

2025 33rd Euromicro International Conference on Parallel, Distributed, and Network-Based Processing (PDP 2025)

**Turin, Italy
12-14 March 2025**



**IEEE Catalog Number: CFP25169-POD
ISBN: 979-8-3315-2494-4**

**Copyright © 2025 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP25169-POD
ISBN (Print-On-Demand):	979-8-3315-2494-4
ISBN (Online):	979-8-3315-2493-7
ISSN:	1066-6192

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2025 33rd Euromicro International Conference on Parallel, Distributed, and Network-Based Processing (PDP) **PDP 2025**

Table of Contents

Message from the General Chairs	xvi
Organizing Committee	xvii
Program Committee	xviii
Best Paper Awards	xxiv

Main Track

Utilizing Network Hardware Parallelism for MPI Partitioned Collective Communication	1
<i>Yiltan Hassan Temuçin (Queen's University, Canada), Amirreza Barati Sedeh (Queen's University, Canada), Whit Schonbein (Sandia National Laboratories, USA), Ryan E. Grant (Queen's University, Canada), and Ahmad Afsahi (Queen's University, Canada)</i>	
Parallel Median Filter with Arbitrary Window Size and Image Depth	9
<i>Moreno Marzolla (University of Bologna, Italy), Michele Ravaioli (University of Bologna, Italy), and Elena Loli Piccolomini (University of Bologna, Italy)</i>	
Deploy, But Verify: Analysing LLM Generated Code Safety	13
<i>Rasmus Krebs (Copenhagen Business School, Denmark) and Somnath Mazumdar (Copenhagen Business School, Denmark)</i>	
Execution Time Optimization for Pipeline Deep Network Training on Multiple GPUs	17
<i>Bing-Jou Wu (National Taiwan University, Taiwan), Ding-Yong Hong (Academia Sinica, Taiwan), Pangfeng Liu (National Taiwan University, Taiwan), and Jan-Jan Wu (Academia Sinica, Taiwan)</i>	
Portable, High Performance Matrix Multiplication Micro-Kernels for RISC-V with EXO	25
<i>Adrián Castelló (Universitat Politècnica de València, Spain), Héctor Martínez (Universidad de Córdoba, Spain), Sandra Catalán (Universitat Jaume I de Castellón, Spain), Jie Lei (Universitat Politècnica de València, Spain), Yuka Ikarashi (MIT CSAIL, USA), Grace Dinh (Cornell University, USA), Francisco D. Igual (Universidad Complutense de Madrid, Spain), and Enrique S. Quintana-Ortí (Universitat Politècnica de València, Spain)</i>	
HiPerConTracer 3.0: Transport-Level Packet Routing Analysis Tool	33
<i>Thomas Dreibholz (Simula Metropolitan Centre for Digital Engineering, Norway) and Somnath Mazumdar (Copenhagen Business School, Denmark)</i>	

CNS Lock: Compact NUMA-Aware Lock with a Standard Interface	42
<i>Brahmaiah Gandham (Mahindra University, India) and Praveen Alapati (Mahindra University, India)</i>	
Fast and Energy-Efficient N-Body Simulation on FPGA through High-Level Synthesis	50
<i>Paolo Palazzari (ENEA, Italy), Marco Faltelli (ENEA, Italy), Francesco Iannone (ENEA, Italy), and Francesco Pascarella (ENEA, Italy)</i>	
Order, Unite, and Conquer: A Group Formulation for Multi-Armed Bandits in Microservice Provisioning	58
<i>João Vitor Bruniera Labres (Telecommunications Research and Development Center (CPQD), Brazil), Paulo Silas Severo de Souza (Federal University of Pampa (UNIPAMPA), Brazil), Deborah Victória Lima Moreira (Telecommunications Research and Development Center (CPQD), Brazil), Paulo Ricardo Branco da Silva (Telecommunications Research and Development Center (CPQD), Brazil), Michel Bernardo de Paiva (Telecommunications Research and Development Center (CPQD), Brazil), Erika Costa Alves (Telecommunications Research and Development Center (CPQD), Brazil), and Layane Menezes Azevedo (Telecommunications Research and Development Center (CPQD), Brazil)</i>	
Energy Consumption and Power Modeling for Various Intel Multicore Processors	62
<i>Thomas Rauber (University Bayreuth, Germany) and Gudula Rünger (Chemnitz University of Technology, Germany)</i>	
Boosting Performance of Iterative Applications on GPUs: Kernel Batching with CUDA Graphs .	70
<i>Jonah Ekelund (KTH Royal Institute of Technology, Sweden), Stefano Markidis (KTH Royal Institute of Technology, Sweden), and Ivy Peng (KTH Royal Institute of Technology, Sweden)</i>	
Fast Maximal Independent Sets on Dynamic Graphs	78
<i>Prajjwal Nijhara (Indian Institute of Technology Jodhpur, India), Aditya Trivedi (Indian Institute of Technology Jodhpur, India), and Dip Sankar Banerjee (Indian Institute of Technology Jodhpur, India)</i>	
Fast Katz Centrality on Dynamic Graphs	86
<i>Prajjwal Nijhara (Indian Institute of Technology Jodhpur, India), Dishit Sharma (Indian Institute of Technology Jodhpur, India), and Dip Sankar Banerjee (Indian Institute of Technology Jodhpur, India)</i>	
Harnessing CUDA-Q's MPS for Tensor Network Simulations of Large-Scale Quantum Circuits .	94
<i>Gabin Schieffer (KTH Royal Institute of Technology, Sweden), Stefano Markidis (KTH Royal Institute of Technology, Sweden), and Ivy Peng (KTH Royal Institute of Technology, Sweden)</i>	
Straggler Mitigation in Distributed Deep Learning: A Cluster-Based Hybrid Synchronization Approach	104
<i>Mustafa Burak Senyigit (Istanbul Technical University, Turkey; Aselsan A.S., Turkey) and Deniz Turgay Altılar (Istanbul Technical University, Turkey)</i>	
Enhancing mmap Scalability by Saving TLB Shootdowns During Page Recycling	112
<i>Frederic Schimmelpfennig (Johannes Gutenberg University Mainz, Germany), André Brinkmann (Johannes Gutenberg University Mainz, Germany), Hossein Asadi (Sharif University of Technology, Iran), and Reza Salkhordeh (Johannes Gutenberg University Mainz, Germany)</i>	

ZeroCAN: Anomaly-Based Zero-Day Attack Detection in Vehicular CAN Bus Networks	121
<i>Jonathan Rendel (Halmstad University, Sweden), William Balte (Halmstad University, Sweden), Harrison Kurunathan (CISTER/ISEP, Polytechnic Institute of Porto, Portugal), Hazem Ismail Ali (Halmstad University, Sweden), Alexandre dos Santos Roque (Federal University of Rio Grande do Sul, Brazil), Wagner Ourique de Moraes (Halmstad University, Sweden), and Mahdi Fazeli (Halmstad University, Sweden)</i>	
A Performance Analysis of Autovectorization on RVV RISC-V Boards	129
<i>Lorenzo Carpentieri (University of Salerno, Italy), Mohammad VazirPanah (University of Salerno, Italy), and Biagio Cosenza (University of Salerno, Italy)</i>	
SPARE: Self-Adaptive Platform for Allocating Resources in Emergencies for Urgent Edge Computing	137
<i>Valerio Besozzi (University of Pisa, Italy), Marco Danelutto (University of Pisa, Italy), Patrizio Dazzi (University of Pisa, Italy), Emanuele Carlini (National Research Council, Italy), and Matteo Mordacchini (National Research Council, Italy)</i>	
PA-Star2: Fast Optimal Multiple Sequence Alignment for Asymmetric Multicore Processors	146
<i>Daniel Sundfeld (University of Brasilia (UnB), Brazil), George Teodoro (Federal University of Minas Gerais (UFMG), Brazil), and Alba C. M. A. Melo (University of Brasilia (UnB), Brazil)</i>	
Concurrent FFT Execution on GPUs in Real-Time	154
<i>Syed Ali (University of North Carolina at Chapel Hill), Joseph Goh (University of North Carolina at Chapel Hill), Joshua Bakita (University of North Carolina at Chapel Hill), Samarjit Chakraborty (University of North Carolina at Chapel Hill), and James Anderson (University of North Carolina at Chapel Hill)</i>	
NPB-PSTL: C++ STL Algorithms with Parallel Execution Policies in NAS Parallel Benchmarks .	162
<i>Júnior Löff (Università della Svizzera italiana (USI), Switzerland), Renato B. Hoffmann (Pontifical Catholic University of Rio Grande do Sul (PUCRS), Brazil), Arthur S. Bianchessi (Pontifical Catholic University of Rio Grande do Sul (PUCRS), Brazil), Leonardo Mallmann (Pontifical Catholic University of Rio Grande do Sul (PUCRS), Brazil), Dalvan Griebler (Pontifical Catholic University of Rio Grande do Sul (PUCRS), Brazil), and Walter Binder (Università della Svizzera italiana (USI), Switzerland)</i>	
Recursive Broadcasting Approach	170
<i>Hovhannes A. Harutyunyan (Concordia University, Canada) and Narek Hovhannisyan (Institute for Informatics and Automation Problems NAS RA, Armenia)</i>	
Communication-Reduced Conjugate Gradient Variants for GPU-Accelerated Clusters	178
<i>Massimo Bernaschi (Institute for Applied Computing (IAC), Rome), Mauro G. Carrozzo (Institute for Applied Computing (IAC), Rome), Alessandro Celestini (Institute for Applied Computing (IAC), Rome), Giacomo Piperno (Institute for Applied Computing (IAC), Rome), and Pasqua D'Ambra (Institute for Applied Computing (IAC), Naples)</i>	
Programming and Mapping for Mixed Heterogeneous Devices: The Case of Optical Flow	187
<i>Sergio Alonso Pascual (Universidad de Valladolid, Spain) and Arturo Gonzalez-Escribano (Universidad de Valladolid, Spain)</i>	

Load-Balanced SpMV Kernel for the bmSparse Matrix Format	196
<i>Gonzalo Berger (Instituto de Computación, Universidad de la República, Uruguay), Ernesto Dufrechou (Instituto de Computación, Universidad de la República, Uruguay), and Pablo Ezzatti (Instituto de Computación, Universidad de la República, Uruguay)</i>	
A Performance Analysis of VM-Based Trusted Execution Environments for Confidential Federated Learning	204
<i>Bruno Casella (University of Turin, Italy)</i>	
A Performance Model of In-Situ Techniques	209
<i>Yi Ju (Max Planck Computing and Data Facility), Nicolas Vidal (Oak Ridge National Laboratory), Adalberto Perez (KTH Royal Institute of Technology), Ana Gainaru (Oak Ridge National Laboratory), Fred Suter (Oak Ridge National Laboratory), Stefano Markidis (KTH Royal Institute of Technology), Philipp Schlatter (KTH Royal Institute of Technology; Friedrich-Alexander-Universität Erlangen-Nürnberg), Scott Klasky (Oak Ridge National Laboratory), and Erwin Laure (Max Planck Computing and Data Facility)</i>	
A Synchronization-Free Incomplete LU Factorization for GPUs with Level-Set Analysis	217
<i>Manuel Freire (Facultad de Ingeniería - UDELAR, Uruguay), Ernesto Dufrechou (Facultad de Ingeniería - UDELAR, Uruguay), and Pablo Ezzatti (Facultad de Ingeniería - UDELAR, Uruguay)</i>	

Special Session on High Performance Computing in Modeling and Simulation (HPCMS)

Contributions to Accelerating a Numerical Simulation of Free Flow Parallel to a Porous Plane	226
<i>Claudio Schepke (Federal University of Pampa (UNIPAMPA), Brazil; Instituto Politécnico de Bragança, Portugal), Roberta A. Spigolon (Federal University of Pampa (UNIPAMPA), Brazil), José Rufino (Instituto Politécnico de Bragança, Portugal), Cesar F. da Cristaldo (Federal University of Pampa (UNIPAMPA), Brazil), and Glenner L. Pizzolato (Federal University of Pampa (UNIPAMPA), Brazil)</i>	
A GPU Implementation of the Analog Ensemble Method	234
<i>Ruben Crico (Université de Toulouse, France), Ines Charles (Université de Toulouse, France), Carlos Balsa (Instituto Politécnico de Bragança, Portugal), and Jose Rufino (Instituto Politécnico de Bragança, Portugal)</i>	
Optimizing Transitive Closure Computation for High Performance Computing and Security ..	242
<i>Elio Masciari (University of Naples Federico II, Italy) and Enea Vincenzo Napolitano (University of Naples Federico II, Italy)</i>	
Improving Cloud Energy Efficiency through Machine Learning Models	247
<i>Eugenio Cesario (University of Calabria, Italy), Paolo Lindia (University of Calabria, Italy), Federica Lobello (University of Calabria, Italy), Andrea Vinci (CNRNational Research Council of Italy, Italy), Shabnam Zarin (Monmouth University, USA), and Santina Capalbo (University of Calabria, Italy)</i>	

Parallel Execution Strategies for Cellular Automata on Shared Memory Architectures	252
<i>Andrea Giordano (ICAR-CNR, Italy), Alessio De Rango (University of Calabria, Italy), Giuseppe Mendicino (University of Calabria, Italy), Donato D'Ambrosio (University of Calabria, Italy), Davide Macrì (ICAR-CNR, Italy), Luigi Rizzo (ICAR-CNR, Italy), Rocco Rongo (University of Calabria, Italy), and William Spataro (University of Calabria, Italy)</i>	
Comparative Analysis of Algorithms and Computational Architectures for Efficient Biological Data Processing	259
<i>Giuseppe Agapito (University Magna Græcia, Italy), Gaetano Guardasole (ex EP University of Calabria, Italy), and Mario Cannataro (University Magna Græcia, Italy)</i>	
Optimizing the Pollution Routing Problem with CUDA Accelerated Discrete Particle Swarm Optimization Algorithm	267
<i>Donald Davendra (Central Washington University, USA) and Magdalena Metlicka (URC Systems, s.r.o., Czech Republic)</i>	
quickSparseM: A Library for Memory- and Time-Efficient Computation on Large, Sparse Matrices with Application to Omics Data	275
<i>Giacomo Baruzzo (University of Padova, Italy), Giulia Cesaro (University of Padova, Italy), and Barbara Di Camillo (University of Padova, Italy)</i>	
Enhancing Employee Health Through an Experimental Diet: Insights from Machine Learning Analysis	283
<i>Maria Luisa Conza (Antur SRL), Simona Fioretto (University of Naples Federico II), Elio Masciari (University of Naples Federico II), and Enea Vincenzo Napolitano (University of Naples Federico II)</i>	
Leveraging Multimodal Vision Language Models for Early Detection of Alzheimer's Disease ..	291
<i>Filippo Casu (University of Sassari, Italy), Enrico Grosso (University of Sassari, Italy), Andrea Lagorio (University of Sassari, Italy), Pietro Ruiiu (University of Sassari, Italy), and Giuseppe A. Trunfio (University of Sassari, Italy)</i>	
A Preliminary Study on Performance Modeling at Scale for Geophysical Applications	299
<i>Fabrice Dupros (Intel Corporation, France), Sylvain Jubertie (Intel Corporation, France), and Hideo Aochi (Brgm, France)</i>	
Exploiting GPU Computing for Effective Agent-Based Simulation: Initial Experiments	303
<i>Marzio Pennisi (Università del Piemonte Orientale, Italy), Giuliana Franceschinis (Università del Piemonte Orientale, Italy), Daniele Baccega (University of Turin, Italy), Simone Pernice (University of Turin, Italy), and Irene Terrone (University of Turin, Italy)</i>	

Special Session on Accelerated HPC in the Cloud-Edge Continuum (AHPC3)

The Cloud-HPC Infrastructure for Hazard Mapping and Vulnerability Monitoring (HaMMon)	309
---	-----

Mauro Imbrosciano (Osservatorio Astrofisico di Catania, Italy), Eva Sciacca (Osservatorio Astrofisico di Catania, Italy), Fabio Vitello (Osservatorio Astrofisico di Catania, Italy), Leonardo Pelonero (Osservatorio Astrofisico di Catania, Italy), Francesco Franchina (Osservatorio Astrofisico di Catania, Italy), Ugo Becciani (Osservatorio Astrofisico di Catania, Italy), Iacopo Colonnelli (Università degli Studi di Torino, Italy), and Doriana Medić (Università degli Studi di Torino, Italy)

An Anomaly Detection Model for RISC-V in Automotive Applications: A Domain-Specific Accelerator Perspective	317
<i>Elio Vinciguerra (University of Catania, Italy), Enrico Russo (University of Catania, Italy), Maurizio Palesi (University of Catania, Italy), and Giuseppe Ascia (University of Catania, Italy)</i>	
QoS-Aware Workload Scheduling on Heterogeneous and Dynamic Edge-to-Cloud Deployments ..	321
<i>Julián Cámara-Miró (Universidad Complutense de Madrid (UCM), Spain), Luis Costero (Universidad Complutense de Madrid (UCM), Spain), and Francisco D. Igual (Universidad Complutense de Madrid (UCM), Spain)</i>	
Adaptive AI-Based Decentralized Resource Management in the Cloud-Edge Continuum	329
<i>Lanpei Li (ISTI-CNR, Italy; University of Pisa, Italy), Jack Bell (University of Pisa, Italy), Massimo Coppola (ISTI-CNR, Italy), and Vincenzo Lomonaco (University of Pisa, Italy)</i>	
Empowering Efficient Drone Monitoring with Low-Latency Edge-Cloud Continuum Platforms	333
<i>Loris Belcastro (University of Calabria, Italy), Cristian Cosentino (University of Calabria, Italy), Fabrizio Marozzo (University of Calabria, Italy), Aleandro Presta (University of Calabria, Italy), and Paolo Trunfio (University of Calabria, Italy)</i>	

Special Session on Papers In Parallel/distributed computing, Supercomputing, and QUantum computing Education for Advancing students, professionals and citizens Knowledge (PIPSQUEAK)

Etudes for Parallel Programmers	341
<i>Moreno Marzolla (University of Bologna, Italy)</i>	
A Massive Open Online Course (MOOC) on High-Performance Parallel Computing for Federica.eu Web-Learning Platform	349
<i>Giuliano Laccetti (Univ. of Naples Federico II, Italy), Marco Lapegna (Univ. of Naples Federico II, Italy), and Ilaria Merciai (Univ. of Naples Federico II, Italy)</i>	
HPC Master Design: Experience from Pisa	357
<i>Marco Danelutto (Univ. of Pisa)</i>	
Exploring Student Misconceptions about Concurrency using Sonic Pi	364
<i>Giorgio Delzanno (Università degli Studi di Genova, Italy), Giovanna Guerrini (Università degli Studi di Genova, Italy), and Daniele Traversaro (Università degli Studi di Genova, Italy)</i>	

Special Session on Astrophysics and Cosmos Observation: HPC and Big Data Management – New Results and Perspectives for the Community (ACOHPC)

Benchmarking Quantum Convolutional Neural Networks for Signal Classification in Simulated Gamma-Ray Burst Detection	372
<i>Farida Farsian (OACT, INAF, Italy), Nicolo Parmiggiani (OAS, INAF, Italy), Alessandro Rizzo (OACT, INAF, Italy), Gabriele Panebianco (OAS, INAF, Italy), Andrea Bulgarelli (OAS, INAF, Italy), Francesco Schilliro (OACT, INAF, Italy), Carlo Burigana (IRA, INAF, Italy), Vincenzo Cardone (OAR, INAF, Italy), Luca Cappelli (OATs, INAF, Italy), Massimo Meneghetti (OAS, INAF, Italy), Giuseppe Murante (OATs, INAF, Italy), Giuseppe Sarracino (OACN, INAF, Italy), Roberto Scaramella (OAR, INAF, Italy), Vincenzo Testa (OAR, INAF, Italy), and Tiziana Trombetti (IRA, INAF, Italy)</i>	
BrahMap: A Scalable and Modular Map-Making Framework for the CMB Experiments	381
<i>Avinash Anand (Università di Roma Tor Vergata, Italy) and Giuseppe Puglisi (Università degli Studi di Catania, Italy)</i>	
HPC and GPU Solutions for Radio Interferometry using RICK	388
<i>Emanuele De Rubeis (Unibo & INAF-IRA, Italy), Claudio Gheller (INAF-IRA, Italy), Giovanni Lacopo (INAF-OATs, Italy), Luca Tornatore (INAF-OATs, Italy), Pascal Jahan Elahi (Pawsey Supercomputing Centre, Australia), Maciej Cytowski (Pawsey Supercomputing Centre, Australia), Giuliano Taffoni (INAF-OATs, Italy), and Ugo Varetto (Pawsey Supercomputing Centre, Australia)</i>	
Anomaly Detection with Machine Learning on Time Series: Unveiling Lost Transients Data	396
<i>Andrea Adelfio (ICSC, Italy), Riccardo Crupi (Università degli Studi di Udine, Italy), Sara Cutini (ICSC, Italy), Stefano Germani (Università degli Studi di Perugia, Italy), Francesco Longo (Università degli Studi di Trieste, Italy), Pasquale Lubrano (ICSC, Italy), and Simone Maldera (INFN, Italy)</i>	
Covariances Computation in the Gaia AVU-GSR Parallel Solver with I/O Techniques: A Performance Study as a Function of Writing Cycle Length	404
<i>Valentina Cesare (National Institute for Astrophysics, Italy), Ugo Becciani (National Institute for Astrophysics, Italy), Alberto Vecchiato (National Institute for Astrophysics, Italy), Mario Gilberto Lattanzi (National Institute for Astrophysics, Italy), Marco Aldinucci (University of Turin, Italy), and Beatrice Bucciarelli (National Institute for Astrophysics, Italy)</i>	
Artificial Intelligence Techniques for Space Experiments	412
<i>Federica Cuna (Istituto Nazionale di Fisica Nucleare, Italy; ICSC), Maria Bossa (Istituto Nazionale di Fisica Nucleare, Italy; ICSC), Fabio Gargano (Istituto Nazionale di Fisica Nucleare, Italy), Nicola Mario Mazziotta (Istituto Nazionale di Fisica Nucleare, Italy), and Pietro Betti (Istituto Nazionale di Fisica Nucleare, Italy)</i>	
Cosmica: A Novel Parallel GPU Code for Cosmic Rays Propagation in Heliosphere	420
<i>Giovanni Cavallotto (National Institute for Nuclear Physics (INFN); ICSC - Centro Nazionale di Ricerca in HPC), Stefano Della Torre (National Institute for Nuclear Physics (INFN); ICSC - Centro Nazionale di Ricerca in HPC), Giuseppe La Vacca (University of Milano-Bicocca), and Massimo Gervasi (University of Milano-Bicocca)</i>	
A Cloud+HPC Hub for Astrophysics and Cosmology Communities	428
<i>Matteo Pasqui (ICSC, "Centro Nazionale di Ricerca in HPC, Big Data and Quantum Computing")</i>	

Numerical Limits in the Integration of Vlasov-Poisson Equation for Cold Dark Matter	431
<i>Luca Cappelli (Univerista' di Trieste, Italy), Giuseppe Murante (INAF O.A.Ts, Italy), and Stefano Borgani (Universita' di Trieste, Italy)</i>	
Machine Learning Supernovae's Progenitor Characterization	439
<i>Marco Grassia (University of Catania, Italy), Stefano Pio Cosentino (University of Catania, Italy), Maria Letizia Pumo (University of Catania, Italy), and Giuseppe Mangioni (University of Catania, Italy)</i>	
High Performance Visualization for Astrophysics and Cosmology	443
<i>Nicola Tuccari (Istituto Nazionale di Astrofisica, Italy), Eva Sciacca (Istituto Nazionale di Astrofisica, Italy), Fabio Vitello (Istituto Nazionale di Astrofisica, Italy), Iacopo Colonnelli (Università di Torino, Italy), Yolanda Becerra (Barcelona Supercomputing Center, Spain), Enric Sosa Cintero (Barcelona Supercomputing Center, Spain), Guillermo Marin (Barcelona Supercomputing Center, Spain), Milan Jaros (IT4Innovations National Supercomputing Center, Czech Republic), Lubomir Riha (IT4Innovations National Supercomputing Center, Czech Republic), Petr Strakos (IT4Innovations National Supercomputing Center, Czech Republic), Sebastian Trujillo-Gomez (Heidelberg Institute for Theoretical Studies, Germany), Emiliano Tramontana (Università degli Studi di Catania, Italy), and Robert Wissing (University of Oslo, Norway)</i>	
From Local to Remote: Scaling VisIVO Visual Analytics for Large-Scale Astrophysical Data Visualization	451
<i>Giuseppe Tudisco (INAF Osservatorio Astrofisico di Catania, Italy), Fabio Vitello (INAF Osservatorio Astrofisico di Catania, Italy), Eva Sciacca (INAF Osservatorio Astrofisico di Catania, Italy), and Ugo Becciani (INAF Osservatorio Astrofisico di Catania, Italy)</i>	
High Performance Stingray: Fast Spectral Timing for All	459
<i>Matteo Bachetti (Istituto Nazionale di Astrofisica, Italy), Eleonora Veronica Lai (Istituto Nazionale di Astrofisica, Italy), Daniela Huppenkothen (University of Amsterdam, the Netherlands), Guglielmo Mastrosiero (Università degli Studi di Milano, Italy), and Matteo Lucchini (University of Amsterdam, the Netherlands)</i>	

Special Session on Digital Twins for Datacenters (DT4DC)

Spoke 3 Big Data Management, Storage and Archive Infrastructure	464
<i>Giacomo Coran (INAF - OATs, Italy), Massimo Costantini (INAF - OATs, Italy), Sara Gelsumini (INAF - OATo, Italy), Deborah Busonero (INAF - OATo, Italy), Cristina Knapic (INAF - OATs, Italy), Andrea Adelfio (INFN, Italy), and Diego Ciangottini (INFN, Italy)</i>	
Sustainable-HPC: Toward Digital Twin for Active Management of Self-Cooled Data Centers with Renewable Energy Sources and Waste Heat Recovery	471
<i>Silvia Meschini (University of Turin, Italy), Lavinia Chiara Tagliabue (University of Turin, Italy), Giuseppe Martino DI Giuda (University of Turin, Italy), Marco Aldinucci (University of Turin, Italy), Paola Gasbarri (University of Turin, Italy), and Daniele accardo (University of Turin, Italy)</i>	

A Review of Current Practices and Challenges in Green Data Centers: Renewable Energy Sources, Waste Heat Recovery, and Intelligent Management Systems	478
<i>Marta Boscariol (University of Turin, Italy), Elisa Cacciaguerra (University of Turin, Italy), Paola Gasbarri (University of Turin, Italy), Daniele Accardo (University of Turin, Italy), Silvia Meschini (University of Turin, Italy), and Lavinia Chiara Tagliabue (University of Turin, Italy)</i>	
Sustainable Data Centers: Advancing Energy Efficiency and Resource Optimization	486
<i>Viviana Vaccaro (Polytechnic University of Milan, Italy), Lavinia Chiara Tagliabue (Department of Computer Science University of Turin, Italy), and Marco Aldinucci (Department of Computer Science University of Turin, Italy)</i>	
Digital Twin Technology in University Data Centers: A Model for Operational Efficiency and Sustainability	494
<i>Viviana Vaccaro (Polytechnic University of Milan, Italy) and Lavinia Chiara Tagliabue (Department of Computer Science University of Turin, Italy)</i>	
HPC4AI@UNITO: A Use Case for Datacenter Digital Twin	499
<i>Viviana Vaccaro (Polytechnic University of Milan, Italy), Robert Birke (University of Turin, Italy), Lavinia Chiara Tagliabue (University of Turin, Italy), Sergio Rabellino (University of Turin, Italy), and Marco Aldinucci (University of Turin, Italy)</i>	
Analysis of Time Synchronization Challenges in Digital Twins for Edge-Enabled Data Centers in Smart Cities Scenario	506
<i>Stefano Rinaldi (University of Brescia, Italy), Salvatore Dello Iacono (University of Brescia, Italy), Paolo Bellagente (University of Brescia, Italy), and Marco Pasetti (University of Brescia, Italy)</i>	

Special Session on Applications, Libraries, and Tools for Computational Science and Machine Learning on Heterogeneous HPC Environments (ALTonHHE)

The P3 Explorer: An Open Database of Performance, Portability, and Productivity	512
<i>Matthew A. Smith (University of York, UK), Steven A. Wright (University of York, UK), Zaman Lantra (University of Warwick, UK), and Gihan R. Mudalige (University of Warwick, UK)</i>	
On the Effectiveness of Unified Memory in Multi-GPU Collective Communication	518
<i>Riccardo Strina (Politecnico di Milano, Italy), Ian Di Dio Lavore (Politecnico di Milano, Italy), Marco Santambrogio (Politecnico di Milano, Italy), Michael Papka (University of Illinois Chicago, USA; Argonne National Laboratory, USA), and Zhiling Lan (University of Illinois Chicago, USA)</i>	

G-Litter Marine Litter Dataset Augmentation with Diffusion Models and Large Language Models on GPU Acceleration	526
<i>Gennaro Mellone (University of Naples "Parthenope", Italy), Ciro Giuseppe De Vita (University of Naples Parthenope, Naples, Italy), Emanuel Di Nardo (University of Naples Parthenope, Naples, Italy), Giuseppe Coviello (NEC Laboratories America Inc, Princeton, NJ, USA), Diana Di Luccio (University of Naples Parthenope, Naples, Italy), Pietro Patrizio Ciro Aucelli (University of Naples Parthenope, Naples, Italy), Angelo Ciaramella (University of Naples Parthenope, Naples, Italy), and Raffaele Montella (University of Naples Parthenope, Naples, Italy)</i>	
NAV: A Comparative Analysis Tool for Nsight Systems GPU Traces	536
<i>Ethan Shama (Queen's University, Canada) and Ryan E. Grant (Queen's University, Canada)</i>	
A Multi-Level Parallel Algorithm for Detection of Single Scatterers in SAR Tomography	544
<i>Massimiliano Russo (University of Naples Federico II, Italy), Mehwish Nisar (National Research Council, Italy), Antonio Pauciullo (National Research Council, Italy), Pasquale Imperatore (National Research Council, Italy), Marco Lapegna (University of Naples Federico II, Italy), and Diego Romano (National Research Council, Italy)</i>	

Security in Parallel, Distributed and Network-Based Computing (SPDNBC)

Machine Learning-Driven Intrusion Detection and Identification in Industrial Control Systems	552
<i>Alireza Dehlaghi Ghadim (Mälardalen University), Mona Moslemzade (Linköping University), Nima Pattiampully Dharmapal (Stockholm University), Niclas Ericsson (Mälardalen University), Mahshid Helali Moghadam (Scania CV AB), Ali Balador (Mälardalen University), and Hans Hansson (Mälardalen University)</i>	
Anomaly Detection in Microservices Architecture using Graph Neural Networks	560
<i>Matthias Osswald (Zurich University of Applied Sciences (ZHAW) InIT, Switzerland), Timothy Schönenberger (Zurich University of Applied Sciences (ZHAW) InIT, Switzerland), Gokcan Cantali (Zurich University of Applied Sciences (ZHAW) InIT, Switzerland; University of Zürich UZH, Switzerland), Wissem Soussi (Zurich University of Applied Sciences (ZHAW) InIT, Switzerland; University of Zürich UZH, Switzerland), and Gürkan Gür (Zurich University of Applied Sciences (ZHAW) InIT, Switzerland)</i>	
Investigation Algorithm for Access Violation Incidents in Cybersecurity	568
<i>Maxim Gorda (St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS), Russia) and Andrey Chechulin (St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS), Russia)</i>	

A Noise-Based Approach Augmented with Neural Cleanse and JPEG Compression to Counter Adversarial Attacks on Image Classification Systems	576
<i>Igor Kotenko (St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS), Russia), Igor Saenko (St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS), Russia), Oleg Lauts (Admiral Makarov State University of Maritime and Inland Shipping, Russia), Nikita Vasiliev (St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS), Russia), and Vladimir Sadovnikov (St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS), Russia)</i>	
Modeling of Smart Additive Manufacturing Processes for Attack Analysis and Detection	584
<i>Aleksei Meleshko (St. Petersburg Federal Research Center of the Russian Academy of Sciences, Russia), Vasily Desnitsky (St. Petersburg Federal Research Center of the Russian Academy of Sciences, Russia), and Igor Kotenko (St. Petersburg Federal Research Center of the Russian Academy of Sciences, Russia)</i>	
Detection of Anomalous Cryptocurrency Transactions using Neural Networks with Decision-Making Explanation	592
<i>Dmitry Levshun (St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS), Russia), Ksenia Zhernova (St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS), Russia), and Andrey Chechulin (St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS), Russia)</i>	
Investigating the Proximity Metric of Program Assembler Code for Genetic Reverse Engineering	600
<i>Konstantin Izrailov (St. Petersburg Federal Research Center of the Russian Academy of Sciences, Russia) and Igor Kotenko (St. Petersburg Federal Research Center of the Russian Academy of Sciences, Russia)</i>	
LLMSecurityTester: A Tool for Detection of Vulnerabilities in LLM-Based Chatbots	608
<i>Vladimir Lavrentiev (SPC RAS, Russia) and Dmitry Levshun (SPC RAS, Russia)</i>	
Author Index	617