

Preface

The International Conference on Nuclear Theory in the Supercomputing Era — 2013 (NTSE-2013) brought together experts in nuclear theory and high-performance computing in Ames, Iowa from May 13 to May 17, 2013. It was the second conference in a series that focuses on forefront challenges in physics, namely the fundamentals of nuclear structure and reactions, the origin of the strong inter-nucleon interactions from QCD, the nonperturbative regime of relativistic quantum field theory, and computational nuclear physics with leadership class computer facilities to provide forefront simulations leading to new discoveries. During this year's conference, we also celebrated James P. Vary's 70th birthday.

Throughout his career, James has made important contributions to theoretical and computational nuclear physics, mentored more than 30 students and postdocs, and served the science community in a number of elected and appointed positions. He has published a few hundred refereed journal articles, and is a regular invited lecturer at national and international scientific conferences. During his career James has always been involved in international collaborations, and in promoting science in far-flung places.

During the period 1993–2000 James served as Director of the International Institute of Theoretical and Applied Physics (IITAP) and institute patterned after the renowned ICTP in Trieste, Italy. IITAP sponsored more than 1000 international visits, primarily of developing country scientists to the US, with sponsorship from UNESCO, Iowa State University, NSF, DOE as well as corporations and foundations. Many of these projects continue until the present time. The state funding crunch of 2000 and 2001 led to a discontinuance of IITAP operations. However, other universities continue to study the model that IITAP pioneered for multi-lateral support of international scientific projects.

We were very pleased that several of his international collaborators were able to participate in this meeting. We were also very happy to be able to bring together some of James' collaborators from his early career, including his PhD supervisor Joe Ginocchio, his former collaborator as postdocs at MIT, Peter Sauer, and Hans Weidenmüller, his mentor and host on various visits to Heidelberg, Germany.

The conference also welcomed many young scientists, including graduate students in nuclear physics and computational science. All participants together made the conference a great success.

The conference topics,

- (1) *Ab initio* nuclear structure;
- (2) Microscopic approaches to nuclear reactions;
- (3) Origin and properties of the strong interactions;
- (4) Light-front quantum field theory; and
- (5) Computational science and applied mathematics,

reflect James' research interest and encompass a broad area of fundamental physics and high-performance computing. For each of these topics, a keynote speaker (Gaute Hagen, Jerry Draayer, Petr Návrtil, Ruprecht Machleidt, Stan Brodsky, and Esmond Ng) presented an overview of the topic, with an additional keynote talk on Lattice QCD by Martin Savage. George Fai (program manager for nuclear theory at DOE) gave us the view from the DOE nuclear theory office, and the conference concluded with a summary talk by Bruce Barrett. James himself delivered a distinguished

lecture with an overview of his recent research as well as his projections for future directions.

We would like to express our appreciation to all participants of the NTSE-2013 conference, to all contributors to these proceedings, to all members of the Scientific Advisory Committee and to the NTSE-2013 sponsors — Iowa State University and Pacific National University.

The organizing committee:

Bruce Barrett (Co-Chair), University of Arizona

Kristina Launey, Louisiana State University

Pieter Maris (Co-Chair), Iowa State University

Jianwei Qiu, Brookhaven National Laboratory

Joseph Shinar, Iowa State University

Andrey Shirokov (Co-Chair), Moscow State University, Russia

Masha Sosonkina, Old Dominion University

Kirill Tuchin, Iowa State University

Xingbo Zhao, Iowa State University