

ACAT 2021



Monday, November 29, 2021 - Friday, December 3, 2021
Virtual and IBS Science Culture Center, Daejeon, South Korea

Scientific Program

Track 1: Computing Technology for Physics Research

This track includes topics that impact how we do physics analysis and research that are related to the enabling technology. Here is a fairly detailed list of possibilities (which isn't, of course, complete!).

Languages, Software quality, IDE and User Interfaces

Languages (new C++ standard, Java, ...), language interoperability, code portability

Software quality assurance; code reflection; documentation, performance and debugging tools

Computer system Benchmarking, beyond Linpack

IDE and frameworks

User Interfaces, Common Libraries.

Distributed and Parallel Computing

Multilevel parallelism

Distributed computing

GRID and Cloud computing

Architectures

New architectures

Massive Multicore

High Performance Computing

Accelerator-based computing (GPGPU's, FPGA's)

High and low precision floating-point (quad/octuple precision and short float for CUDA)

Virtualization

Containerization (shifter, remote scripting)

Hardware abstraction

Clouds

Networking

New TCP control and routing mechanism

Alternative to ethernet

Online computing

Advanced Monitoring, Diagnostics and Control

Scalable distributed data collectors

High Level Triggering (HLT)

Stream event processing & High Throughput Computing (HTC)

Track 2: Data Analysis - Algorithms and Tools

There are as many different algorithms and methods as there are physicists. Obviously, we can't list them all here, but here are some broad outlines of techniques that fit into this category. Of course, new and novel categories are part of what this conference is looking for.

Machine Learning

Neural Networks and Other Pattern Recognition Techniques

Evolutionary and Genetic Algorithms

Package Benchmarking

Automation of Science: Data to formula

Advanced Data Analysis Environments

Statistical Methods, Multivariate analysis

Data mining

Simulation, Reconstruction and Visualization Techniques

New algorithms for finding tracks, or other objects.

Detector and Accelerator Simulations, MC and fast MC

Reconstruction Algorithms
Visualization Techniques; event displays
Advanced Computing
Quantum Computing
Bio Computing: life process simulation, brain simulation, quantum biology

Track 3: Computations in Theoretical Physics: Techniques and Methods

This track focuses on computing techniques and algorithms used in the theoretical side of physics research.

Automatic Systems

Automatic Computation Systems: from Amplitudes to Event Generators

Multi-dimensional Integration: Methods and Tools

Intensive High Precision Numerical Computations: Algorithms and Systems

Higher Orders

Matching NLO and NNLO Calculations to Event Generators

Multi-loop Calculations and Higher Order Corrections

Computer Algebra Techniques and Applications

Computational Physics: Theoretical and Simulation Aspects

Lattice QCD

Cosmology, Universe Large Scale Structure, Gravitational Waves

Nuclear Physics N-body Computation

Plasma Physics

Earth Physics, Climate, Earthquakes