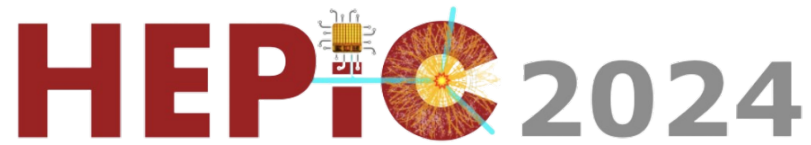# HEP-IC

Tuesday, 30 April 2024 - Thursday, 2 May 2024

Brookhaven National Laboratory

Scientific Programme

Guidelines for the overview talks:

Duration min 15' - max 25' including questions (exact time will be discussed and allocated to each group to allow groups with more activities the possibility to present them)

Contents need to address the following 4 points:
High-level review of recent projects broadly, including non-HEP applications;
New developments, efforts and plans. For example:
Exploration of a new technology node
Characterization of existing node under new conditions: eg. cryogenic
Newly available tools and techniques;
Existing collaborations with other labs and universities;
Barriers to collaboration and possible solutions.

Overview of group activities

Collaborating across institutions

Suggested topics:
The CERN experience,
Synergy with DRD and RDC mechanisms.

Roundtable: Open discussion on barriers and potential solutions related to:
Methods and rules for IP sharing,
Tools interoperability,
Acknowledgment of authorship,
Legal agreements

New development efforts, trends and plans

Suggested topics:
Monolithic pixels,
Trends in pixel readout chip designs for high rate and radiation,
Precision timing in HEP experiments,
Front-ends for extreme conditions,
Beyond-CMOS components for HEP,
Wide band-gap semiconductors,
Integrated silicon photonics,
Readout of quantum sensors, superconducting logic,
Role of AI in readout ASICs,
Circuits and devices for edge AI,
Digital-on-top SoC methodologies and HEP applications,
Microprocessor IPs and eFPGAs in scientific applications,
Verification IP development,
Trends in CAD tools, technologies, and foundry services,
Open source ASIC ecosystem.

Roundtable: Open discussion on common methodologies, technologies, advanced modeling

Collaborations and partnerships with other research agencies and industry

Suggested talks:
Talk from DOE,
Advantages for HEP from synergies with industry,
Working with National Labs.

Roundtable: Open discussion on barriers and potential solutions related to
CHIPS Act strategies for HEPIC,
Engagement with federal agencies (such as NIST),
Contracts with providers,
License agreements,
NDAs,
DOE external contracts (CRADA, WFO) approval processes

New collaborations and training initiatives

Suggested topics:
Report on the HEPIC internship program,
Training initiatives by commercial tool vendors,
Other training opportunities (such as EDIT),
Cross-institutional training and continuous education in ASIC design.

Roundtable: Open discussion on how to:
Revitalize the Design Community,
Where do the next generation of designers come from?
How do they get trained in the system aspects of our design needs?
How do we organize continuing education for our designers?
How to attract members who have a foot in both communities, so that as detector design ideas are being conceived there are experienced designers at the table to help bring perspectives and possibilities.

HEP IP database

Suggested topics:
Recent experience of inter-institutional projects,
Leveraging related efforts (such as by CERN).

Working session: Open discussion on possible ways to create a physical sharable database and legal and physical framework for a shared database