CHEP 2024: Preface to the Proceedings

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Abstract. The 27th International Conference on Computing in High Energy and Nuclear Physics (CHEP), organized by the AGH University of Science and Technology together with the Henryk Niewodniczanski Institute of Nuclear Physics Polish Academy of Sciences and Jagiellonian University, took place in Krakow, Poland, from 19–25 October 2024. The conference attracted around 500 registered participants from 33 different countries and 166 institutions. Scientific presentations were made over the five days of the conference. Twenty longer talks have been presented in plenary sessions; 350+ shorter talks have been presented in parallel sessions; and 140+ posters have been displayed, split over four dedicated sessions.

1 Foreword

It is with great pleasure that we present the Proceedings for the 27th CHEP conference. The Local Organizing Committee is deeply grateful to the Program Committee, Track Conveners, and International Advisory Committee for their exceptional support and guidance throughout this journey. The enthusiasm of the CHEP community for returning to in-person meetings was evident, and we sincerely appreciate the dedication and effort reflected in the conference presentations and these Proceedings. With approximately 500 participants, over 350 oral presentations, and more than 140 posters, CHEP 2024 was a resounding success for the High-Energy Physics community. We are thrilled to have hosted the CHEP community in Krakow, Poland, and we eagerly look forward to reconnecting at the next conference in Bangkok, Thailand, on May 25–29, 2026.

2 CHEP Conference Series

The CHEP conferences focus on computing, networking, and software challenges faced by the world's leading data-intensive science experiments, which analyse hundreds of petabytes of data using global computing resources. They serve as a unique forum where computing experts from Particle and Nuclear Physics come together to exchange knowledge and insights.

Since its inception in 1985, CHEP has been held approximately every 18 months. Table 1 provides a list of past conferences along with available URLs.

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Table 1. Dates and Locations of previous CHEP conferences.

Name	Dates	Location
CHEP'85	25–28 June 1985	Amsterdam, Netherlands
CHEP'87	2–6 February 1987	Asilomar, California, USA
CHEP'89	10–14 April 1989	Oxford, England, United Kingdom
CHEP'90	9–13 April 1990	Santa Fe, New Mexico, USA
CHEP'91	11–15 March 1991	Tsukuba, Japan
CHEP'92	21–25 September 1992	Annecy, France
CHEP'94	21–27 April 1994	San Francisco, California, USA
CHEP'95	18–22 September 1995	Rio de Janeiro, Brazil
CHEP'97	7–11 April 1997	Berlin, Germany
CHEP'98	31 August–4 September 1998	Chicago, Illinois, United States
CHEP'2000	7–11 February 2000	Padova, Italy
CHEP'01	3–7 September 2001	Beijing, China
CHEP'03	24–28 March 2003	San Diego, California, USA
CHEP'04	27 September–1 October 2004	Interlaken, Switzerland
CHEP'06	13–17 February 2006	Mumbai, India
CHEP'07	2–7 September 2007	Victoria, British Columbia, Canada
CHEP'09	21–27 March 2009	Prague, Czech Republic
CHEP'10	18–22 October 2010	Taipei, Taiwan
CHEP'12	21–25 May 2012	New York, New York, USA
CHEP'13	14–18 October 2013	Amsterdam, Netherlands
CHEP'15	13–17 April 2015	Okinawa, Japan
CHEP'16	10–14 October 2016	San Francisco, California, USA
CHEP'18	9–13 July 2018	Sofia, Bulgaria
CHEP'19	4–8 November 2019	Adelaide, Australia
vCHEP'21	17–21 May 2021	*Virtual* event hosted by CERN
CHEP'23	5–11 May 2023	Norfolk, Virginia

3 CHEP 2024 Conference

The CHEP 2024 conference was hosted by AGH University of Science and Technology (AGH) together with the Henryk Niewodniczanski Institute of Nuclear Physics Polish Academy of Sciences (IFJ PAN) and Jagiellonian University (UJ) and held at the Auditorium Maximum in Kraków, Poland. Running from 19–25 October 2024, the conference hosted roughly 500 attendees from 33 different countries. On the weekend before the main conference, October 19-20, the HEP Software Foundation Training took place as the Pre-CHEP Workshop. The focus of the CHEP conference continually adapts to emerging technologies and major scientific initiatives. Plenary sessions feature a diverse range of scientific and computing topics, fostering an engaging and insightful program for the community.

3.1 Program Details

The scientific program for CHEP'24 featured engaging morning plenary sessions throughout the week, nine parallel session tracks, and a thought-provoking panel discussion on disruptive computing technologies such as Quantum Computing and LLMs: "Will They Bring Disruptive Changes to HEP Computing?" A public lecture was hosted to introduce High-Energy Physics computing challenges to the local audience.

The plenary sessions featured 21 invited long talks, while the parallel sessions (Table 2) hosted more than 350 short talks, sparking lively discussions on the technical merits of various approaches. Additionally, more than 140 posters were showcased across four dedicated

Figure 1. Photo of Conference attendees taken at CHEP'24 in Krakow, Poland.

poster sessions. The conference concluded with a series of Track Summary presentations and the exciting announcement that CHEP 2026 will take place in Bangkok, Thailand, from May 25–29, 2026.

The CHEP'24 Conference site contains a record of the presentations, posters, and photos.

3.2 Organization

The CHEP conference is organized through a structured framework consisting of three key committees. The Program Committee (PC) which oversees the scientific content of the program. The International Advisory Committee provides valuable expertise and guidance to support the conference chairs. The Local Organizing Committee, which supports the PC in program development and manages local arrangements, including lodging, transportation, social events, and logistical aspects such as registration, scheduling, venue selection, and conference proceedings.

3.2.1 Program Committee

The Program Committee chairs (Table 3) play a pivotal role in the successful execution of a CHEP conference. Their responsibilities include:

- Defining the scientific structure of parallel sessions, guided by input from the International Advisory Committee and the local conference chairs. Collaborating with them to shape the overall conference structure, including plenary sessions and speaker selection.
- Proposing additional PC members to assist with abstract selection and the organization of parallel sessions.

Table 2. Parallel Session Tracks.

Track	Description / Keywords
Track 1: Data and Metadata Organization, Management and Access	Storage management frameworks; data access protocols; object, metadata and event store systems; content delivery and caching; data analytics; FAIR data principles; non-event data; data classification (including ML); online and offline databases; exabyte-scale datasets.
Track 2: Online and real-time computing	Data acquisition; triggers; streaming and trigger-less data acquisition; online calibration/reconstruction; real-time analysis; event building; configuration and access controls; detector control systems; real-time analytics and monitoring; trigger techniques and algorithms; hardware trigger algorithms; ML for triggers or outlier detection; accelerators and hybrid computing for online computing.
Track 3: Offline Computing	Offline reconstruction; detector calibration; detector geometries; data quality systems; data preparation; physics performance; compute accelerators and hybrid computing for offline; ML for offline computing/calibration/outlier detection; quantum algorithms and general quantum computing technologies.
Track 4: Distributed Computing	Grid middleware; monitoring and accounting frameworks; security models and tools; distributed workload management; federated authentication and authorisation infrastructures; middleware databases; software distribution and containers; heterogeneous resource brokerage.
Track 5: Simulation and analysis tools	Object identification; object calibration; analysis workflows; software for end-user analysis; ML in analysis workflows; lattice QCD; theory calculations; MC event generation; detector simulation; fast simulation (classic and ML); quantum simulation and algorithms.
Track 6: Collaborative software and maintainability	Collaborative software; sustainable software; software management, continuous integration; software building; testing and quality assurance; software distribution; programming techniques and tools; integration of external toolkits; Manuals and documentation; ML for documentation, LLMs.
Track 7: Computing Infrastructure	Opportunistic resources, orchestration of virtual machines and containers; cloud; HPC and exascale; networking; computing centre infrastructure; energy efficiency; cost of computing; management and monitoring; quantum networks.
Track 8: Collaboration, Reinterpretation, Outreach and Education	Collaborative tools; reinterpretation tools; analysis preservation and reuse; data preservation for collaboration; outreach activities; open data for education and training; training initiatives; event displays.
Track 9: Analysis facilities and interactive computing	Frameworks; infrastructure for interactive computing; applications and use-cases; experience with AF production systems and pilots; aspects of reproducibility in interactive computing.

- Overseeing the review and selection of abstracts, ensuring consistent standards of quality and relevance.
- Developing a track structure for selected talks and organizing sessions for accepted posters.
- Appointing Track Conveners.
- Managing the submission and review process for papers, appointing referees, monitoring the review system's use by Track Conveners, encouraging necessary revisions, and ensuring timely completion of peer reviews.

3.2.2 Track Conveners

The Track Conveners assist the Program Committee chairs by reviewing submissions before the conference, hosting parallel sessions during the event, and playing a crucial editorial role

Table 3. Program Committee Co-Chairs

Name	Affiliation
Katherine V. Ellis	Science and Technology Facilities Council (STFC)
Stephan Hageboeck	European Organization for Nuclear Research (CERN)
Markus Schulz	European Organization for Nuclear Research (CERN)
Dorothea vom Bruch	Aix Marseille Univ, CNRS/IN2P3, CPPM

in shaping these Proceedings afterwards. The list of Track Convenors is collected in Table 4.

Table 4. Track Conveners

Name	Affiliation	Name	Affiliation
Christina Agapopoulou	IJCLAB	Marilena Bandieramonte	Univ. of Pittsburgh
Marco Battaglieri	INFN-GENOVA	Daniela Bauer	Imperial College
Jake Bennett	Univ. of Mississippi	Lene K. Bryngemark	LU
Laura Cappelli	INFN Ferrara	James Catmore	Univ. of Oslo
Marta Czurylo	CERN	Giacomo De Pietro	KIT
Wouter Deconinck	Univ. of Manitoba	Matthew Feickert	Wisconsin
Tobias Fitschen	Univ. of Manchester	Henryk Giemza	NCBJ Warsaw
Nathan Grieser	Univ. of Cincinnati	Giovanni Guerrieri	CERN
Fabio Hernandez	CC-IN2P3/CNRS	Bruno Heinrich	Hoeft, KIT
Charis Kleio Koraka	Univ. of Wisconsin	Ruslan Mashinistov	BNL
Rosen Matev	CERN	Tigran Mkrtchyan	DESY
Lucia Morganti	INFN-CNAF	Kunihiro Nagano	KEK
Panos Paparrigopoulos	CERN	Flavio Pisani	CERN
Jonas Rembser	CERN	David Rohr	CERN
Enric Tejedor Saavedra	CERN	Gianfranco Sciacca	Univ. Bern
Nicole Skidmore	Univ. of Warwick	Sam Skipsey	Univ. of Glasgow
Nicolas Smith	FNAL	Tobias Stockmanns	FZJ (Julich)
Davide Valsecchi	ETH	Christoph Wissing	DESY

3.2.3 International Advisory Committee

The International Advisory Committee is a distinguished group of experts with experience from previous CHEP conferences. Their role is to provide valuable guidance to both the Program Committee and the Local Organizing Committee. The composition of the International Advisory Committee is shown in Table 5.

3.2.4 Local Organization Committee

The CHEP 2024 conference was chaired by Agnieszka Dziurda and Tomasz Szumlak. The chairs would like to thank the Local Organizing Committee (Table 6). The chairs would like to express their heartfelt gratitude to the Local Organizing Committee for their incredible effort in making this conference a success. Organizing an event of this scale is no small task, and your dedication, hard work, and attention to detail have truly made a difference. From the seamless logistics to the warm hospitality, engaging sessions, and smooth coordination, everything was exceptionally well-prepared. The chairs would like to thank also the Technical

Table 5. International Advisory Committee

Name	Affiliation	Name	Affiliation
Sang Un Ahn	KISTI	Mohammad Al-Turany	GSI
Julia Andreeva	CERN	Latchezar Betev	CERN
Ian Bird	CERN	Catherine Biscarat	L2IT (CNRS/IN2P3, UT3)
Tommaso Boccali	INFN Pisa	Amber Boehnlein	JLab
Concezio Bozzi	INFN Ferrara	David Britton	Glasgow
Simone Campana	CERN	Marco Cattaneo	CERN
Gang Chen	IHEP	Peter Clarke	Edinburgh
Caterina Doglioni	Univ. of Manchester	Peter Elmer	Princeton Univ.
Xavier Espinal	CERN	Alessandra Forti	Manchester
Patrick Fuhrmann	DESY	Gerardo Ganis	CERN
Maria Girone	CERN	Vladimir V. Gligorov	LPHNE and IN2P3/CNRS
Heather Gray	UC Berkeley/LBNL	David Groep	Nikhef
Takanori Hara	KEK	Benedict Hegner	CERN
Peter Hristov	CERN	Paul Jackson	Univ. of Adelaide
Michel Jouvin	IJCLab (CNRS/IN2P3)	Jerome Lauret	BNL
Paul Laycock	BNL	Pere Mato	CERN
Gonzalo Merino	PIC/CIEMAT	Niko Neufeld	CERN
Stefano Piano	INFN sez. Trieste	Danilo Piparo	CERN
Ghita Rahal	IN2P3/CNRS	Stefan Roiser	CERN
Chiara Ilaria Rovelli	INFN Rome	Elizabeth Sexton-Kennedy	FNAL
Oksana Shadura	Univ. of Nebraska-Lincoln	Lucia Silvestris	INFN Bari
Oxana Smirnova	Lund	Randall Sobie	Victoria
Graeme A. Stewart	CERN	Brad Sawatzky	JLab
Reda Tafirout	TRIUMF	Ikuo Ueda	KEK
Raffaella De Vita	INFN	Gordon Watts	Univ. of Washington
Torre Wenaus	BNL	Eric Yen	Academia Sinica

and Logistic Support team (Table 7) for ensuring everything ran smoothly! Your hard work behind the scenes made a huge difference in making this event a success. The chairs truly appreciate the dedication and efficiency of the Technical and Logistic Support team.

Table 6. Local Organizing Committee

Name	Affiliation
Agnieszka Dziurda (Co-chair)	IFJ PAN
Tomasz Szumlak (Co-chair)	AGH
Bartosz Baliś	AGH
Tomasz Bołd	AGH
Dominik Derendarz	IFJ PAN
Grzegorz Korcyl	UJ
Bartosz Mindur	AGH
Agnieszka Obłąkowska-Mucha	AGH
Bartłomiej Rachwał	AGH
Piotr Salabura	UJ

4 Sponsors

Primary support for the CHEP 2024 conference was provided by AGH University of Science and Technology, the Henryk Niewodniczanski Institute of Nuclear Physics Polish Academy of Sciences and Jagiellonian University. Additional support was provided by the EGI Foun-

Table 7. Technical and logistic support

Name	Affiliation
Anna Inglot	
Maciej Giza	IFJ
Wojciech Gomułka	AGH
Jakub Hajduga	AGH
Sabin Hashmi	AGH
Stefan Horodeński	AGH
Kamila Kalecińska	AGH
Piotr Libucha	AGH
Krzysztof Prościński	UJ
Anna Władyszewska	UJ

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Figure 2. Sponsors for CHEP'24.