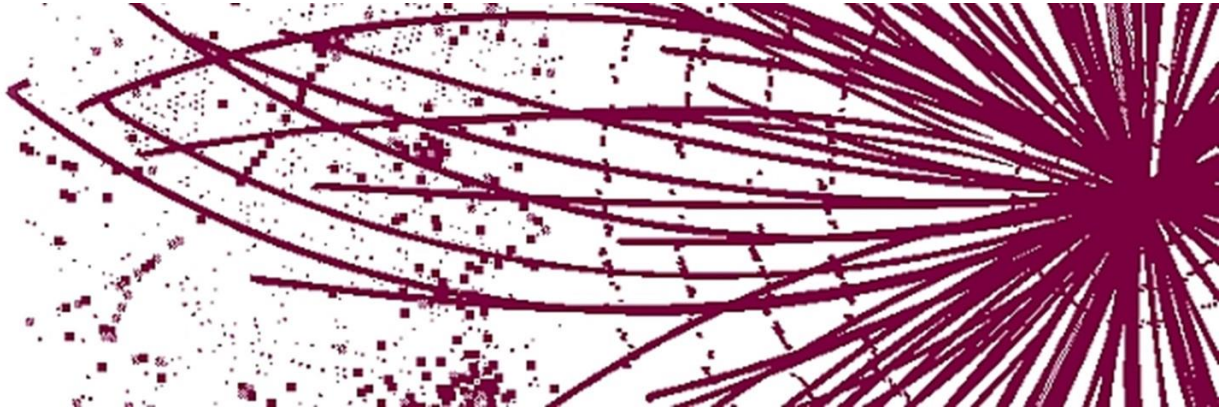
Experimental nuclear and particle physics center



Lithuanian Consortium for Particle Physics

Lithuanian Student Education on Experimental High-Energy Physics Challenges through the Software Development

A. Juodagalvis

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4th CERN Baltic Group Conference (CBC 2024), Tallinn, 2024-Oct-15

Outline

- NSF IMPRESS-U initiative
- Lithuanian participation in IMPRESS-U
- About IRIS-HEP
- Lithuanian fellows

- In 2023, the National Science Foundation (NSF, USA) announced International Multilateral Partnerships for Resilient Education and Science System in Ukraine (IMPRESS-U)
- A new collaboration with the following partners:
  - Estonia: Estonian Research Council (ETAG),
  - Latvia: Latvian Council of Science (LCS),
  - Lithuania: Research Council of Lithuania (LMTLT),
  - Poland: National Science Center (NCN) and Polish National Agency for Academic Exchange (NAWA),
  - Ukraine: National Research Foundation of Ukraine (NRFU),
  - USA: National Academy of Sciences (NAS),
  - USA: Office of Naval Research Global (ONRG) and private donors and foundations

- The goals of the partnership initiative are to:
  - Support excellence in science and engineering research, education, and innovation through international collaboration
  - Promote and catalyze integration of Ukrainian researchers in the global research community

- With this initiative, NSF invited visionary, ambitious, high quality collaborative research proposals that address scientific challenges in any field of science, engineering, or education

- It is expected that joint funding will be provided in such a way that each country funds its own scientists

- Website: https://www.nsf.gov/od/oise/IntlCollaborations/Ukraine.jsp

- Experimental Nuclear and Particle Physics Center at the Faculty of Physics of Vilnius University was invited by IRIS-HEP to participate in the project
  - "Extending research software collaborations in Particle Physics to Ukraine, Poland and Lithuania"
  - Project duration 2024-2026

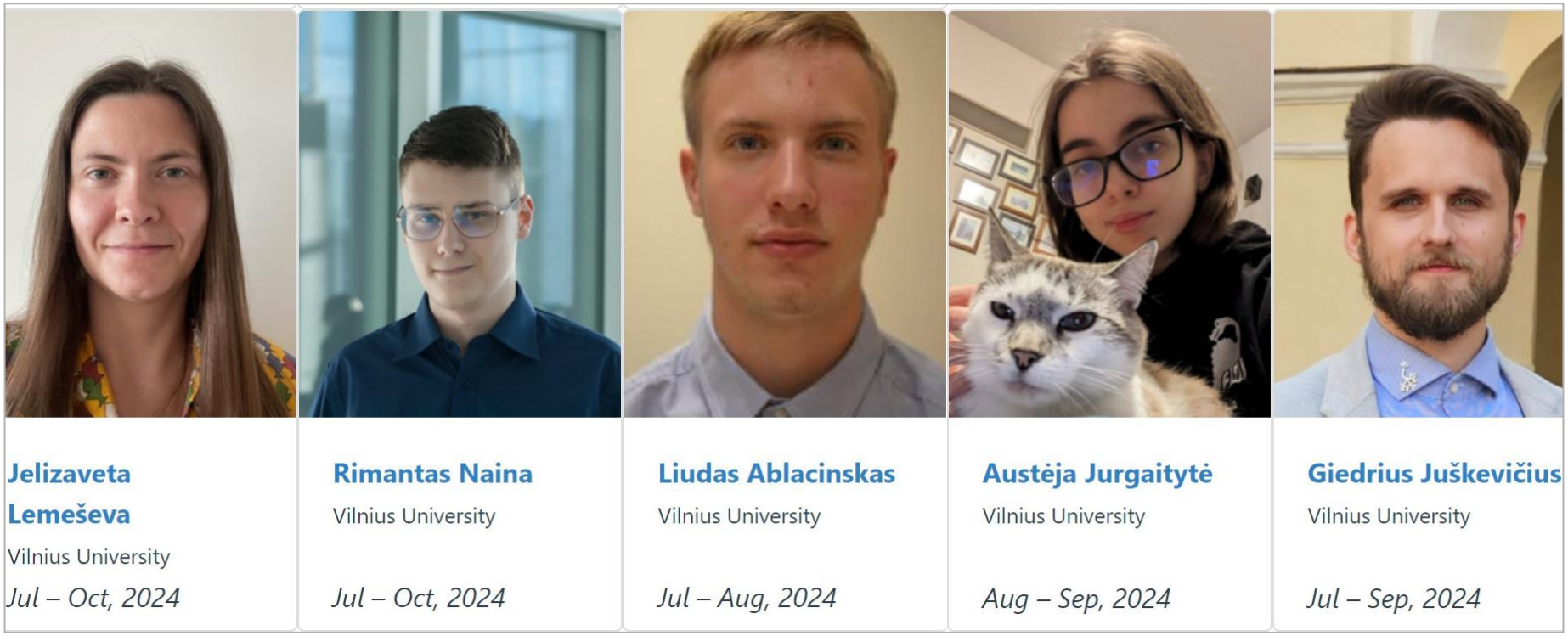
- The international project was approved by the NSF
- Lithuanian scientists funded during 2024 June – 2026 May by LMTLT
  - Project No. S-IMPRESSU-24-4
- Deliverables:
  - 10 student internships (up to 3 months): 5 in 2024, 3 in 2025, and 2 in 2026
  - 10+10 reports by the interns (both oral and in writing)
  - 3 project disseminations at national and international conferences
- Project leaders: Andrius Juodagalvis (VU FF) and Valdas Rapševičius (VU MIF)

- IRIS-HEP is a software institute funded by the National Science Foundation (NSF) in USA

- It aims to develop the state-of-the-art software cyberinfrastructure required for the challenges of data intensive scientific research at the High Luminosity Large Hadron Collider (HL-LHC) at CERN, and other planned HEP experiments. These facilities are discovery machines which aim to understand the fundamental building blocks of nature and their interactions
- Website: https://iris-hep.org/

Lithuanian IRIS-HEP fellows in 2024

- 5 VU students were sent to CERN in Summer 2024
  - https://iris-hep.org/fellows.html
  - Their project descriptions are given in their fellow profile
  - Students presented their work at “Lithuanians at CERN” meeting and at the “Final IRIS-HEP Fellows presentations” seminar series



Jelizaveta Lemeševa	Rimantas Naina	Liudas Ablacinskas	Austėja Jurgaitytė	Giedrius Juškevičius
Vilnius University	Vilnius University	Vilnius University	Vilnius University	Vilnius University
Jul – Oct, 2024	*Jul – Oct, 2024*	*Jul – Aug, 2024*	*Aug – Sep, 2024*	*Jul – Sep, 2024*

IRIS-HEP Fellows Final Presentations

- Presentations were recorded and posted on youtube https://www.youtube.com/@iris-hep

- L. Ablačinskas and L. Gerlach, „Anomaly detection in the CMS L1 Trigger: Investigation of the effects of circular padding for convolutional neural networks over cyclic data“
  - no presentation
- A. Jurgaitytė and D. Lange, „Development of Clad Tutorials for CMS/HEP“
  - https://indico.cern.ch/event/1449315/contributions/6101297/attachments/2942222/5169552/Austeja_Jurgaityte_IRIS_HEP_final_presentation.pdf
- G. Juškevičius and D. Lange, „Adding RNTuple to the Analysis Grand Challenge“
  - https://indico.cern.ch/event/1455396/contributions/6126403/attachments/2930396/5145756/Giedrius_Juskevicius_iris_hep_fellowship.pdf
- J. Lemeševa and T. Szimko, „Improving latency and scalability of the user runtime job log collecting and exposure in REANA“
  - https://indico.cern.ch/event/1449315/contributions/6101296/attachments/2942223/5169554/Jelizaveta_Lemeseva_IRIS-HEP_2024.pdf
- R. Naina, J. Hajduga, and T. Szumlak, „Interface for Rapid Geometry Modelling and Exchange Between CAD Tools and Simulation Platforms Dedicated for HEP Experiments“
  - https://indico.cern.ch/event/1449314/contributions/6101289/attachments/2928638/5141960/rimantas_naina_iris_hep.pdf

Summary

- Undergraduate student participation in computer software development for HEP experimental needs introduces them to some challenges faced in HEP experiments

- Staying at CERN in an international environment exposes them also to experimental high-energy physics and multicultural science

- This gives a broader overview of HEP science than could be obtained while staying at home institution

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