Introduction

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Topic chairs

As demand in high-resolution and high-fidelity modeling and simulation increases, desktop computers or small clusters of processors have proven to be insufficient to carry out the calculations in many scientific, engineering, and industrial applications. Indeed, many such applications typically require a significant amount of computing time or need to process a large amount of data. The High-Performance and Scientific Applications Topic highlights recent progress in the use of high-performance parallel and scientific computing, with an emphasis on successes, advances, and lessons learned in the development and implementation of novel scientific, engineering, and industrial applications.

Today's large computational solutions are often required to operate in complex information and computation environments, where data access can be as important as computational methods and performance, so the technical approaches in this topic span a wide range of areas, which include, but are not limited to, high performance parallel computing, data access, and the associated problem-solving environments that compose and manage advanced solutions. This is reflected by the papers accepted. The papers cover areas such as parallel numerical methods for sparse matrix computation and block-structured adaptive mesh refinements; multicore implementations of numerical optimization algorithms and cellular automata; computer science issues such as fault tolerance and tree search algorithms; and applications such as real-time contingency analysis for power grid and data analysis for radio telescopes. We invite you to read and enjoy this collection of papers.