Preface of the 3rd edition of the Special Track on Big Data and High-Performance Computing

Abstract

This volume contains the proceedings of the 3rd edition of BigHPC, the Special Track on Big Data and High-Performance Computing, held in conjunction with the 4th Italian Conference on Big Data and Data Science (ITADATA), 9 – 11 September 2025, Turin, Italy.

Preface

The third edition of the Special Track on Big Data and High-Performance Computing (BigHPC) was held in conjunction with the fourth Italian Conference on Big Data and Data Science (ITADATA 2025) in Turin, Italy, from September 9 to 11, 2025. This volume contains five full papers and two short papers selected for presentation at the track. BigHPC aims to consolidate its role as a leading annual forum for the Italian big data, high-performance computing (HPC), and quantum computing communities. It brings together researchers and practitioners from academia and industry to discuss the latest advances in large-scale data processing, scalable algorithms, computational architectures, and innovative solutions for analyzing and managing vast datasets across scientific and industrial domains.

BigHPC 2025 covered a wide range of topics related to big data, HPC, and quantum computing and artificial intelligence, including advanced parallel and HPC algorithms, computational models and architectures designed for large-scale data processing, and quantum-based algorithms. Additionally, discussions included performance optimization, scalability challenges in HPC systems, and the integration of AI techniques to enhance big data processing and analytics in scientific and industrial applications.

The scientific program included three sessions and a keynote talk delivered by Professor Biagio Cosenza (University of Salerno), five full paper presentations, and two extended abstract talks. A highlight of this year's track was a panel on emerging directions in parallel, distributed, and quantum computing, featuring Dr. Claudio Cicconetti (IIT-CNR), Prof. Biagio Cosenza, and Prof. Sandro Fiore (University of Trento). In addition, Professor Marco Aldinucci (University of Turin), director of the CINI National Laboratory on *HPC: Key Technologies and Tools (HPC-KTT)* kicked off the event introducing the laboratory's crucial role in modernizing HPC infrastructures and applications, with contributions spanning programming models, execution environments, system software, performance engineering, energy efficiency, and cloud-based access to computing resources.

Finally, we would like to express our sincere gratitude to the Steering and Program Committee members for their dedication, to the invited speakers and authors for their valuable contributions, and to the CINI National Laboratory on Data Science, together with the ITADATA 2025 organizers, for their essential support in all organizational and technical aspects.

Organization

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Massimo Cafaro, University of Salento

BigHPC2025: Special Track on Big Data and High-Performance Computing, co-located with the 4th Italian Conference on Big Data and Data Science, ITADATA2025, September 9 – 11, 2025, Turin, Italy.

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