PHYSICS COMPUTING NEWS - SPRING 1993

Newsletter of the Division of Computational Physics

In this Newsletter you will find the following articles:

If you have any questions regarding the items in this newsletter, or suggestions for future issues of *Physics Computing News*, please contact C. Richard DeVore, Newsletter Editor. Questions about the election of Division officers should be addressed to Gary D. Doolen, Secretary-Treasurer. Their addresses are given in the Roster on page 6.

NEWS BYTES

Michael Schlüter 1945-1992: In Memoriam

On November 18, 1992, Michael Schlüter died, following a battle with illness that he had carried far beyond his doctors' predictions. With his passing, we have lost a brilliant colleague and a very great gentleman. He had both the ability and the enthusiasm to make science great fun. While doing so, his work ranged from semiconductors to superconductors to surfaces and interfaces to defects at a level from the practical to the basic. It is a special mark of the man that his last efforts on fullerenes (the 4th NEC Symposium proceedings on this subject were dedicated to him) were carried out during his terminal illness. It reveals that courage and tenacity which permits the special few to live fully right up to the very last. It is most appropriate that the memorial gathering of colleagues to be held 19 March 1993 at Bell Laboratories will explore the diverse science that fascinated him. While pursuing his science, Michael Schlüter also exhibited talent as an adminstrator

and spokesperson. He rose through the ranks at Bell Laboratories to head various departments there. He actively participated in the APS. Among his many activites, two will be mentioned here. He helped author the Division of Materials Science report designed to convey the significance of that science to the layperson. This report is evidence of his interest in having science favorably represented. He also was a member of our own Division of Computational Physics and of its Executive Committee from its inception, where he was instrumental in the formation of the principles and guidelines that created Physics Computing '91. We will not forget his kindness, concern, and the perceptiveness he brought to all of our interactions with him.

For those colleagues and friends of Michael's who wish to so mark his passing, his family has requested that expressions of sympathy take the form of donations to the National Brain Tumor Foundation, 323 Geary Street, Suite 510, San Francisco CA 94102.

PRIZES & AWARDS

Aneesur Rahman Prize

The Aneesur Rahman Prize was established by the American Physical Society in 1992 to recognize and encourage outstanding achievement in computational physics research. The Prize is sponsored by the International Business Machines Corporation, and consists of $5,000, an allowance for travel to the meeting of the Society at which the prize is awarded and at which the the recipient will deliver the Rahman Lecture, and a certificate citing the contributions made by the recipient.

The first recipient of the Rahman Prize will be honored at our spring meeting, Physics Computing '93. Nominations closed on March 1, 1993.

In 1994, the Division will meet in conjunction with the Joint April Meeting of the APS and the AAPT in Washington DC. The Society's schedule calls for nominations for Prizes and Awards presented there to close on September 1, 1993. Division members who wish to nominate colleagues for the second Rahman Prize are encouraged to do so before that date. Announcements will appear periodically in *APS News* over the intervening months, but the next issue of this newsletter, *Physics Computing News*, may not be printed before the September 1 deadline.

All nominations submitted this year, with the exception of the 1993 prize winner's, will remain open for the 1994 Rahman Prize.

Nominations are open to scientists of all nationalities regardless of the geographical site at which the work was done. The prize shall ordinarily be awarded to one person, but a prize may be shared among recipients when all recipients have contributed to the same accomplishments.

Send the name of the proposed candidate and supporting information, including a *curriculum vitae* of the nominee, a description of the important contributions for which the nominee is being recognized, and a proposed citation, to: Jay P. Boris, APS/DCP Prize & Award Committee, Code 6400, Naval Research Laboratory, Washington DC 20375-5344.

FELLOWSHIP PROGRAM

In 1992, the Division of Computational Physics had 5 members elevated to Fellowship in the APS. We congratulate these colleagues on being so honored. The new Fellows are:

David V. Anderson - "For valuable contributions to the understanding of plasma equilibria, stability, and nonlinear dynamics through the application of computational models that emphasized realism, accuracy, and efficiency."

David M. Ceperley - "For development of innovative algorithms to deal with quantum many-body problems and their application to significant physical problems."

Paulett C. Liewer - "For her pioneering work in use of parallel supercomputers for plasma modeling, both development of concurrent algorithms for plasma particle-in-cell codes and application to physical problems, and also past work on transport in tokamaks."

Clifford E. Rhoades, Jr. - "For significant contributions to computational physics and their wide-ranging application, especially establishing an upper bound on neutron star masses, and developing robust algorithms for computing radiation and fluid flow."

Stephen R. Sharpe - "For outstanding contributions to the development and application of advanced computational techniques in particle theory."

RATIFICATION OF DIVISIONAL BYLAWS

The proposed Bylaws for the Division of Computational Physics have been approved by the members of the division. The vote count was 220 for, 0 against, and 3 abstentions (these ballots were returned unmarked). The provisions of the Bylaws, which had been followed informally prior to the balloting, now are in full effect.

MEETING ANNOUNCEMENTS

1993 Joint April Meeting of the APS and the AAPT

The Joint April Meeting of the APS and the AAPT will be held in Washington DC during the week of April 12. The Division is sponsoring one symposium and cosponsoring three symposia at the meeting:

Symposium of the Division of Computational Physics: Gyan Bhanot, Presiding

Lattice Gas Hydrodynamics – Theory and Experiment, Bruce Boghosian, Thinking Machines Corporation
Short Range Molecular Dynamics on Scalable Supercomputers, Roscoe Giles, Boston University
Analysis of Spin Models and Protein Folding by State Counting Methods, Paul Stolorz, Santa Fe Institute
Catastrophes and Self Organized Criticality, Per Bak, Brookhaven National Laboratory

Joint Symposium of the Divisions of Computational Physics and Particles & Fields: *Computing in High Energy Physics*, Peter Cooper, Presiding

The Software Trigger at CDF, Thomas Devlin, Rutgers University
High Energy Triggers Using Neural Networks, Myron Campbell, University of Michigan
Coarse Grained Parallel Computing in High Energy Physics, Steven Wolbers, Fermi National Accelerator Laboratory
Computing for an SSC Experiment, Irwin Gains, Fermi National Accelerator Laboratory

Joint Symposium of the Divisions of Computational Physics and Particles & Fields: *Lattice Gauge Theory*, Steven Gottlieb, Presiding

Non-Perturbative Higgs Physics in the Minimal Standard Model, Julius Kuti, University of California, San Diego
Studies of Quarkonium in Lattice QCD, Andreas Kronfeld, Fermi National Accelerator Laboratory
Recent Results from Weak Matrix Elements Calculations, Amarajit Soni, Brookhaven National Laboratory
The QCD TeraFlops Project, Norman Christ, Columbia University

Joint Symposium of the Divisions of Computational Physics, Astrophysics, and Physics of Beams: *Astrophysical Jets*, Megan Urry, Presiding

HST Observations of Jets in Active Galaxies, William B. Sparks, Space Telescope Science Institute
Numerical Simulations of Protostellar and Extragalactic Jets, Michael L. Norman, National Center for Supercomputing Applications

Jets from Young Stellar Objects, Patrick M. Hartigan, Harvard-Smithsonian Center for Astrophysics
Acceleration Mechanisms and the Physics of Beams, Robert Noble, Fermi National Accelerator Laboratory

Physics Computing '93

The Division of Computational Physics will host Physics Computing '93 in Albuquerque, New Mexico, May 31 – June 4, 1993. Co-sponsors of the meeting, which will also be known as The 5th International Conference on Computational Physics, are the AIP journal *Computers in Physics* and the European Physical Society. The venue will be the Albuquerque Convention Center.

The first day of the conference, as in previous years, will be devoted to tutorial presentations. A list of speakers and topics is given below. Each subsequent morning of the conference will open with a plenary session. The technical program will feature invited presentations as well as contributed talks and posters. An exhibit show featuring leading hardware and software companies, placement services, a press room, receptions, and a companions program also are being organized.

A special event to take place at this year's meeting is the presentation of the first Aneesur Rahman Prize for contributions to computational physics. This APS prize is sponsored by IBM, and consists of a $5,000 award, an allowance for travel to the meeting, and a certificate citing the achievements of the recipient. The honoree will be invited to deliver the Rahman Lecture at one of the meeting's plenary sessions. Nominations for the 1993 prize closed on March 1, 1993.

Abstracts of contributed papers for PC '93 must have been received by March 5, 1993. The Housing and Preregistration forms must be received by May 7, 1993. Post-deadline papers also will be accepted until May 7.

A preliminary epitome of Physics Computing '93 is enclosed with this newsletter. Questions, comments, or suggestions about the meeting can be directed to Conference Organizer Robert Swendsen or Program Chair Michael Creutz. Their addresses are given in the Roster on page 6. Additional information can be obtained electronically by anonymous ftp to `pinet.aip.org` in directory `pc93`.

Tutorial Subjects

Particle Simulation Methods, James W. Eastwood, AEA Technology, Culham Laboratory, UK
Monte Carlo Methods for Radiative Transfer in Astrophysics, Barbara Whitney, Harvard University
Quantum Monte Carlo Methods for Continuum Systems, David M. Ceperley, University of Illinois, Urbana-Champaign
Advances in Flux-Corrected Transport Algorithms: A Lazy Person's Approach to High-Resolution CFD, Jay P. Boris, Naval Research Laboratory
Introduction to Mathematica, Nancy Blachman, Variable Symbols Inc.
Introduction to Maple, Nancy Blachman, Variable Symbols Inc.
Programming in High Performance FORTRAN, Chuck Koelbel, Rice University
Modular FORTRAN: A Language for Building Large Parallel Programs, Ian Foster, Argonne National Laboratory
Requirements for High Performance Scientific Distributed Computing, David W. Forslund, Los Alamos National Laboratory
High Performance Computing Trends, or Massively Parallel Computing Comes of Age, Mark Seager, Lawrence Livermore National Laboratory
Introduction to the Finite Element Method: A Physicist's Approach – With Applications to Quantum Mechanics, L. Ramdas Ram-Mohan, Worcester Polytechnic Institute
2D Moving Finite Elements: An Adaptive Grid Method for Computational Fluid Dynamics, Alan H. Glasser, Los Alamos National Laboratory, C. Keith Miller, University of California, Berkeley, and Andrew P. Kuprat, Los Alamos National Laboratory
A Tutorial on Conjugate Gradient Methods, Steven Ashby, Lawrence Livermore National Laboratory
A Survey of Available Third Party Software for Applications in Physics, Chemistry, Engineering, and Mathematics, Suslarla Murty, Lawrence Livermore National Laboratory

Technical Sessions

- Numerical Algorithms & Methods
  - finite differences, adaptive meshes, multigrid and acceleration algorithms, particle methods, fast transforms, Lagrangian methods, eigenvalue solvers, finite element methods, sparse matrix solvers
- Networking & Databases
  - information retrieval, future directions in networking
- Education
  - computers in physics education
- Visualization
  - virtual reality, image processing, scientific visualization
- Computing in Experimental Physics
  - real-time computing, experimental techniques, data analysis
- Computer Languages & Architectures
  - parallel languages, parallel architectures, symbolic computation, neural networks, physical basis of computer hardware design
- Other Methods
  - quantum Monte Carlo; molecular dynamics; *ab initio* and fundamental structure calculations; fluids, plasmas, and turbulence; few body problems; chemical dynamics; N-body calculations; growth, aggregation, and fractals; cellular automata; chaos; macromolecules and protein folding; climate and pollution modeling; inverse problems; biophysics.

2nd International Conference on Computational Physics

The Institute of Applied Physics and Computational Mathematics, Beijing, the Center for Computationally Intensive Physics, Oak Ridge National Laboratory, and Drexel University, Philadelphia, invite participation in the 2nd ICCP, to be held in Beijing, Republic of China, September 13-17, 1993. It is a sequel to the 1st ICCP, held in Beijing in June, 1988.

Topics to be covered at this conference include:

- Hardware
  - computer architectures; networking
- Algorithms & Methods
  - lattice gases and cellular automata; molecular dynamics; methods in computational fluid dynamics
- Visualization
  - graphics; animation; multimedia; virtual reality
- Applications
  - grand challenges; computer-aided education; fluid dynamics; lattice field theories - QCD, QED; cosmology and astrophysics; atomic physics; nuclear physics; nonlinear dynamics; condensed matter physics

For further information about the conference, contact:

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beijing93@einstein.physics.drexel.edu

Hong Kong Workshop on Computational Physics

A computational physics workshop is being organized in Hong Kong for the week prior to the Beijing conference. It will be hosted by Hong Kong University on September 8-10, 1993. For additional details about the workshop, contact:

Professor P. Kevin MacKeown
Hong Kong University
hrsppkm@hku.bitnet

2nd IMACS International Conference on Computational Physics

The International Association for Mathematics and Computers in Simulation is sponsoring its second international conference on applications of computational science to physics and related disciplines. The meeting is being hosted by Parks College of Saint Louis University on October 6-9, 1993 in St. Louis, MO.

Among the topics to be covered at this conference are computational physics, chemistry, fluid dynamics, biophysics, semiconductors, mechanics, and statistical mechanics.

For further information about the conference, contact Professor Jean Potvin at:

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ROSTER OF EXECUTIVE COMMITTEE

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ROSTERS OF APPOINTED COMMITTEES

Nominating

Harvey A. Gould, *Chair*
Bruce Boghosian
Kate Kirby
Rubin H. Landau
Claudio Rebbi

Fellowship

Michael J. Creutz, *Chair*
Gary D. Doolen
Evelyn M. Goldfield
Shadia R. Habbal
Peter J. Reynolds

Publications

Roscoe C. Giles, *Chair*
Elaine S. Oran

International Liaison

David V. Anderson, *Chair*
John W. Negele
Elaine S. Oran

Prizes and Awards

Jay P. Boris, *Chair*
John D. Joannopoulos
Malvin H. Kalos
William H. Press
Ralph Z. Roskies

High Performance Computing (Ad Hoc)

Claudio Rebbi, *Chair*
David V. Anderson
John W. Negele
Elaine S. Oran
Ralph Z. Roskies

INSTRUCTIONS FOR VOTING

In this year's election we will elect a Vice Chair and two Members at Large of our Executive Committee. The candidates to be elected this year will serve on the Executive Committee of the Division for three years; their terms expire in the Spring of 1996.

For each of these positions we have two or more candidates. Their biographical information and policy statements are included to help inform you about them. Enclosed is a ballot sheet and a return envelope. Please vote for one candidate for the office of Vice Chair and for two candidates among those running to be Members-at-Large.

Mail your ballot in the enclosed envelope to the Secretary-Treasurer of the Division. It must be received by April 30, 1993 for it to be counted.

INFORMATION ABOUT THE CANDIDATES

Vice-Chair

Daniel C. Barnes
Group Leader
Plasma Theory
Los Alamos National Laboratory

Daniel C. Barnes received his Ph.D. in Applied Mathematics from Purdue University in 1975. From 1975 to 1980 he was a Staff Member of the Plasma Theory Group at the Los Alamos National Laboratory, serving as Assistant Group Leader for computations from 1978. In 1980 he joined the staff of the Institute for Fusion Studies at the University of Texas at Austin. In 1984 he founded the Austin office of Science Applications International Corporation, where he served as office manager until 1989. He currently heads the Plasma Theory Group at Los Alamos. He also has been a Visiting Scientist at the Courant Institute for Mathematical Sciences at New York University and the Institute for Plasma Physics, Nagoya, Japan. His current research interests include analysis and simulation of laboratory neutral and nonneutral, space, and astrophysical plasmas, especially low-noise, implicit particle simulation and dense nonneutral plasmas.

He has chaired the Sherwood Fusion Theory Executive Committee and is currently Chair of the Executive Committee of the Numerical Tokamak Project, a Department of Energy sponsored Grand Challenge. He is a Fellow of the APS and member of the Division of Computational Physics since 1991.

Candidate's Statement

The formation and rapid growth of the Division of Computational Physics reflects the revolutionary increase of computational capability available to the working physicist. Desktop systems with the capability of the most advanced 1980 supercomputers are now available and affordable. The same enabling technologies have led to the introduction of massively parallel mainframes with exponentially growing processing capabilities. All of these resources have enabled computational investigations of physical proesses with adequate resolution and parameter space variation to provide a true "numerical laboratory" for the study of complex physical systems. These numerical experiments, intermediate between true experiments and classical theoretical approaches, are revolutionizing the way that physics is done.

Our Division should continue to play an active role in promoting these new approaches to physics. There are two main components of this advocacy. First, we should advertise our successes and provide realistic projections of resources and capabilities to the larger community of practicing physicists and funding agencies. Second, we should promote the development of improved, reliable algorithms for efficiently utilizing a growing computational capability. I see this latter role as a great technical chalenge, as algorithm development continues

to lag hardware development. We have a unique role to play here: our organization across all branches of physics allows us to benefit from our diversity by focusing on the development and sharing of computational methods. If elected, I will use my position as spokesperson for the Division to continue to promote these roles.

Vice-Chair

Carleton E. DeTar
Professor of Physics
University of Utah

Carleton DeTar is Professor of Physics at the University of Utah, specializing in high energy theoretical physics.

He received his A.B. in Chemistry and Physics from Harvard College in 1966 and his Ph.D. in Physics from the University of California at Berkeley. He was a faculty member in the Department of Physics at the Massachusetts Institute of Technology from 1972 to 1978 at which time he joined the faculty at the University of Utah, becoming a full Professor in 1985. He has taken leave for extended visits to CERN in 1974, the University of Helsinki in 1981, and Kyoto University in 1988.

He currently is serving on the Steering Committee of the U.S. QCD Teraflops collaboration, which is proposing to participate with the MIT Laboratory for Computer Science and Lincoln Laboratories in the development and construction of an experimental massively parallel computer suitable for teraflops-scale computations in QCD and other applications. He also is a member of the San Diego Supercomputer Center Allocations Committee and the 1993 NSF Metacenter Grand Challenge Allocations Committee. He helped organize the regular meeting of the Division of Particles and Fields which took place in Salt Lake City in 1987. His experience with computers began with the IBM 650, and extends most recently to a variety of parallel machines, including workstation clusters. He teaches computational physics to both graduate and undergraduate students.

Candidate's Statement

For physicists at the end of the twentieth century, computers have become an indispensable tool for conducting research. The rapid growth in computing power has opened new possibilities that we have scarcely begun to realize. The complexities of parallel computation, the virtually untapped power of visualization, and the explosive growth of the global scientific information network present both challenges and opportunities for new avenues of research. The change is so rapid, we are all perpetual students of the new technology and methodology. Yet we also are teachers to the physics community at large, both in the academic world and industry. Thus it is not surprising that the Computational Physics Topical Group grew so rapidly to divisional status. Although most of us participate in our respective subject divisions, a strong overlap in computational methods brings us together. By its regular meetings and other activities our Division provides a forum for exchanging ideas about methods and, better still, provides an opportunity for interdisciplinary discussions of physics itself. Our sessions at the general meetings serve to inform the general membership about significant advances in computational physics. If elected, I will work to strengthen the continued vital international role of the Division as a vehicle for the interdisciplinary exchange of ideas about computational approaches and the dissemination of these ideas to the rest of the physics community.

Member-At-Large

Richard C. Brower
Professor of Electrical Engineering and Physics
Boston University

Richard Brower received a B.A. in Physics from Harvard College (1963), an M.A. from Harvard University in Applied Mathematics (1964) and a Ph.D. from the University of California at Berkeley in Particle Physics (1969). He did four years of post-doctoral research at MIT, Cal Tech and CERN in Switzerland (as an NSF Postdoctoral Fellow, 1970). After joining the faculty at UC Santa Cruz (1973-86), he received an A. P. Sloan Research Fellowship (1974) taking leave at the Stanford Linear Accelerator and MIT. Previous employment also included a Visiting Professorship at Harvard University (1980 and 1982) and as Visiting Scientist at Schlumberger-Doll Research, Ridgefield (1982). At present he is a member of the QCD teraflop steering committee and a managing editor of International Journal of Modern Physics C — Physics and Computers.

He has worked in several fields of theoretical physics — interactions of elementary particles, lattice formulation of statistical mechanics, quantum field theory and string theory. At Boston University he has worked to establish the Center for Computational Sciences and to develop new algorithms for quantum and statistical systems, exploiting methods such as percolation clusters and multigrid methods in the context of efficient parallel computation. Current work includes Random Matrix Methods for 2-d string/gravity, Chiral lattice models and new Monte Carlo methods for protein folding.

Candidate's Statement

The role of the APS Computational Physics Division is to promote computational physics as a new discipline co-equal to, but not separate from, theoretical and experimental physics. Thus I believe the major challenge is to develop the internal logic of new computational tools without causing a schism with the other branches due to a proliferation of jargon. Whenever possible new methods should be communicated to our colleagues and introduced into the educational curriculum. To this end I would promote both the Divisional meetings stressing our deep interdisciplinary roots which help to foster a common mathematical and software environment for algorithmic design and implementation as well as new forums for single (or few) research topic meetings which can bring new computational methods into traditional fabric of theoretical and experimental physics and into the general educational curriculum.

Member-At-Large

Barry M. Klein
Professor of Physics and Department Chair
University of California, Davis

Barry M. Klein received his Ph.D. in condensed matter theory from New York University in 1969. From 1969-71 he had a postdoctoral research appointment at the Naval Research Laboratory. In 1971 he became a member of the NRL staff working in condensed matter and plasma physics on the theory of x-ray emission from laser-produced plasmas. In 1978 he became head of the NRL Electronic Structure of Solids Section and led a theoretical effort in electronic structure studies of a wide range of solid systems, with particular emphasis on fundamental investigations of superconducting properties and point defects. In 1984-85 he was Program Manager for Condensed Matter Theory and Acting Section Head for Condensed Matter Sciences at the National Science Foundation. Dr. Klein returned to NRL in 1985 and became Branch Head for Condensed Matter Physics, and supervised research in experimental x-ray physics, plasma spectroscopy and synchrotron radiation, in addition to theoretical condensed matter research. In 1989 Dr. Klein became Branch Head

for the Complex Systems Theory Branch, leading a theoretical effort involving over 20 scientists engaged in studies of a wide range of condensed matter properties, from electronic structure theory, to many body theory, to atomic physics. In 1992 Dr. Klein became Professor of Physics and Chair of the Department of Physics at the University of California, Davis.

Barry M. Klein has been the recipient of an NASA undergraduate Fellowship and an NRC Postdoctoral Associateship. He has received many NRL awards including a Meritorious Civilian Service Award in 1992. He has served as Chair of the Peer Review Board of the NCSA and Pittsburgh Supercomputer Centers from 1988-91, and has been a member of numerous other NSF, DoD, and DoE Committees. He is currently on the High Performance Computing Advisory Board for Los Alamos and Oak Ridge National Laboratories; the Advisory Board for the Pennsylvania State Materials Research Laboratory; and the Executive Board of the journal Modelling and Simulation in Materials Science and Engineering.

Barry Klein's condensed matter research efforts have been in electronic structure theory and computer applications. He has published widely in the areas of superconductivity, defects, alloy theory, and magnetism. His current interests are in superlattices, quantum dots and wires, developing accurate model Hamiltonian methods, and formulating new electronic structure approaches for parallel computers.

Candidate's Statement

My entire research career has been focused on using both theory and computation to solve problems in condensed matter physics, materials science, and computational chemistry. The combining of these three fields in one sentence is deliberate, since I would like to emphasize that many of our science and engineering disciplines have many overlapping computational goals and techniques. This commonality has been particularly apparent to me in my varied committee assignments and editorial service, and points up a very important, and practical, function of our organization — the bringing together of different, but related, research areas under a common organizational umbrella in the APS to serve our mutual interests. Important functions that we should perform include: promoting meetings that emphasize the synergisms that are present in our fields; lobbying the different funding agencies to support computational research; helping our research students and unemployed brethren to find employment; working to create and promote new educational paradigms that meet the needs of students.

The field of computational research has shown huge growth in recent years (and is expected to continue), and with the expectation that we will become more and more of a "software society," our Society and our Division will have to assume an increasing leadership role as a major representative of our common interests. My career, having traversed several generations of hardware and software, and my past service in the "computational infrastructure," gives me a good perspective to help our Division meet the future challenges.

Member-At-Large

Dawn C. Meredith
Associate Professor of Physics
University of New Hampshire

Dawn Meredith obtained her Ph.D. in Physics from the California Institute of Technology in 1987 after receiving her M.S. in Physics from Caltech and her B.A. in Liberal Arts from St. John's College in Santa Fe. She joined the UNH faculty in 1987. Her thesis work was at the interface of nuclear physics and quantum chaology, studying the statistics of a nuclear shell model. Her research continues in the field of quantum chaology, investigating properties of a quantum mechanical systems in the semiclassical limit, focusing on the statistical properties and morphology of eigenfunctions and on nonlinear Hamiltonian dynamics. She is co-author with Steve Koonin of "Computational Physics - Fortran Edition" (Addison-Wesley, Reading, 1990) and is currently involved in an effort to design an interdisciplinary scientific computing course.

Candidate's Statement

Computational Physics is a synergistic enterprise, combining theoretical and experimental physics with numerical and programming methods to give results greater qualitatively different than any of the fields alone.

It is also synergistic in that it brings together not only all members of the physics community, but also members of the scientific, engineering, applied mathematics, and computer science communities, where the results or needs of one field promote research in another. The Divisional meetings and publications must reflect this broad constituency if it is to fulfill its role to enhance computationally based research.

The Division also has a unique opportunity to guide the growth of education in computational physics. Only in the last decade has computer hardware become so affordable that computational work can be incorporated into the undergraduate cirriculum. While there has been much work focused on including computational work in the graduate and undergraduate cirrculum, both as part of "standard" classes and also in courses devoted to this subdiscipline, we have yet to place this subdiscipline on an pedagogical footing comparable to, for example, mathematical physics. The Division must make an effort to continue the dialog concerning the place of computational physics in education and the details of how to teach it well.

Member-At-Large

Michael R. Strayer
Head of Theoretical and Computational Physics
Oak Ridge Nationial Laboratory
and
Professor of Physics
University of Tennessee

Michael R. Strayer graduated from the University of Oregon in 1965 with a B.S. in Mathematics, and from the Massachussetts Institute of Technology in 1971 with a Ph.D. in theoretical physics. He was awarded a C.N.R.S. fellowship at the Institut de Physique Nuclaire, France, 1971-1972, and was a principal research associate at the Daresbury Laboratory, United Kingdom, 1972-1977. After returning to U.S. he was appointed as an assistant professor at Texas A&M University, 1977-1979, and at Yale University, 1979-1983. In 1983 he became a Senior Scientist in the Physics Division of the Oak Ridge National Laboratory. Since 1991 he is the Head of Theoretical and Computational Physics at ORNL, and is also a Professor of Physics at the University of Tennessee. His work has been primarily in the area of many-body nuclear and atomic physics, classical non-linear systems, chaos, and non-perturbative quantum electrodynamics. Dr. Strayer has co-authored over a hundred theoretical and computational physics journal articles and has organized four conferences and one summer school on computational physics.

Currently, Strayer is the principal investigator of four Department of Energy contracts, including the Computational Science Education Project, a project to develop an electronic syllabus for computational science education in the pure and applied sciences, and the computational Grand Challenge, "The Quantum Structure of Matter," funded by the High Performance Computing and Communications Program.

Candidate's Statement

Advances in computer technology and algorithm development are suggesting a radically different approach in performing scientific research. The future US competitiveness and its technological superiority strongly depends on the maximial utilization of these resources. The change will not only influence the way research is conducted but also is expected to alter the entire educational system. I believe that one of the tasks of the computational science community is to provide the leadership for transforming our educational curriculum to take advantage of these developments. Electronic books with realistic examples and multimedia will replace today's more pragmatic textbooks. I believe the Division of Computational Physics could be a catalyst in this endeavour.

BALLOT

Vice-Chair: Vote for one candidate.

- ☐ Daniel C. Barnes
- ☐ Carleton E. DeTar

Members-at-Large: Vote for two candidates.

- ☐ Richard C. Brower
- ☐ Barry M. Klein
- ☐ Dawn C. Meredith
- ☐ Michael R. Strayer

Please return your ballot in the envelope provided. It must be received on or before April 30, 1993 for it to be counted.