



# **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

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

17:30 to 19:30

**Aperitif and buffet dinner**

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**Transport to town centre**

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# Tuesday Agenda

## Location: San Domenico

Agenda time displays according to the selected time zone.

### The selected timezone is Europe/London

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

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

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# Wednesday

## Agenda

### Location: San Domenico

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### The selected timezone is Europe/London

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

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



16:35 to 17:00

**Performance Portability and  
Programmability in the Evolution of Weather  
Codes Towards Heterogeneous Platforms**

Camilo Moreno (Intel  
Corporation)

[Presentation slides](#)

[Video recording](#)

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17:30 to 20:00

**Dinner at Cantina Bentivoglio**

Starting at 18:30 at

Via Mascarella 4/b

40126 Bologna

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# Thursday Agenda

## Location: San Domenico

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### The selected timezone is Europe/London

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

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

# Friday Agenda

## Location: San Domenico

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### The selected timezone is Europe/London

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

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