

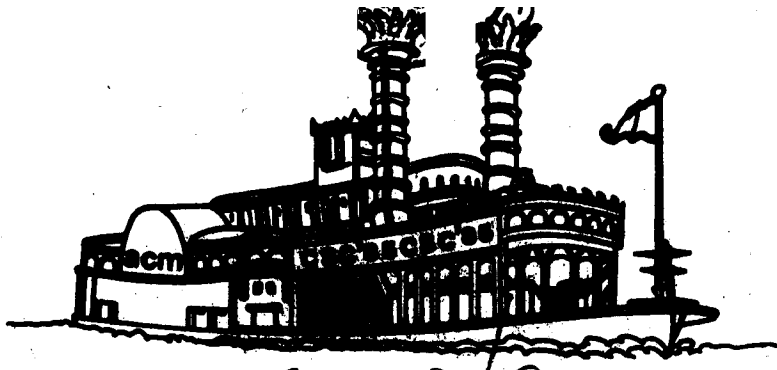
**1985 ACM
Thirteenth Annual
COMPUTER
SCIENCE
CONFERENCE**

PROCEEDINGS



Association for Computing Machinery

**1985 ACM
Thirteenth Annual
COMPUTER
SCIENCE
CONFERENCE®
March 12-14, 1985**



**New Orleans Marriott Hotel
New Orleans, Louisiana**

The Association for Computing Machinery, Inc.
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TECHNICAL PROGRAM ENTRIES

MESSAGES FROM THE:

- **ACM PRESIDENT**
- **CONFERENCE CHAIRMAN**
- **PROGRAM CHAIRMAN**

MESSAGE FROM THE PRESIDENT

Conferences are a vital part of ACM—they are a chance to meet colleagues in order to share and evaluate technical interests. The ACM Computer Science Conferences have been exceptional in their breadth and variety of opportunities to exchange ideas and personalities. CSC '85 continues and extends this tradition. The technical program highlights the growing interest in systems integration, management and use of shared information, and control over the impact of electronic technologies. The topics are important; the chance to meet in New Orleans to discuss these topics is equally important. I hope you enjoy this time at your Conference.

Adele Goldberg
ACM President

CONFERENCE CHAIRMAN'S MESSAGE



Welcome to New Orleans and the 1985 ACM Computer Science Conference. As the leading broadly-based academic computer science conference, CSC '85 will provide you with a unique opportunity to broaden your professional horizon. In addition, you will have the opportunity to meet in both technical and social settings with colleagues, both previous and newly acquainted, to further the exchange of technical ideas and experiences.

An exceptional technical program has been developed by the Program Committee chaired by Dr. Wayne D. Dominick. The Program Committee has given the Conference a new professional direction by emphasizing keynote addresses, invited papers, and refereed papers. In addition, the Conference has retained the previously popular abstract sessions. The technical program is organized around three theme days, each of which relates to a research subject of contemporary relevance.

The technical program is enhanced by a number of other important activities. One of these is the Technical Exhibits, which are increased in number by more than thirty percent over those at CSC '84. On display will be the latest publications, products, and services available in the computing field. The ACM International Scholastic Programming Contest will be held on Wednesday evening and will include two innovations. They are: (1) the use of Personal Computers by the contestant teams and judges and (?) the inclusion of a spectator's area. A Department Chairpersons' program and luncheon will be held on Wednesday. Finally, the Annual Employment Register will be held during the Conference.

The technical program is enhanced by a unique social program that could be held only in New Orleans. These include (1) a riverboat reception and Mardi Gras parade on the historic Mississippi River on Wednesday evening, (2) the Conference Luncheon on Thursday, and (3) a Cajun Crawfish boil on Thursday evening. In addition, receptions will be held on Monday and Tuesday evenings. Live Dixieland and Cajun music will be provided at all receptions and at the Cajun Crawfish Boil to provide the proper New Orleans atmosphere. Finally, tours of enchanting New Orleans and its environs will be available before, during, and after the Conference.

CSC '85 was made possible by the tireless efforts of the numerous talented volunteers on the Conference Steering Committee and its subcommittees and the dedicated group of conference staff members at ACM Headquarters. All of them have worked many hours over the past year to make CSC '85 the success that we are confident you will find it to be. Enjoy the Conference and the enchanting city of New Orleans!

*Terry M. Walker, Ph.D.
Conference Chairman*

MESSAGE FROM THE PROGRAM CHAIRMAN



The Technical Program for CSC '85 was constructed with one goal foremost in our minds, namely, organizing the most professional Technical Program that has ever been presented at an annual ACM Computer Science Conference. Toward this end, the CSC '85 Technical Program exhibits a new and major emphasis on the presentation of rigorously refereed papers, while still blending in the traditional orientation toward the presentation of a large number of brief abstracts of research and development activities.

The Technical Program is structured into three theme days, representing three primary research and development thrusts within the field of computer science today and into the future. These three theme days are:

*****DIGITAL SYSTEMS DESCRIPTION, DESIGN AND SYNTHESIS TECHNIQUES**

****INTEGRATED INFORMATION SYSTEMS**

*****DISTRIBUTED PROCESSING, DISTRIBUTED CONTROL AND DISTRIBUTED DATA.**

The tone for each of these theme days is established in the morning plenary sessions consisting of one keynote address and two invited papers on each day. These presentations by highly respected authorities in the theme areas are followed by afternoon sessions of refereed paper presentations and panel discussions. In addition to the keynote and invited papers, we are pleased to be able to present a program consisting of 39 refereed research papers—over 6 times more refereed papers than have been presented at any previous ACM Computer Science Conference.

Additionally, we have been able to maintain the traditional ACM Computer Science Conference orientation toward the presentation of unrefereed abstracts of research and development activities. CSC '85 is continuing this excellent tradition by supporting 15 abstract sessions, comprising 90 such research and development abstract presentations.

The Program Committee is very proud of the level of professionalism that is manifested within this Technical Program. We believe that it is the best Technical Program that has ever been offered at an ACM Computer Science Conference. We are confident that you will agree.

*Wayne D. Dominick, Ph.D.
Program Chairman*

ACKNOWLEDGEMENTS

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SARA IN THE DESIGN ROOM*

Gerald Estrin
Computer Science Department
University of California at Los Angeles

This paper presents an overview of SARA (System ARchitects Apprentice), an interactive environment which was created so that designers might enhance their capabilities to effectively design concurrent computer systems. SARA's requirements, methodology, support tools, and experiences are summarized in turn. The paper ends with a discussion of collaborative capabilities needed in the "design room".

INTRODUCTION

SARA is an acronym for System ARchitects Apprentice. The name represents a design philosophy which is concerned with a framework for computer based tools to extend the capabilities of computer system designers. The need for SARA was driven by increasing complexity of computer systems and by the question whether, through formal models and automation, it was possible to reduce the gap between designers' intent and actual system behavior. The author first became aware of such a need when he was faced with the task of predicting and diagnosing ailments of the early computer system at the Institute for Advanced Study in Princeton [1]. The need became real on a larger scale as a consequence of a proposed unconventional "restructurable" computer architecture requiring many special purpose designs of hardware and software systems, capable of operating concurrently [2-4]. A major byproduct of this research was the UCLA Graph Model [5-7] used to represent flow of control and later shown to be equivalent to Petri Net models.

An extensive period of UCLA student research and development resulted in a working computer-aided design system, called DCDS (Digital Control Design System), to support hardware or firmware system design [8]. Another group investigated basic limitations in performance measurement. A third group formalized graph models of concurrent systems and revealed the analytic power that could be brought to bear on those models [9]. It became clear that new design methods were needed if we were to create predictable, analyzable, and measurable computer systems. All of that research culminated in a proposed methodology and a proposed set of computer based tools to support multilevel design of concurrent hardware or software systems [10].

Based upon a small set of modeling primitives, some fundamental tools were designed, implemented and then integrated in an advanced design environment. SARA was built, first at UCLA and then, via the ARPA Network, at MIT. Presentations on methodology, goals and experiences introduced SARA to scrutiny of professionals in 1977 and 1978 [11-13].

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