



20th ECMWF workshop on high performance computing in meteorology

Programme

Monday Agenda

Location: Tecnopolo di Bologna

Agenda time displays according to the selected time zone.

The selected timezone is Europe/London

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| 13:00 to 17:00 | Today's programme is not being livestreamed. | |
| 13:30 to 14:00 | Arrival and registration | |
| 14:00 to 14:30 | Opening remarks by Dr Florence Rabier, ECMWF Director-General and invited guests: <ul style="list-style-type: none">• Presidente Stefano Bonaccini (President of the Regione)• Magnificent Rector, prof. Giovanni Molari (Rector of University of Bologna)• Professor Francesco Ubertini (President of Cineca) | |
| 14:30 to 14:50 | Presentation and discussion around the ECMWF High-Performance Computing System and the European Weather Cloud: The ECMWF High Performance Computing Facility Presentation slides | Oliver Treiber (ECMWF) |
| 15:10 to 16:10 | Tour of the computer hall | |
| 14:50 to 15:10 | Presentation and discussion around the ECMWF High-Performance Computing System and the European Weather Cloud: Implementation of the Production European Weather Cloud Presentation slides | Xavier Abellan (ECMWF) Stig Telfer (StackHPC Ltd) |
| 16:20 to 17:20 | Panel discussion on the topic of “Diversifying HPC” chaired by Antonio Navarra Invited speakers will debate the various challenges and opportunities facing the HPC community. Panellists: <ul style="list-style-type: none">• Katherine Evans (Oak Ridge National Laboratory)• Utz-Uwe Haus (HPE HPC EMEA Research Lab)• Peter Messmer (NVIDIA)• Sheri Mickelson (NCAR) | |
| 17:20 to 17:30 | Group photo | |

17:30 to 19:30

Aperitif and buffet dinner

Transport to town centre

Tuesday Agenda

Location: San Domenico

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| 08:00 to 11:50 | Morning session Chair: Balthasar Reuter | |
| 08:00 to 09:00 | Keynote: Modular Supercomputing: enabling application diversity in HPC Presentation slides Video recording | Estela Suarez (Forschungszentrum Juelich, Juelich Supercomputing Centre) |
| 09:00 to 09:15 | Coffee break | |
| 09:15 to 09:30 | Digital Twins of the Earth system Presentation slides Video recording | Thomas Geenen (ECMWF) |
| 09:30 to 09:55 | Technical Challenges of deploying and running future Destination Earth Twins Presentation slides Video recording | Utz-Uwe Haus (HPE) Craig Prunty (SiPearl) |
| 09:55 to 10:20 | Destination Earth, Data Spaces and a European Cloud Federation: opportunities and challenges Presentation slides Video recording | Charalampos Tsitlakidis (European Commission - DG CONNECT) |
| 10:20 to 10:45 | The Earth-2 Service Architecture Presentation slides Video recording | Peter Messmer (NVIDIA) |
| 10:45 to 11:00 | Comfort break | |
| 11:00 to 11:25 | Machine learning at ECMWF Presentation slides Video recording | Matthew Chantry (ECMWF) |

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| 11:25 to 11:50 | AI for Simulation: Accelerating HPC with AI and IPUs Presentation slides Video recording | Alexander Titterton (Graphcore) |
| 11:50 to 13:10 | Lunch break | |
| 13:10 to 17:10 | Afternoon session Chair: Martin Palkovic | |
| 13:10 to 13:35 | Met Office HPC Update Presentation slides Video recording | Paul Selwood (Met Office) |
| 13:35 to 14:00 | IFShub - An integrated web interface to IFS developer workflow Presentation slides Video recording | Paul Burton (ECMWF) |
| 14:00 to 14:25 | Earth system modeling on Modular Supercomputing Architectures: coupled atmosphere-ocean simulations with ICON Presentation slides Video recording | Olaf Stein (Research Centre Juelich) |
| 14:25 to 14:50 | Coffee break | |
| 14:50 to 15:15 | The concept of NCAR's community software facility Presentation slides Video recording | Thomas Hauser (National Center for Atmospheric Research) |
| 15:15 to 15:40 | LFRic and NGMS: Meeting challenges of exascale through diversifying HP Presentation slides Video recording | Iva Kavčič (Met Office) |
| 15:40 to 16:05 | Exascale Computing for Meteorology Presentation slides Video recording | Ilene Carpenter (HPE) |
| 16:05 to 16:20 | Comfort break | |
| 16:20 to 16:45 | Towards Diversified Exascale Numerical Weather Prediction Workflows Presentation slides Video recording | Christopher Harrop (CIRES, University of Colorado and NOAA Global Systemes Laboratory) |

16:45 to 17:10

**ICON on its Way to Exascale - Status
and Next Steps**

[Presentation slides](#)

[Video recording](#)

Claudia Frauen (German Climate
Computing Center (DKRZ))

Wednesday

Agenda

Location: San Domenico

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| | | |
|----------------|---|--|
| 07:45 to 11:50 | Morning session Chair: Chris Kitchen | |
| 07:45 to 08:45 | Keynote: Leveraging diversity in all dimensions to predict multiscale meteorology and its impacts Presentation slides Video recording | Katherine Evans (Oak Ridge National Laboratory) |
| 08:45 to 09:30 | Coffee break | |
| 09:30 to 09:55 | HPC update for Australian Bureau of Meteorology Presentation slides Video recording | Adam Smith (Bureau of Meteorology) |
| 09:55 to 10:20 | Diverse Aspects of Computing at DWD Presentation slides Video recording | Ulrich Schättler (DWD) |
| 10:20 to 10:45 | Embracing Diversity and Democratizing High-Performance Computing: Cultivating Inclusion and Driving Innovation Presentation slides Video recording | Mthetho Sovara (Centre for High Performance Computing) |
| 10:45 to 11:00 | Comfort break | |
| 11:00 to 11:25 | A Deep Dive into DPU Computing - Addressing HPC Performance Bottlenecks Presentation slides Video recording | Richard Graham (NVIDIA) |
| 11:25 to 11:50 | Numerical Weather prediction at MeteoSwiss using ICON on GPUs Presentation slides Video recording | Xavier Lapillonne (MeteoSwiss) |

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| 11:50 to 13:10 | Lunch break | |
| 13:10 to 17:10 | Afternoon session Chair: Ioan Hadade | |
| 13:10 to 13:35 | Foundation Model in Earth Science: Towards Atmospheric Prediction and Analysis Presentation slides Video recording | Sujit Roy (University of Alabama in Huntsville; NASA MSFC) |
| 13:35 to 14:00 | Code refactoring patterns targeting bandwidth optimized architectures and heterogeneous architectures Presentation slides Video recording | Jacob Poulsen (Intel) |
| 14:00 to 14:25 | Performance Optimization of ECTrans on AMD GPUs Presentation slides Video recording | Paul Mullaney (AMD) |
| 14:25 to 14:50 | Coffee break | |
| 14:50 to 15:10 | Hybrid 2024: Adapting IFS for a hybrid CPU-GPU architectures Presentation slides Video recording | Michael Lange (ECMWF) |
| 15:10 to 15:30 | GPU adaptation of NWP single column algorithms Presentation slides Video recording | Michael Staneker (ECMWF) |
| 15:30 to 15:50 | Automating GPU adaptation of NWP single column physics using Loki Presentation slides Video recording | Ahmad Nawab (ECMWF) |
| 15:50 to 16:10 | Heterogeneous HPC to the rescue? Ways to improve the energy efficiency of climate simulations today and tomorrow Presentation slides Video recording | Jan Frederik Engels (German Climate Computing Center (DKRZ)) |
| 16:10 to 16:35 | Integrated Forecasting System Performance Optimisation Presentation slides Video recording | Richard Graham (NVIDIA) |

16:35 to 17:00

**Performance Portability and
Programmability in the Evolution of Weather
Codes Towards Heterogeneous Platfoms**
[Presentation slides](#)
[Video recording](#)

Camilo Moreno (Intel
Corporation)

17:30 to 20:00

Dinner at Cantina Bentivoglio
Starting at 18:30 at
Via Mascarella 4/b
40126 Bologna

Thursday Agenda

Location: San Domenico

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| 08:00 to 13:05 | Morning session Chair: Cristina Duma | |
| 07:45 to 08:45 | Keynote: ML for High-Performance Climate: Massive Data Post Processing, Extreme Compression, and Earth Virtualization Engines Presentation slides Video recording | Torsten Hoefler (ETH Zurich) |
| 08:45 to 09:30 | Coffee break | |
| 09:30 to 09:55 | Best Practices for NWP in the cloud Presentation slides Video recording | Timothy Brown (Amazon Web Services) |
| 09:55 to 10:20 | Exploration of public cloud computing by an operational site running the Unified Model Presentation slides Video recording | Jeff Zais (NIWA) |
| 10:20 to 10:45 | Weather forecasting on the cloud: an evaluation of IFS performance on Azure HPC instances Presentation slides Video recording | Cathal O'Brien (ECMWF) |
| 10:45 to 11:00 | Comfort break | |
| 11:00 to 11:25 | Enabling Elastic Cloud Integration with Kubernetes Presentation slides Video recording | Timothy Whitcomb (US Naval Research Laboratory) |
| 11:25 to 11:50 | Designing sustainable buildings globally with Hybrid-cloud Presentation slides Video recording | Niall Kennedy (YellowDog) |

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|----------------|--|--|
| 11:50 to 13:05 | Lunch break | |
| 13:10 to 17:10 | Afternoon session Chair: Thomas Geenen | |
| 13:10 to 13:35 | Diversifying Your HPC Technology with Azure: A New Era of Scientific Computing Presentation slides Video recording | Mike Kiernan (Microsoft) |
| 13:35 to 14:00 | New Generation HPC for CMA Presentation slides Video recording | Shuai Deng (National Meteorological Information Centre) |
| 14:00 to 14:25 | Optimization of the Digital Twins for Weather and Climate Predictions: an exciting battleground Presentation slides Video recording | Stella Paronuzzi Ticco (BSC) |
| 14:25 to 14:50 | Coffee break | |
| 14:50 to 15:10 | Project Rajin and UXarray: community tools for the analysis of kilometer scale climate and weather model output Presentation slides Video recording | John Clyne (National Center for Atmospheric Research (NCAR)) |
| 15:10 to 15:30 | Seeking portability and productivity for future NWP code with GT4Py Presentation slides Video recording | Christian Kühnlein (ECMWF) |
| 15:30 to 15:50 | GT4Py: A Python framework for weather and climate applications Presentation slides Video recording | Till Ehrenguber (CSCS / ETH Zurich) |
| 15:50 to 16:10 | Pace: A GPU-enabled implementation of FV3GFS using GT4Py Presentation slides Video recording | Oliver Elbert (NOAA) |
| 16:10 to 16:20 | Comfort break | |
| 16:20 to 17:10 | Poster session | |

Friday Agenda

Location: San Domenico

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|----------------|--|---|
| 08:00 to 13:00 | Morning session Chair 1 (9:00-11:45): Sam Hatfield Chair 2 (12:00-14:00) Patrick Gillies | |
| 07:45 to 08:10 | Updates of HPC in Japan Meteorological Agency Presentation slides Video recording | Eizi Toyoda (Japan Meteorological Agency) |
| 08:10 to 08:30 | Domain Specific Language Adoption into NASA's Goddard Earth Observing System code Presentation slides Video recording | Christopher Kung (NASA / SAIC) |
| 08:30 to 08:50 | Transforming Weather and Climate Code with Psyclone Presentation slides Video recording | Sergi Siso (STFC Hartree Centre) |
| 08:50 to 09:10 | Parallel Software Framework of MCV Model Presentation slides Video recording | Qingu Jiang (CMA Earth System Modeling and Prediction Centre) |
| 09:10 to 09:55 | Coffee break | |
| 09:55 to 10:20 | Computation Storage as seen from the Excalidata project Presentation slides Video recording | Jean-Thomas Acquaviva (DDN Storage) |
| 10:20 to 10:45 | Save Up to 260 CO2e per PB with the WEKA Data Platform Presentation slides Video recording | Derek Burke (WEKA) |
| 10:45 to 11:00 | Comfort break | |

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| 11:00 to 11:25 | I/O management at NCEP. Problems and Progress Presentation slides Video recording | George Vandenberghe (NOAA/NCEP) |
| 11:25 to 11:50 | MME REP: Climate Data Records and EO data processing in a server-less computing paradigm Presentation slides Video recording | Salvatore Pinto (EUMETSAT) |
| 11:50 to 12:00 | Comfort break | |
| 12:00 to 12:25 | MultIO: A framework for message-driven data routing in high-resolution weather and climate modelling Presentation slides Video recording | Domokos Sarmany (ECMWF) |
| 12:25 to 12:50 | EarthWorks: The computational and engineering challenges faced when building a global storm-resolving resolution modeling system Presentation slides Video recording | Sheri Mickelson (NCAR) |
| 12:50 to 13:00 | Closing remarks Video recording | Martin Palkovic (ECMWF) |