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Tenth SIAM International Conference on Numerical Combustion
May 9-12, 2004
Sedona, Arizona.

Final Technical Report

The Society for Industrial and Applied Mathematics hosted the Tenth International Conference on Numerical Combustion held May 9-12, 2004 in Sedona, Arizona. This distinguished conference series began in 1985 in Sophia Antipolis, France and was followed by conferences in San Francisco, California (1987), Juan les Pins, France (1989), St. Petersburg Beach, Florida (1991), Garmisch, Germany (1993), New Orlean, Louisiana (1996), York, England (1998), Amelia Island, Florida (2000), and Sorrento, Italy (2002). SIAM is widely recognized as the originator and the U.S. anchor of this important meeting whose topics concerns the applied mathematics and computation associated with combustion and reactive flow. In particular, the International Numerical Combustion Symposiums have become one of the international major venues for research on direct simulation and modeling turbulent reacting flow. It is also one of the major international venues for theoretical work in reacting flows.

This meeting drew approximately 200 participants from 30 countries whose research included the topics in turbulence, kinetics, detonation, flames, pollution, microgravity, micro-combustion, ignition, applications of parallel processing, tera-scale computation of combustion applications, material synthesis, droplets and sprays, heterogeneous combustion, energetic materials (propellants and explosives), engine and furnace combustion, fires, numerical methods and, software engineering for combustion applications.

The program consisted of 3 plenary presentations, 8 minisymposia, 16 contributed sessions, and a poster session with posters, with 131 total speakers and presenters.

The three plenary talk speakers and topics were:

Thomas Jackson, University of Illinois “Simulation of Heterogeneous Solid Propellant Combustion”

Malte Braack, University of Heidelberg, Germany “Adaptive Methods for Laminar Flames”

Michael Frenklach, University of California, Berkeley, “Numerical Modeling Soot Particle Formation”

The 8 minisyposium topics and organizers were:

“Combustion Processes in Astrophysics” Organizers: Alexei Khokhlov University of Chicago and Elaine S. Oran, Naval Research Laboratory

“Numerical Modelling of Microscale Combustion” Organizer: Paul Ronney University of Southern California

“Low Mach Number Combustion: Approaches and Applications - Part I and II”, Organizer: Joseph F. Grcar, Lawrence Berkeley National Laboratory

“Numerical Studies of Reactive Flow using Adaptive Mesh Refinement”, Organizer: Donald W. Schwendeman Rensselaer Polytechnic Institute

“Mathematical Analysis of Detonation Problems” Organizer: David Wagner University of Houston

“Simulation and Modeling of Homogeneous Charge Compression Ignition Combustion”, Organizer: Jacqueline H. Chen Sandia National Laboratories

“Eulerian Methods for the Accurate Treatment of Polydisperse Evaporating Sprays” Organizer: Marc Massot CNRS, France

The 16 contributed sessions were entitled:

Turbulence I, Chair: Stewart Cant, University of Cambridge, United Kingdom

Laminar Flames, Chair: Beth Anne V. Bennett, Yale University

Engines, Chair: Werner J. Dahm, University of Michigan

Turbulence II, Chair: Kuldeep Prasad, National Institute of Standards and Technology

Detonations, Supernova, Chair: Kevin Zumbrun, Indiana University

Numerical Strategies, Chair: Ulrich Maas, Karlsruhe University, Germany

Turbulence III, Chair: Evatt R. Hawkes, Sandia National Laboratories

Detonations, Chair: Bradley L. Wescott, University of Illinois, Urbana-Champaign

Turbulence IV, Chair: Hong G. Im, University of Michigan

Modeling, Chair: Omke J. Teerling, University of Leeds, United Kingdom

Turbulence V, Chair: Venkatramanan Raman, Stanford University

Laminar Flames, Detailed Chemistry, Chair: Vincent Giovangigli, École Polytechnique, France

Turbulence VI, Chair: William G. Houf, Sandia National Laboratories

Laminar Flames, Sprays, Chair: William Sirignano, University of California, Irvine

Front Tracking-Surface Evolution, Energetic Materials, Chair: Joseph M. Powers, University of Notre Dame

Combustion, Chair: Andrea Frisque, University of British Columbia, Canada.

The Wednesday afternoon excursion to the Grand Canyon, was deemed very successful by the participants. It was announced by the Steering Committee that it is hoped that the next International meeting would be in Spain, and 4 years hence in Monterey, CA (as suggested by SIAM staff). The accommodations in Sedona were excellent and the meeting was deemed a great success by the participants. The US meeting hosted by SIAM are seen as attractive events and are highly valued by this important community that make extensive use of applied mathematics in their modeling of combustion phenomena. The cooperation and professional help and efficiency of the SIAM staff and organization were in large part responsible for the success of this meeting and is greatly appreciated. The co-chairs (Buckmaster, Smooke and Stewart) were delighted to work with SIAM and enjoyed organizing this meeting.

Respectfully submitted,

Co-chairs: John D. Buckmaster, Mitchell Smooke and D. Scott Stewart