1991 Symposium on Applied Computing
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1991 Symposium on Applied Computing
April 3-5, 1991
Kansas City, Missouri

Conference Chair's Message

On behalf of the University of Missouri-Kansas City, it is my very real pleasure to welcome you to the 1991 Symposium on Applied Computing. In this last year for a "SAC," we are continuing the pattern of recent symposia toward higher quality, wider geographic participation and increased attendance. More than two-thirds of the 100 or so papers submitted have been accepted for publication in these Proceedings. The authors represent academic, industrial and government institutions in 19 states from Massachusetts to California, from Minnesota to Louisiana, and 5 foreign nations. The papers cover a wide range of topics in applied computing and address many of the most exciting issues in their fields. I am sure you will find this year's conference stimulating and rewarding, and the Proceedings a valuable addition to your personal literature.

The job of conference chairman can be exhausting, exasperating and not much fun...but it was not that way for me! The real work of putting SAC '91 together has been shared by a large number of energetic, dedicated people who deserve all the credit. The Program Co-Chairs, Vijay Kumar and Beth Unger, carried out their regular responsibilities with professional dispatch while implementing an intense paper review regimen, highlighting four invited speakers and a keynote address by a long-term member of the National Research Council, and introducing a tutorial program for the first time. Alan Goerner is the architect (and one of the tutors) of the three tutorials being offered in Object Orientation and ISDN. The multitude of onerous planning tasks that go into a conference of this quality and size were reduced to a sequence of seemingly easy decisions for me by Stephanie Griffin and Andrea Duncan. Without their constant attention to detail and boundless enthusiasm for the tasks at hand, no part of the conference planning would have succeeded as well as it did. Barbara Smith and her associates in University Communications gracefully handled the artistic and journalistic issues. David Scholmer and Dasari Tej skillfully managed the conference budget and registration process. Bob Werner and his colleagues at IEEE Computer Society Press coordinated the publication of the Proceedings. Eleanor Brantley Schwarz, Vice Chancellor for Academic Affairs (my boss!) and UMKC Chancellor George A. Russell provided solid support throughout the entire effort. The SAC '91 Steering Committee, and particularly last year's symposium chairman and next year's SIGAPP chairman Hal Bergel, has helped in countless ways to make this year's conference a success. And, of course, the entire program committee (all 43 of them!) earned accolades for the outstanding technical program they assembled. To all these people go the rewards of success. Anything else is my responsibility.

Institutional sponsors for the 1991 Symposium include the National Science Foundation, the University of Missouri-Kansas City and its Computer Science Telecommunications Program, and the UMKC Student ACM Chapter.

It has been a privilege and an honor to be chosen to chair the SAC '91 conference. It was a challenge and it was fun. Now let's move on to SIGAPP in 1992!

Sincerely,

Richard G. Hetherington
SAC '91 Conference Chair
1991 Symposium on Applied Computing
April 3-5, 1991
Kansas City, Missouri

Program Chairs' Message

The conference Symposium on Applied Computing has become a successful international forum for the presentation of state-of-the-art research results in several areas of computer science, emphasizing the applied nature of this research. The high quality of this year's conference is evident from the composition of the technical program committee, stream chairs, and the contents of the proceedings. The proceedings contain papers chosen for presentation at the conference, hosted by the Computer Science Telecommunications Program of the University of Missouri-Kansas City, Kansas City, Missouri.

The call for papers attracted 100 submissions from all over the world in a number of areas of applied computer science, of which 45 were accepted for both presentation and publication in the proceedings. The volume and quality of submissions indicate the continued health of the conference.

This year's conference, while maintaining the traditions of the Symposium on Applied Computing, has some additional features. Tutorials will be offered on Object-Oriented Technology and ISDN, and four internationally known researchers have been invited as speakers. They will present state-of-the-art research in areas of applied computer science.

We express our thanks to all authors who submitted papers, to the stream chairs for organizing a thorough review of the submitted papers, to the tutorial chair for organizing tutorials on important topics, and to all the reviewers for their excellent technical review. We also express our special thanks to the program committee and the conference chair for their contributions in making this conference a success. We hope you will find SAC'91 stimulating and invite you to enjoy the ambiance of Kansas City. See you there!

Vijay Kumar
Program Co-chair

Beth Unger
Program Co-chair
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Keynote Address

American Research Enterprise: The New Realities

David Bodde
Vice President, Midwest Research Institute
President, MRI Ventures

Abstract

Computer science and applications occupy a unique place in America's technological infrastructure. On the one hand, applied computation is advancing apace, driven by progress in solid state physics, microelectronics, artificial intelligence, and a host of other disciplines. On the other hand, applied computing is itself an extraordinary engine of development, enabling advances in engineering and basic science. Thus, this middle ground may be an ideal position from which to view the emerging forces affecting American research enterprise, the new realities of our time.

Three trends have accelerated since the mid-1970s. First, the ability to use (not necessarily originate) advanced technology has become central to the ability of any nation to generate economic wealth. Second, the technological capabilities of the major industrial nations and a host of new economic powers have converged markedly. And third, discrete national technical enterprises have become untenable, and advanced technology has shown no respect for borders. Thus, the United States faces global, technological competition under terms that did not exist 15 years ago.

To be sure, the United States has many strengths to draw upon. Our overall R&D budget remains larger than that of Japan, Germany, the United Kingdom, and France combined. Our research universities are the envy of the world. We build advanced weapons that work. We are a formidable competitor.

But at the margins, our economic position continues to erode, in part because many of our current practices do not mesh well with these new realities. We invest heavily in basic research and in procuring special technologies for the government's own use -- in space and defense, for example. This is necessary and helpful. Alone, it is not enough.

We must learn to invest, systematically and for the long term, in the entire value chain of activities that lead from good science to a world-competitive product or service. Interestingly enough, the true pioneers in such investment have not been in the federal government at all, but rather in the states. We must find ways to increase the technical literacy of the American people and to persuade more talented persons to enter careers in science and technology. And most fundamentally, we must build a widespread consensus among political leaders, business leaders, and the public at large that American economic competitiveness is not linked exclusively to our resources but also to our ability to use technology capably and wisely.

We in the technical community have an important leadership role. We must speak these truths to the holders of political power. We must become part of the consensus-building process and pursue constructive change with the same awareness and zeal that we invest in our technologies.
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