CHEP 2019: Preface to the Proceedings

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Abstract. The 24th International Conference on Computing in High Energy and Nuclear Physics (CHEP) took place at the Adelaide Convention Centre, Adelaide, South Australia from 4–8 November 2019. 525 registered participants took part in the conference, where there were plenary sessions as well as a wide ranging set of ten parallel tracks across all areas of work in the field and allied sciences. The conference hosted 34 plenary presentations, 370 oral presentations in parallel sessions and 131 posters.

1 Foreword

In November of 2019, the 24th International Conference on Computing in High Energy and Nuclear Physics (CHEP) was held in Adelaide, South Australia. This signified the first iteration of the conference to be hosted in Australia.

Australia is, by just about anyone's measure of distance, a long way from everywhere else in the world. This is especially true with regards to the focal centres of the high energy and nuclear physics communities. Flying from Adelaide to CERN takes around 24 hours, with a similar time required to reach North America. Even travelling to relatively nearby Asia presents the challenge of sitting on a plane for 10 hours or more.

It was thus a great delight to welcome to Adelaide more than 540 people to participate in CHEP 2019, comprised of scientific delegates and accompanying persons. During the conference, the Adelaide weather of late spring granted long days of sunshine and a comfortable level of warmth, well before the more extreme heat of the Australian summer would commence. This yielded a pleasant atmosphere for delegates to enjoy the organised excursions, choosing to tour either the McLaren Vale wine region or Cleland Wildlife Park. After the completion of the conference, many overseas travellers visited the surrounding regions of South Australia, or journeyed interstate to explore other parts of Australia.

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Of course, at the time we did not know that for many this would be the last opportunity for international travel before world events would change everyone's lives. With the onset of the coronavirus pandemic, 2020 presented an entirely new set of challenges to all nations. The CHEP 2019 proceedings catalogue many diverse advances in knowledge, reminding us of the value that is generated by gathering in-person for a conference. This gives all the more reason to look forward to the next face-to-face meeting of the CHEP community in Norfolk, Virginia.

2 CHEP conference series

The CHEP conference series was established in 1985, and since then has been one of the most important events in the field of computing in high-energy and nuclear physics. The conference covers a broad set of topics such as online, offline and distributed computing; software development, simulation, reconstruction and analysis packages; data handling, data bases and storage solutions; clouds, virtualisation and containers; networking and facilities, including high performance computing. It provides a valuable discussion platform, enabling the exchange of ideas between physicists, computing scientists and software engineers, as well as between renowned experts and young researchers.

Focusing on the achievements, ongoing activities, plans, and trends in the field, the CHEP conference is held every 18 months. The host location is selected on a rotating basis between the geographical regions of Europe, the Americas, and Asia Pacific. The list of past CHEP conferences is shown in Table 1.

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

3 CHEP 2019 Conference

3.1 Venue

The CHEP 2019 conference was held at the Adelaide Convention Centre (pictured below).

3.2 Conference Programme

The programme for CHEP 2019 consisted of plenary sessions and 10 parallel tracks. In the plenary sessions, 18 scientific keynote talks were given covering state-of-the-art developments in HEP (LHC Experiments, Belle II, DUNE, JUNO); other data intensive experiments and systems (SKA, gravitational waves, real-time alert systems, computational chemistry); and key technological and strategic areas (quantum computing, artificial intelligence, cyberthreats and security, European Strategy Update). In addition, two sessions were organised on diversity and inclusivity. There were 10 track highlight talks as well as a presentation from the organisers of the next face-to-face CHEP conference, which will be hosted in Norfolk, Virginia, USA.

In the parallel programme the keywords associated with Tracks 1-9 are shown in Table 2. Track X, so named for being a cross-over track and the tenth parallel track, was specially constructed from papers that had themes of common interest between Tracks 1, 2 and 9. 370 oral presentations were given in the parallel sessions. 131 posters were presented with 2 dedicated poster sessions taking place.

Table 2: CHEP 2019 Parallel Tracks

	Name	**Keywords**
1	Online and Real-time Computing	Data acquisition; high-level triggers; trigger-less acquisition; online data calibration; online reconstruction; machine learning for online; real-time analysis; event building; configuration and access controls; detector control systems; real-time analytics and monitoring; heterogeneous resources online; trigger techniques and algorithms; hardware trigger algorithms; online databases
2	Offline Computing	Detector simulation; MC event generation; offline reconstruction; detector geometries; non-event data; data classification; fast simulation; machine learning for offline; offline databases
3	Middleware and Distributed Computing	Grid middleware; monitoring and accounting frameworks; security models and tools; distributed workload management; heterogeneous resource brokering (such as GPUs); federated authentication and authorisation infrastructures; middleware databases
4	Data Organisation, Management and Access	Storage management frameworks; data access protocols; object, metadata and event store systems; content delivery and caching; data analytics; machine learning for DOMA; FAIR data principles
5	Software Development	Software frameworks; software management, continuous integration; software building; testing and quality assurance; software distribution; programming techniques and tools; coding for heterogeneous architectures; integration of ML and other toolkits
6	Physics Analysis	Analysis algorithms; object identification; object calibration; machine learning for analysis; analysis preservation; analysis workflows; lattice QCD; theory calculations
7	Facilities, Clouds and Containers	Cloud resources; virtual machines and container technologies; anything-as-a-service; private and commercial clouds; dynamic provisioning; networking; computing centre infrastructure; management and monitoring; facility integration of heterogeneous resources
8	Collaboration, Education, Training and Outreach	Collaborative tools; outreach activities; training initiatives; open data for outreach; data preservation for collaboration; event displays; open science cloud initiatives
9	Exascale Science	HPC and supercomputers; algorithm scaling; computing models; exabyte; exaflop; compute accelerators; generic algorithms; weak scaling; quantum computing; massive scale machine learning
X	Crossover sessions from online, offline and exascale	Selected contributions that were identified as of common interest, touching topics between online, offline and exascale computing (Tracks 1, 2 and 9)

3.3 Programme Committee

The CHEP 2019 Programme Committee (PC) developed the parallel sessions with appointed track conveners, who provided their expertise to review the papers submitted to the conference. The plenary programme was defined by the conference and PC chairs, in consultation with the International Advisory Committee (IAC). The PC members are listed in Table 3.

Table 3: CHEP 2019 Programme Committee

Name	**Affiliation**
Alessandra Forti	Manchester
Brian Paul Bockelman	Morgridge Institute for Research
Caterina Doglioni (PC Co-chair)	Lund
Catherine Biscarat	CNRS/IN2P3
Chiara Rovelli	INFN Roma
Christoph Wissing	DESY
Christopher Pinkenburg	BNL
Chunhua Li	LiaoNing Normal University
Clara Nellist	Göttingen
Dimitri Arkhipkin	BNL
Doris Kim (PC Co-chair)	Soongsil
Fabio Hernandez	CC-IN2P3
Felice Pantaleo	CERN
Graeme A Stewart (PC Co-chair)	CERN
Ilya Komarov	DESY
Isabel Campos Plasencia	CSIC
James Letts	UCSD
Jennifer Ngadiuba	CERN
Juan Guzman	CSIRO
Lauren Tompkins	Stanford
Lucia Silvestris (PC Co-chair)	INFN Bari
Martin Ritter	LMU München
Marzena Lapka	CERN
Maurizio Pierini	CERN
Mihaela Gheata	Institute of Space Science
Oksana Shadura	Nebraska-Lincoln
Paul Laycock	BNL
Phiala Shanahan	MIT
Sang-Un Ahn	KISTI
Sofia Vallecorsa	CERN
Stefan Roiser	CERN
Steven Farrell	NERSC
Steven Schramm	Geneva
Teng Jian Khoo	Geneva
Tibor Šimko	CERN
Tigran Mkrtchyan	DESY
Tomoe Kishimoto	Tokyo
Wei Yang	SLAC
Xavier Espinal	CERN
Yu Nakahama Higuchi	Nagoya

3.4 International Advisory Committee

The CHEP 2019 International Advisory Committee provided essential strategic advice for the organisation of the event and the members of the IAC are listed in Table 4. The CHEP 2019 IAC met 12 times, including one meeting held after the conference itself.

Table 4: CHEP 2019 International Advisory Committee

Name	**Affiliation**
Alessandra Forti	Manchester
Amber Boehnlein	JLab
Andreas Wicenec	UWA/ICRAR
Concezio Bozzi	INFN Ferrara
David Britton	Glasgow
David Groep	Nikhef
Davide Costanzo	Sheffield
Caterina Doglioni (PC Co-chair)	Lund
Doris Kim (PC Co-chair)	Soongsil
Elizabeth Sexton-Kennedy	FNAL
Gang Chen	IHEP
Ghita Rahal	CC-IN2P3
Gonzalo Merino	Wisconsin
Gordon Watts	Washington
Graeme A Stewart (PC Co-chair)	CERN
Hannah Short	CERN
Heather Gray	UC Berkeley/LBNL
Ian Bird	CERN
Ikuo Ueda	KEK
Jerome Lauret	BNL
Josep Flix	PIC/CIEMAT
Julia Andreeva	CERN
Latchezar Betev	CERN
Lucia Silvestris (PC Co-chair)	INFN Bari
Maarten Litmaath	CERN
Marco Cattaneo	CERN
Maria Girone	CERN
Markus Klute	MIT
Michel Jouvin	IN2P3 - Orsay
Michel Vetterli	Simon Fraser/TRIUMF
Minh Huynh	UWA/ICRAR-CSIRO
Mohammad Al-Turany	GSI
Niko Neufeld	CERN
Oxana Smirnova	Lund
Patrick Fuhrmann	DESY
Peter Clarke	Edinburgh
Peter Elmer	Princeton
Peter Hristov	CERN
Petya Vasileva	CERN
Randall Sobie	Victoria
Richard Mount	SLAC

Table 4: CHEP 2019 International Advisory Committee

Name	Affiliation
Sang Un Ahn	KISTI
Simon Lin	Academia Sinica
Simone Campana	CERN
Takanori Hara	KEK
Tommaso Boccali	INFN Pisa
Torre Wenaus	BNL
Vasil Georgiev Vasilev	Princeton
Wahid Bhimji	NERSC/LBNL
Xiaomei Zhang	IHEP

3.5 Local Organisation

The CHEP 2019 conference was chaired by Paul Jackson and Waseem Kamleh. The chairs wish to thank the secretariat, Sharon Johnson and Silvana Santucci, for their tremendous work in ensuring the organisation of the conference ran smoothly. Valuable assistance was provided by the members of the local organising committee, listed in Table 5.

Table 5: CHEP 2019 Local Organising Committee

Name	Affiliation
Anthony Thomas	Adelaide
Anthony Williams	Adelaide
Derek Leinweber	Adelaide
Jacinda Ginges	UQ
James Zanotti	Adelaide
Martin Sevior	Melbourne
Martin White	Adelaide
Paul Jackson (co-chair)	Adelaide
Peter Skands	Monash
Ross Young	Adelaide
Waseem Kamleh (co-chair)	Adelaide

3.6 Proceedings Reviewers

In addition to the programme committee members, listed in Table 3, we are very grateful to many members of the HEP community who helped review the papers that were submitted to this issue of the proceedings. The full list of reviewers is: Alaettin Serhan Mete, Alessandra Forti, Alex Martyniuk, Amol Jaikar, Andrea Perrotta, Andrea Sciabà, Andreas Gellrich, Andrzej Bożek, Anna Sfyrla, Antonio Di Pilato, Antonio Pérez-Calero Yzquierdo, Archana Sharma, Aristeidis Fkiaras, Arturo Sánchez, Attila Krasznahorkay, Bokrae Jung, Brian Bockelman, Byungyun Kong, Carlos Lourenco, Caterina Doglioni, Catrin Bernius, Cecilia Uribe Estrada, Chiara Rovelli, Christian Voss, Christoph Wissing, Christophe Haen, Christopher Pinkenburg, Christos Leonidopoulos, Chunhua Li, Clara Nellist, Concezio Bozzi, Costin Grigoras, Daniel Hackett, David Bouvet, David Lange, David Rohr, Diego Davila Foyo, Diogo Castro, Dmitri Smirnov, Dimitri Arkhipkin, Doris Yangsoo Kim, Dorothea Vom Bruch, Edgar Fajardo, Eileen Kuehn, Enric Tejedor, Fabio Cossutti,

Fabio Hernandez, Farrukh Kahn, Federico Stagni, Felice Pantaleo, Frank Meier, Frank Winklmeier, Geonmo Ryu, Ghita Rahal, Graeme A Stewart, Hadrien Grasland, Hannah Short, Igor Sfiligoi, Ikuo Ueda, Ilya Komarov, Imma Riu, Isabel Campos Plasencia, Jakob Blomer, James Letts, Jason Webb, Javier Montejo Berlingen, Jean-Roch Vlimant, Jennifer Ngadiuba, Jeny Teheran, Jeongheon Kim, Jesus Puerta Pelayo, Jin Kim, Joao Fernandes, Juan Guzman, Julia Andreeva, Justas Balcas, Kenneth Bloom, Kenyi Hurtado Anampa, Kilian Lieret, Kilian Schwarz, Kunihiro Nagano, Lauren Tompkins, Lea Morschel, Lucia Silvestris, Luisa Arrabito, Maarten Litmaath, Manuel Giffels, Marco Mascheroni, Markus Prim, Martin Ritter, María Acosta Flechas, Masahiko Saito, Matthew Barrett, Maurizio Pierini, Max Fischer, Maxim Potekhin, Mihaela Gheata, Nicola Hardi, Oksana Shadura, Oxana Smirnova, Patricia Conde Muino, Paul Laycock, Paul Nilsson, Peter Love, Phiala Shanahan, Philippe Charpentier, Piotr Traczyk, Rene Caspart, Riccardo Di Maria, Riccardo Maria Bianchi, Rizart Dona, Ross Young, Ryu Sawada, Sandro Wenzel, Sang Un Ahn, Sang-Ho Na, Sangwook Bae, Sebastian Lopienski, Sergey Padolski, Simon George, Sioni Paris Summers, Sofia Vallecorsa, Sonia Natale, Stefan Roiser, Stefan Wunsch, Stefania Xella, Steven Farrell, Steven Goldfarb, Steven Schramm, Stewart Martin-Haugh, Sviatoslav Bilokin, Sébastien Gadrat, Teng Jian Khoo, Thomas Hartmann, Tibor Šimko, Tigran Mkrtchyan, Tim Smith, Tomoe Kishimoto, Torre Wenaus, Vasil Georgiev Vasilev, Vyacheslav Krutelyov, Wahid Bhimji, Walter Lampl, Wei Yang, Xavier Espinal, Xavier Valls Pla, Yu Nakahama Higuchi, Yuji Kato, Ziheng Chen.

Sponsors

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