WIGNER GPU LABORATORY PRESENTS

GPU DAY 2021

10-11. NOVEMBER

MORE INFORMATION AND REGISTRATION:

HTTPS://GPUDAY.COM/

HTTPS://INDICO.KFKI.HU/EVENT/1330/

KEYNOTE SPEAKERS: ALBERTO DI MEGLIO, OSKAR MENCER

THE FUTURE OF MASSIVE PARALLEL AND QUANTUM COMPUTING

EMERGING ACCELERATOR PLATFORMS

IMAGE PROCESSING, COMPUTER VISION, AND RECONSTRUCTION

INDUSTRIAL APPLICATIONS

GRAPHICS, RENDERING, AND IMAGE SYNTHESIS

COMPUTING AND VISUALIZATION IN EDUCATION

QUANTUM COMPUTING SIMULATION

MACHINE LEARNING, NEURAL NETWORKS, FEATURE RECOGNITION

MANY-CORE COMPUTING IN PHYSICS AND OTHER FIELDS OF SCIENCE

The Wigner GPU Laboratory

The aim of the Wigner GPU Laboratory is to provide support for any fields in science in sense of parallel computing techniques, especially for faster numerical calculations in gravitational and high-energy physics, astronomy, astrophysics, material sciences, and detector simulations. We have started with GPU technologies in 2009, but later our aim was improved to any kind of parallel computing technology. Today, many- and multi-core, GPU, FPGA, Xeon Phi technologies are all available in the laboratory. Beside the academic environment and other institutes, we have connections to industrial partners as well.

History

- 2005-2008 Idea of using GPU in HEP calculations

  Starting of the WLCG Grid (ALICE & CMS) Tier-2 at the Wigner
- 2009 Discussion with GGB & P. Lévai & G. Debreczeni

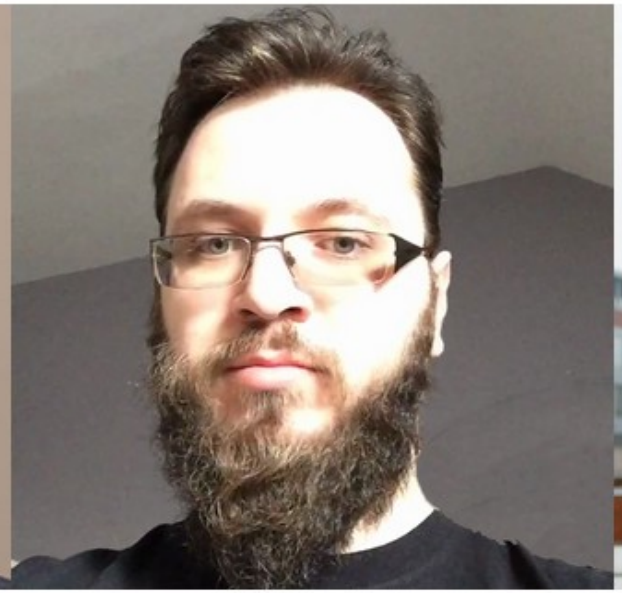
  2 main direction: HEP & Gravity
- **2010- 1st GPU Day & formation of the Wigner GPU Laboratory**

  Students: M. F. Nagy(-Egri) & D. Berényi
- 2010- GPU Day series
- 2016- Lectures on Modern Computing in Science series
- 2016- Wigner GPU Lab Fellowship
- **2021- Wigner Scientific Computational Laboratory** (TOP50 National Lab.)

The Staff

Barnaföldi, Gergely Gábor

LEADER OF THE LOCAL ALICE GROUP AND GPU LAB.



Kacskovics, Balázs

PHD STUDENT, ADMINISTRATOR

Szigeti, Balázs

MSC STUDENT, ADMINISTRATOR

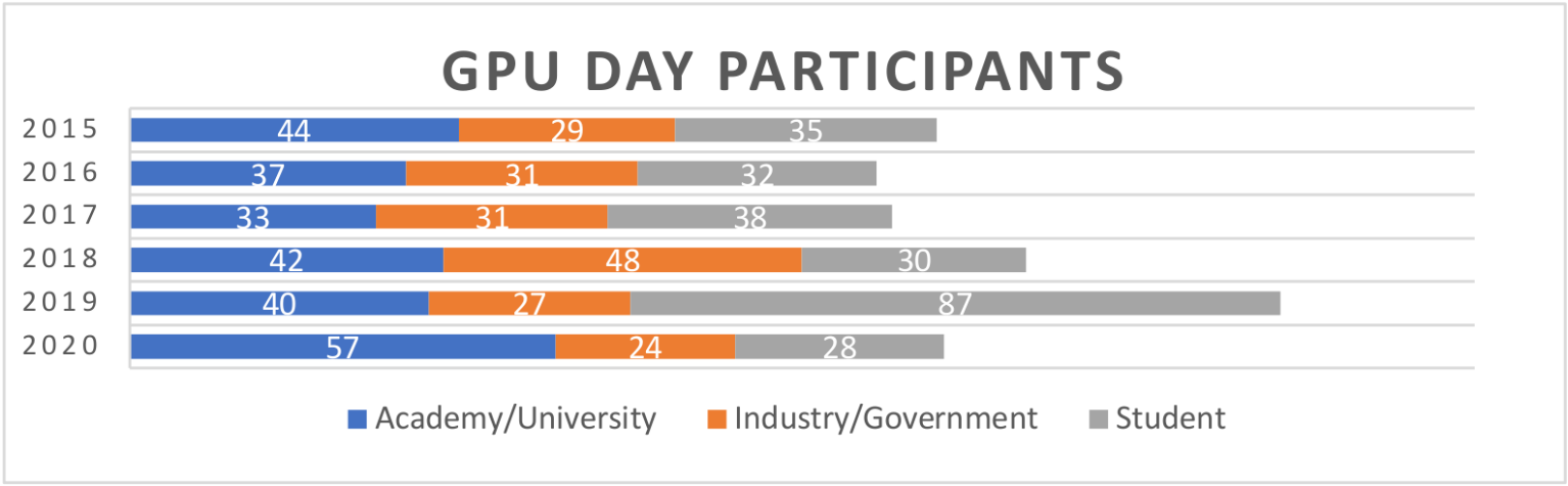
Bíró, Gábor

PHD STUDENT, ADMINISTRATOR

Academic & Industrial Partners

Results in numbers

- 6 Lectures on Modern Computing in Science
- 11 GPU Days



- 30 Wigner GPU Lab Fellowship
  - 18 finished fellowships
  - 12 running fellowships
- 30+ industrial & academic partners (Lombiq LTD, Ericsson, Khronos, CERN)
- 30+ scientific publications and program codes

Wigner GPU Day 2021 – gpuday.com

Programme for today/tomorrow

9:00 – 9:20 Opening Talk and Welcome by the Director
Péter Lévai , Gergely Gábor Barnaföldi

9:20 – 9:40 Space-ready FPGA hardware acceleration for .NET software – Hastlayer
Zoltán Lehóczky , Ernő Dávid

9:40 – 10:00 200+ GPUs in one HPC – available in months
Zoltán Kiss

10:00 – 10:40 Standards in HPC
Máté Nagy-Egri

10:40 – 11:00 Coffee Break

11:00 – 11:30 The GUARDYAN code for high fidelity nuclear reactor calculations
Dávid Légrády

11:30 – 11:50 Solving the Kuramoto Oscillator Model of Power Grids on GPU
Lilla Barancsuk

11:50 – 12:10 Particle Simulation of Resonant Nanoantennas for Laser Driven Fusion
István Papp

12:10 – 12:30 Accelerating Tridiagonal Solvers
István Reguly

12:30 – 14:00 Lunch Break

14:00 – 14:30 AI application in stellar spectroscopy
Viska Wei

14:30 – 15:00 Implementing Hierarchical Bayesian Networks on the GPU
Lázsló Dobos

15:00 – 15:20 Accelerating the solution of large number of delay differential equations with GPUs
Dániel Nagy

15:20 – 15:40 Mixed precision: when is it worth it?
Bálint Siklósi

15:40 – 16:00 Coffee Break

16:00 – 16:20 Laboratory observation of water surface polygon vortices
Ádám Kadlecsik

16:20 – 16:40 Hydrolysis of N,N-dimethylin dole-3-ethaniminium cation, the oxidized form of the endogenous psyche delic N,N-dimethyltryptamine
Károly Kubicskó

16:40 – 17:00 Parallel proton CT image re construction
Ákos Sudár

17:00 – 17:20 The challenges and methods of tuning the HIJING++ Monte Carlo event generator
Balázs Majoros

17:20 – 18:00 AlphaFold2 transmembrane protein structure prediction shines
Tamás Hegedűs

9:00 – 9:20 Social biases in AI
Balázs Keszthelyi

9:20 – 10:00 20 Years of Static Dataflow
Oskar Mencer

10:00 – 10:20 Boson sampling simulation enhanced by FPGA based data-flow engines
Peter Rakyta

10:20 – 10:40 Introduction to photonic quantum machine learning
Dániel Nagy

10:40 – 11:00 Coffee Break

11:00 – 11:40 CERN Quantum Technology Initiative unveils strategic roadmap shaping CERN's role in next quantum revolution
Michele Grossi

11:40 – 12:00 Application of Machine Learning tools in heavy-ion collisions at the Large Hadron Collider
Mallick Neelkamal

12:00 – 12:30 TBA
Yasser Omar

12:30 – 14:00 Lunch Break

14:00 – 18:00 AIME 2021

From tomorrow afternoon...

HEPTech AI²ME

CERN, WIGNER RCP together with the HEPTech Network are organizing the next

Artificial Intelligence
Academia-Industry Matching Event

Artificial Intelligence, Machine Learning
and those supported by Quantum Algorithms

Hybrid Workshop - 11,12 November 2021