

Preface

Special Issue for the 20th International Conference on Numerical Simulation of Plasmas (ICNSP)

This special issue includes a collection of invited papers presented at the 20th International Conference on Numerical Simulation of Plasmas (ICNSP), which took place from October 10-12, 2007 in Austin, Texas, and at the traditional US – Japan Workshop on Simulation Science preceding the 20th ICNSP at the same location. The purpose of the bi-annual conference is to highlight major advances in computational plasma physics since the 19th ICNSP held in July, 2005 in Nara, Japan. The detailed information of the conferences can be found in

<http://workshops.ph.utexas.edu/>

The 3rd John Dawson Prize was presented at the conference to Jerry Brackbill at Los Alamos National Laboratory in recognition of his pioneering contributions to plasma physics made through numerical simulations. A paper by Brackbill and Lapenta titled *Magnetohydrodynamics with implicit plasma simulation* begins the present special issue. The John Dawson Prize, which carries a cash prize of \$1,200, was established in 2003 to commemorate the late John Dawson, a pioneer of plasma simulation. The previous Dawson award winners are C.K. Birdsall at UC Berkeley and A.B. Langdon at Lawrence Livermore National Laboratory (2003), and Tetsuya Sato of Earth Simulator Center, Japan (2005).

The Oscar Buneman Awards for the most insightful visualization began at the 16th ICNSP. The award has two categories: one for the Best Still Image and another for the Best Animation. The 5th Oscar Buneman Awards was presented to John Cary at the University of Colorado & Tech-X Corporation, Peter Messmer and Chet Nieter at Tech-X Corporation for *best still image*; and Luis Gargaté at Instituto Superior Tecnico for *best animation*. The Oscar Buneman Awards carry a cash prize of \$600 for each category.

Over one hundred papers were presented at the 20th ICNSP conferences and the US – Japan Workshop. The seventeen papers published in this special issue cover a wide range of topics in computational plasma physics. These papers present results from simulations of space and astrophysical plasmas, magnetic fusion plasmas, laser-plasma interactions, beam and accelerator physics, and low temperature and dusty plasmas. Numerical methods presented include magnetohydrodynamics (MHD), hybrid methods, kinetic plasma methods (PIC and Vlasov), Lattice Boltzmann Algorithms, molecular dynamics, implicit and multi-scale methods, and workflow, data management, and visualization for plasma simulations. Taken together, the papers published in this special issue paint a picture of a vibrant and thriving scientific community that is efficaciously leveraging the remarkable advances in computing power to advance our understanding of plasma dynamics.

All papers in this special issue were peer-reviewed. We would like to thank all referees for their work and support.

Zhihong Lin*
Editor of the special issue
University of California, Irvine

François Waelbroeck†
20th ICNSP Program Committee Chair
University of Texas, Austin

***Zhihong Lin** is currently an Associate Professor at the Department of Physics and Astronomy, University of California, Irvine, USA. He obtained a Ph.D. in Plasma Physics from Princeton University in 1996. He received the Presidential Early Career Awards for Scientists and Engineers in 2000 and was elected to a Fellow of the American Physical Society in 2006. He has published 50 papers in computational plasma physics for fusion and space physics applications.

†**François Waelbroeck** is Associate Director of the Institute for Fusion Studies in the Department of Physics, University of Texas at Austin. He received his BSc in Engineering Physics from the Free University of Brussels in 1982 and his PhD in physics from the University of Texas at Austin in 1988. He has over forty publications on plasma stability and confinement, and has coauthored with R. D. Hazeltine a textbook entitled "The Framework of Plasma Physics". He is a Fellow of the Institute of Physics and of the American Physical Society.