Association for Computing Machinery

Advancing Computing as a Science & Profession

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RECORD-SHATTERING SUPERCOMPUTING PERFORMANCE WINS
ACM GORDON BELL PRIZE AT SC13

Fluid Dynamics Simulation Holds Potential Advances for Industrial and Healthcare Technology

DENVER, **November 22, 2013** – Scientists from Switzerland, Germany and the U.S have set a new supercomputing simulation record in fluid dynamics by reaching 14.4 Petaflops of sustained performance to win the 2013 ACM Gordon Bell Prize **awards.acm.org/bell**.   The simulation, which represents a 150-fold improvement over current state-of-the-art performance levels for this type of application, has potential utility for improving the design of high pressure fuel injectors and propellers, shattering kidney stones, and therapeutic approaches for cancer treatment. The research was conducted by scientists at ETH Zurich and IBM Research, in collaboration with the Technical University of Munich and the Lawrence Livermore National Laboratory (LLNL). The results were presented by the team at SC13 **sc13.supercomputing.org** in Denver, where the winner of the ACM Gordon Bell Prize was announced on November 21.

The simulation conducted by the team resolved unique phenomena associated with clouds of collapsing bubbles. This condition occurs when vapor bubbles formed in a liquid collapse due to changes in pressure. The successful effort employed 13 trillion cells and 6.4 million threads on LLNL's "Sequoia" IBM BlueGene/Q, one of the fastest supercomputers in the world. The simulation resolved 15,000 bubbles and a 20-fold reduction in time to solution over previous research. The paper describing this achievement was one of six papers chosen as finalists for the 2013 Gordon Bell Prize awarded by ACM **acm.org**.

Members of the team included Diego Rossinelli, Babak Hejazialhosseini, Panagiotis Hadjidoukas, and Petros Koumoutsakos from ETH Zurich; Costas Bekas and Alessandro Curioni from IBM Zurich Research Laboratory; Adam Bertsch and Scott Futral from Lawrence Livermore National Laboratory; and Steffen Schmidt and Nikolaus Adams from Technical University Munich.

About the ACM Gordon Bell Prizes
The ACM Gordon Bell Prizes are awarded each year to recognize outstanding achievement in high-performance computing. The purpose of this recognition is to track the progress over time of parallel computing, with particular emphasis on rewarding innovation in applying high-performance computing to applications in science. Prizes are

awarded for peak performance as well as special achievements in scalability and time-to-solution on important science and engineering problems and low price/performance. Financial support for the $10,000 awards is provided by Gordon Bell, a pioneer in high-performance and parallel computing.

About ACM
ACM, the Association for Computing Machinery **www.acm.org,** is the world's largest educational and scientific computing society, uniting computing educators, researchers and professionals to inspire dialogue, share resources and address the field's challenges. ACM strengthens the computing profession's collective voice through strong leadership, promotion of the highest standards, and recognition of technical excellence. ACM supports the professional growth of its members by providing opportunities for life-long learning, career development, and professional networking.

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