, P. Mengucci, D. Rinaldi, L. Montalto, V. Marciulionyte, G. Tamulaitis, Barium and lithium silicate glass ceramics doped with rare earth ions for white LEDs, Opt. Mater., 84, 459-465 (2018).

4) G. Tamulaitis, G. Dosovitskiy, A. Gola, M. Korjik, A. Mazzi, S. Nargelas, P. Sokolov, and A. Vaitkevičius, Improvement of response time in GAGG:Ce scintillation crystals by magnesium codoping, *Journal of Applied Physics* 124, 215907 (2018).

## **Appendix 2 – Students and supervisors**

Dr. A. Juodagalvis currently leads the physics analysis efforts with two master students focusing on Drell–Yann precision studies. In addition to physics analysis, PhD student in computer and data sciences Mantas Stankevičius, cosupervised by assoc. prof. Valdas Rapševičius and dr. Virginijus Marcinkevičius, works on the machine-learning-based CMS data certification. On the other hand, assoc. prof. Thomas Gajdosik with one PhD Vytautas Dūdėnas and several master students is engaged in SUSY, neutrino physics and related phenomenological efforts.

During 2017–2018 VU Faculty of Physics had one PhD student in theoretical particle physics (Vytautas Dūdėnas, supervisor assoc. prof. Thomas Gajdosik), who will graduate soon. During 2016–2018, three PhD students defended their thesis on photoelectrical phenomena research relevant to CERN topics (supervisor prof. Eugenijus Gaubas).

Now, Laimonas Deveikis is a PhD student and Marijus Ambrozas entered MSc studies with a focus on CMS data analysis at the Faculty of Physics of Vilnius University; former VU students Anton Kunčinas and Simonas Draukšas continue MSc studies in particle physics at the University of Bergen and at the University of Oxford, respectively.