



EuroHPC Summit Week 2022



LUMI/CSC exa/post exa-scale system visions Dr. Fredrik Robertsén



From **22 to 24 March 2022** | Paris, France

#EHPCSW

#PRACEdays



LUMI

- LUMI-C in operation, 1536 CPU nodes
- LUMI-G arriving, 2560 Nodes with 4 MI250X GPUs, and 1 CPU
 - 375 Pflop HPL (commitment)
- Exascale architecture
 - Same as Frontier at ORNL
 - HPL Exaflop achievable if you throw money at it
 - About 3x more GPUs
 - 3x more power consumption, 25-30 MW





The site

- Hosted in an old paper mill in Kajaani, Finland
- 200 MW site power, 100% hydroelectric
 - Lumi uses less than 10 MW
 - Do we want to use more?
- Free cooling, ~2C mean temperature
 - Waste heat reuse
- Can host far larger machines than LUMI
 - Some construction likely needed





LUMI future

- Lumi is a 5-year project, we do not have any concrete plans for the hardware of the successor yet
 - 2026 ->, post exa-scale
- Far more heterogeneous
 - Different accelerators/partitions for different tasks
 - Multiple “strong” partitions
 - Application performance should be the main driver
 - Tighter CPU to GPU/accelerator integration
 - Composable hardware
- Workflows spanning multiple partitions





LUMI-Quantum

- LUMI aims at being one of the central European hubs for hybrid HPC/QC
- Quantum computers are now being integrated with LUMI
 - **NordlQuEst**: Nordic/Estonian quantum computers and resources
 - **FiQCI**: Additional QC resources through national investments
- **Distributed approach** allows for truly pan-European collaboration with **pooling of resources/talent and exchange of know-how**

