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Message from your Honorary Chairperson

Let me express my sincere gratitude to our distinguished Program Chairperson, Professor Gio Wiederhold, for inviting me to write this message. I feel deeply honored.

The *International Data Engineering Conference* was born in 1984 in Los Angeles. Many of us were a little concerned because of its broad focus. We were greatly pleased, however, by the extremely high quality of the papers that were presented. In some sense these papers provided us with the real meaning of "Data Engineering." To most of us, that term exemplifies the synergism that is developed by the harmonious interaction of several disciplines, including Knowledge Engineering and Artificial Intelligence, Data Base Engineering, Software Engineering and Computer Architecture to solve real world problems.

This Second Conference emphasizes and amplifies our original intent. Our authors have to be congratulated for the quality of their papers. Professor Bruce Berra has, as usual, shown outstanding leadership as General Chairperson with his excellent organization and coordination of several efforts required of this Conference. Without his continual enthusiasm and insight, these Conferences would not have been possible.

Our warm congratulations go to our Program Chairperson Gio Wiederhold for selecting an excellent Program Committee and organizing a wonderful program. His staunch adherence to high quality, and topics of technological importance are reflected in the papers presented in these proceedings.

Professor Peter Ng served very masterfully as the Tutorial Chair. Our sincere appreciation goes to Mr. Aldo Castillo, Mr. Walter Bond, Dr. Mas Tsuchiya and Professor K.H. Kim for their exceptional work as Treasurer, Local Arrangement Chairperson, International Liaison Committee Chairperson and Awards Committee Chairperson respectively. Sincere appreciation also to Professor Ichikawa and Professor Weber, co-chairpersons of the International Coordination Committee.

The Best Student Paper Awards in this Conference and its successors are named after Professor K.S. Fu of Purdue University, whose untimely death has saddened many of us. In him we lost an intellectual giant, a kind and generous friend and most importantly, a great teacher. We are proud to commemorate his wonderful achievements and contributions through this modest action. We owe our gratitude to Professor Wiederhold for coming up with this wonderful idea.

In conclusion, we thank our authors, our referees, committee members and most importantly, our participants for helping to make this conference a great success.

Sincerely yours,

C.V. Ramamoorthy
Honorary General Chairperson
Chairperson, Steering Committee

Foreword

Data Engineering is concerned with the role of data and knowledge about the data in the design, development, management, and utilization of information systems. It encompasses the more traditional aspects of data bases as well as knowledge bases and, in general, the management of numerical, textual, symbolic, and pictorial information. Research, design, and development areas within data engineering include models, logical and physical design, distributed systems, tools, software and hardware architectures, security and integrity, system modeling and design, intelligent systems, and development of ways to prolong the useful life of the data.

In organizing a conference such as this perhaps the easiest job is that of General Chair. All the General Chair really has to do is to choose the right people for the various Committee positions and then sit back and watch the smooth flow of the process, with perhaps a little fine tuning here and there. This has been the experience for me in this Conference. So I must give credit where credit is due and that is to each and every member of the conference committee. However, I'd like to single out two people who worked extra hard, Gio Wiederhold for the technical program and Walter Bond for local arrangements. Without their efforts the conference indeed would not have been possible.

Finally, I'd like to thank all of the authors and you the participants for your support. I hope you have a rewarding experience.

P. Bruce Berra
General Chairperson

Acknowledgements

This meeting would not have been possible without the contributions of time and intellect made by a large number of volunteers. Special thanks go to the Program Co-Chairs, the members of the Program Committee who were active in reviewing the submissions, and the many individual reviewers pressed into service. Thanks are also due to Mary Drake and Ariadne Johnson, who dealt with the getting papers in and out, and called authors and reviewers to resolve all the problems that arose. Voy Wiederhold was also drawn into support activities when work became overwhelming.

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Thanks are also due to the organizations which made it possible for these individuals to contribute their time. We hope the experience is mutally beneficial for all. We are counting on your continued support. See you all in 1987 as well.

For the IEEE Computer Society and the Program Committee of the Data Engineering Conference,

Gio Wiederhold
Program Chairperson

Conference Overview

Gio Wiederhold
Department of Computer Science
Stanford University

Introduction to the Proceedings

It has been exciting to put the program together for the Second Data Engineering Conference. We operated on a fairly tight schedule, received a large number (184) of submissions, and interacted with members of the program committee all over the world. All submitted papers were reviewed by one of the program co-chairs and by at least two members of the program committee, sometimes aided by local reviewers.

The Program Committee for the Second Data Engineering Conference met first during VLDB in Stockholm and processed those papers for which sufficient reviews had been received in time. These decisions were considered and the remaining papers processed at the second meeting, held at Stanford on September 21 and 22, 1985. To assess the level of international participation, we can tabulate:

	Submits	Accepts	Prog.Comm.
Africa	3	0	0
Asia	23	7	5
Australia	0	0	1
Latin America	3	0	1
Europe	48	15	16
North America	108	53	44

While these numbers are probably not representative of the distribution of Data Engineering activities in the world, we are glad to have had such a broad response. We would like to bring the numbers of acceptances and reviewers into better balance with the submissions. Acceptances should broaden as the expectations and standards for this conference become better known. Having remote reviewers requires for us to plan for delays and differing habits of dealing with correspondence.

Many good papers were not accepted due to constraints of space and time at the conference. While more parallel sessions could increase the opportunities for presentations, they tend to make the conference less satisfactory for the attendants and also force more severe size limits on accepted papers. I like to avoid arbitrary limitations in file systems and in papers. My attititude is that one should always write as concisely as possible, but never omit essentials. Quality was the primary criterion for acceptance, in some popular areas the cutoff was more strict. Theory papers were judged on relevance to data engineering. We have tried to provide useful feedback to all authors, so that work which was not now accepted will benefit from the review process.

Data Engineering

The ability of the banner "Data Engineering" to attract a substantial set of coherent papers to this conference reduces the need for definition of this term, coined last year for this conference series. Data Engineering can be viewed as a complement to Program Engineering. In our domain we concentrate on the semantics and structuring of data in order to complement the more developed fields of program semantics and structuring. However, we recognize that Data Engineering technology lags behind Programming technology. We do not have the equivalent of a Backus-Naur-Form notation to describe our tools, for instance the various data models, in a rigorous syntactic format. In terms of semantic understanding the two sides seem to be running even, although an increased formalization of data semantics should provide benefits.

Whether a data-oriented approach or a programming-oriented approach should dominate software and system engineering depends on the application domain. In the applications where the algorithms are simple, the data volume is large, or where data live longer than programs, the data engineering approach seems best.

The Topics

We find that papers submitted and accepted cover traditional as well as novel areas. Major areas of interest included data modeling, concurrency control, and distributed systems. Data modeling, while vital, is a particularly problematical area for publication. How does one prove that a new or improved model of data is a significant improvement over what exists? In an academic setting no realistic experiments are feasible. Industry is rarely in a position to compare alternatives. Even single instances of experience are hard to report since

they require the exposition of the information flow of an entire institution. The session on specification may help direct further research here.

Mapping of the model to a physical implementation is an area where more experience should be reported. We have several sessions on fundamental issues of physical design and performance. Performance of data systems remains always a crucial concern. Plans for databases in an Ada environment are significant since this language is making a transition from dealing with embedded software to general data-processing use. A session on database machines should help assess progress in this active area.

Issues beyond traditional databases, but certainly within the scope of data engineering, are heterogenous and multi-media databases. Concepts of artificial intelligence enter when we consider knowledge base systems, fuzzy systems, and temporal databases. Some rethinking in these areas may be appropriate; solutions appropriate for the regular and rigid structures seen in commerce create problems. Examples of such problems are found in databases to support engineering design. While the benefits associated with comprehensive data management seem obvious, current use is tentative and not yet accepted by the profession.

The proof of the pudding is in the eating. The proof of database concepts is in their application. We will continue to look towards industrial experience to record success and failure.

Discussion Sessions

We are experimenting in this conference with a concept of having *discussion sessions*. We find that in conferences panel sessions are often popular, but sometimes disappointing when speakers are not adequately prepared. We have selected, without special consideration of the individual papers in the sessions, five sessions for a new format. The authors' papers will appear in full in the proceedings, but the authors have been asked to only present a summary and then participate in a discussion on the session topic. Questions to be addressed are expected to be of the form as 'where do we stand' and 'whither should we go'. We hope that by having as discussants authors of refereed papers we will assure preparation, concern, and commitment. The chairs of these sessions will have increased responsibility; we have asked in each of these sessions an additional discussant to help move things along. Feedback about this concept from the participants and the audience will be appreciated.

We are complementing these discussion sessions with three traditional panels in areas where research directions are being set.

The Next Steps

The response we had to the conference led to the decision to continue with a Third Data Engineering Conference to be held in February of 1987, probably at another site, but continuing in the area of Los Angeles or San Diego. Prof. Benjamin Wah, one of the program co-chairs this year, has consented to be the program chairman next year. A call-for-papers should be available at this meeting.

The shortened cycle will also mean that we will try to shorten the publication cycle for the outstanding papers forwarded by the program committee of this second Data Engineering Conference to the editors of the IEEE Computer Society Transactions on Software Engineering, IEEE Computer, Software, and Expert Magazines. For ongoing state-of-the-art reports, we see IEEE Computer Society Database Engineering Bulletin as the principal vehicle.

We would like to expand the industrial participation in future Data Engineering Conferences to an entire track, rather than one session. We will use different standards for acceptance, but not lesser ones, for such submissions. It is essential for academic researchers to listen to the experiences gained in industry if they are to provide relevant solutions to real-world problems. To make that possible it is necessary that industrial papers contain facts, with precise definitions. In academia there is really no opportunity to establish an environment of realistic size for testing hypothesis. Not having realistic demonstrations makes it easy for industry to dismiss academic results as being irrelevant. I believe a major mission of the IEEE Computer Society is to bridge the industry to academia gap; it is your participation that can build this bridge.

What have we learned?

The final plenary panel of this conference session is devoted to a summary, and it is obviously not possible to have this summary in the proceedings. Questions to be addressed at the summary session center around the general theme: "What have we learned?".

As stated in the introduction, we are looking for better understanding of data, and through it, improve the management of data. We will try to present the conclusions within the journal issues carrying papers, selected from this conference, for further publication.

I wish us all a successful and fruitful conference.

Gio Wiederhold.

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