

# ACAT 2024



**Monday 11 March 2024 - Friday 15 March 2024**

**Charles B. Wang Center, Stony Brook University**

## Scientific Programme

## 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!).

Software

Language interoperability

Software development and quality

Analysis Libraries and tools

Computing

Distributed and parallel computing, including programming models

Architectures, from accelerators (GPU, ASIC, FPGA) to HPC

Floating-point models

Hardware abstractions

Online computing, including data transfer, High Level Triggering (HLT)

Advanced computing models such as Quantum Computing

Data

Data transfer, networking

Data formats and compression

Simulations and visualization

Detector and accelerator simulations, full and fast

Visualization techniques; event displays

## Track 2: Data Analysis - Algorithms and Tools

There are as many different algorithms and methods as there are physicists. New and novel categories of algorithms are part of what this conference is looking for.

Machine Learning

Neural network architectures and their applicability

Automation of science: data to formula

Hyperparameter tuning

Optimization and Deployment

Differentiable programming

Statistical methods

Novel reconstruction algorithms, such as for track finding

## Track 3: Computations in Theoretical Physics: Techniques and Methods

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 NNNLO Calculations to Event Generators

Multi-loop Calculations and Higher Order Corrections

Computer Algebra Techniques and Applications

Computational Physics: Theoretical and Simulation Aspects  
Cosmology, Universe Large Scale Structure, Gravitational Waves  
Nuclear Physics N-body Computation  
Plasma Physics  
Earth Physics, Climate, Earthquakes