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Proceedings

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Chapters “Efficient GPU Offloading with OpenMP for a Hyperbolic Finite Volume Solver on Dynamically Adaptive Meshes”, “Massively Parallel Genetic Optimization Through Asynchronous Propagation of Populations” and “Analyzing Resource Utilization in an HPC System: A Case Study of NERSC’s Perlmutter” are licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>). For further details see license information in the chapters.

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Preface

ISC High Performance Computing—formerly known as the International Supercomputing Conference—was founded in 1986 as the Supercomputer Seminar. Originally organized by Hans Meuer, Professor of Computer Science at the University of Mannheim, and former director of its computer center, the seminar brought together a group of 81 scientists and industrial partners who shared an interest in high-performance computing (HPC). Since then, the annual conference has become a major international event within the HPC community. It has grown well beyond its humble beginnings, and moved out of Mannheim into other cities throughout the years: Frankfurt, Heidelberg, Dresden, Hamburg, and Leipzig. Over the years, the conference has witnessed a steady increase in the number of high-quality research papers submitted to the conference, and a corresponding growth in the number of conference attendees. ISC-HPC 2023 was held in person in Hamburg, Germany, from May 21–25.

The call for submissions to ISC-HPC 2023 was issued in Fall 2022, inviting the researcher and developer communities to submit their latest results for review by the Program Committee. In total, 78 papers were submitted by authors from all over the world. The Research Papers Program Committee consisted of 70 members from 16 countries. After at least three double-blind reviews were completed, a rebuttal process offered the authors an opportunity to respond to reviewers' questions and help clarify issues the reviewers might have had. To come to a final consensus on the papers, a virtual Program Committee meeting was held to discuss the papers. Finally, the committee selected 21 papers for publication.

For the past several years, the ISC-HPC conference has presented an ISC-sponsored award to encourage outstanding research in high-performance computing and to honor the overall best research paper accepted for publication at the conference. Some years ago, this annual award was renamed in memory of the late Dr. Hans Meuer, general chair of the ISC-HPC conference from 1986 through 2014, and a co-founder of the TOP500 project. This year, from the set of accepted research papers, the Research Papers Program Committee selected the best paper based on its technical merit, including its novelty and impact on the HPC community. During a live ceremony, the following paper was bestowed with the Hans Meuer Award: *Expression Isolation of Compiler-Induced Numerical Inconsistencies in Heterogeneous Code* by Dolores Miao from the University of California, Davis, USA, Ignacio Laguna from Lawrence Livermore National Laboratory, USA, and Cindy Rubio-González from the University of California, Davis, USA. The paper addresses the challenge of ensuring numerical accuracy in CPU- and GPU-based parallel applications using an automated approach that is both precise and efficient. Application programmers can spend weeks or months identifying numerical problems caused by compiler optimizations, and be forced to reduce the performance of their entire application just to solve a problem that might be caused by a single line of code. The winning paper implements a method that works with industry standard compilers for CPUs and GPUs, and is more than 99% accurate across a wide range of

experiments. The tool developed by the authors provides hope for complex applications that cannot compromise on numerical accuracy or performance.

As chairs of the Research Papers Committee, we would like to express our gratitude to the HPC community for submitting papers to ISC-HPC. We also wish to extend our thanks to the track chairs, members of the Best Paper Committee, and members of the Research Papers Committee, who provided the reviews and helped us arrive at the final decisions for manuscript acceptance.

May 2023

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