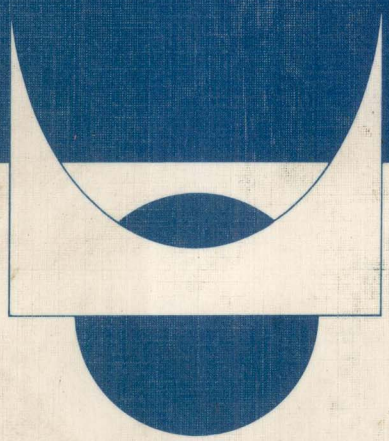
Information Technology 78

JOSEF MONETA
Editor



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Edited by
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Israel Ports Authority
Tel-Aviv, Israel

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EDITOR'S PREFACE

These proceedings contain the papers presented at the Third Jerusalem Conference on Information Technology in 35 sessions devoted to invited, solicited and contributed papers, not including the sessions for panel discussions.

Since the focus of the Conference was on technology transfer, this theme naturally attracted a great deal of attention. Yet, as the papers show, case studies of successful technology transfer are rather the exception. The reason is that technology does not operate in a vacuum; it requires an economic, cultural and technical environment which cannot easily be replicated beyond the confines of the society in which it developed originally. And, even there, a successful transfer of technology cannot be taken for granted as is shown by an empirical study, reported in one of the papers, of the transfer process from the research stage through to the marketed product in highly developed countries.

Other major themes of the Conference were software and programming languages, communications and networks, databases, computer descriptions and their uses, and advanced computer applications in geographic map processing, satellite image processing, medicine, computer aided design, education, banking, and in information retrieval, rounded out by papers reminiscing on the history of computers in the U.S.A., England and Israel, or trying to foretell the development of computer chess in the next decade. A novel use of computers is advocated in an article on the involvement of the citizen in the public domain, while yet another writer pleads for placing human values above the calculus of efficiency, a plea well in keeping with the moral tradition associated with Jerusalem.

The extremely tight publication schedule, combined with a slow international mail turnaround, ruled out any possibility of returning to the authors for correction any papers that failed to comply with the standard format requirements, or those that needed editorial "brushing up". There were very few papers that did not require corrections, from minor modifications for spelling errors, solecisms, missing header lines, figure captions, legends, and even missing authors' names, to major changes when papers required shortening in accordance with referees' recommendations, or uncommon usage of the English language obscured the meaning, or where the main thrust of an author's argument became lost in wordy or entangled prose.

Papers requiring major modifications were retyped and proofread locally. Others, which formed the majority, were annotated by the editor for correction by the publishers, the North-Holland Publishing Company. All papers received were forwarded to the publishers for preparation of the film from which the Proceedings were printed.

The editor would like to apologise to authors whose papers have had to be modified, for not having been able to consult them in order to obtain their prior permission. In each case, the utmost care was taken to preserve the spirit of the articles and the style of the authors.

If the Proceedings are now easily readable, in spite of the widely varying cultural and linguistic backgrounds of the authors, the editor's work will not have been in vain.

The editor would like to thank Drs. Willem Dijkhuis and Mrs. Titia Kraaij of the North-Holland Publishing Company for their invaluable assistance in having the Proceedings printed, to Mrs. Ruth Kuperman of the Information Processing Association of Israel for help with various technical chores, and to his wife, Margo, for assisting with the correspondence.

Josef Moneta
Editor

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Foreword by Chairmen of Conference Steering Committee

This is the third time that the Jerusalem Conference on Information Technology is being held. The first such Conference was convened in 1971, and it was followed by JCIT2 in 1974.

We can hardly call the succession of three conferences a tradition, but we do hope it will turn into one, providing a constant opportunity for professionals in developing countries to meet and exchange ideas in Israel, a country that occupies an intermediate position between developed and developing countries and can serve as an efficient link in the transfer of computer technology.

Like its predecessors, JCIT3 has been organized under the sponsorship of IFIP and a number of prestigious national computer societies. The Information Processing Association of Israel, the national member of IFIP, is the organizer of JCIT3, which is being promoted by the Computer Committee of the Jerusalem Economic Conference.

It is needless to say how much work has been invested in the preparation of this Conference. Over 150 people participated actively in Israel and abroad in the steering committee, program committee, national committees, youth competition and chess committees, as authors of papers, discussants, and panelists. Two innovations distinguish JCIT3 from its predecessors: first, an international chess tournament, including the world champion program of the IFIP 1977 Congress in Toronto. Secondly, an international youth competition in computer science in whose finals youngsters from the USA and Israel will compete for first, second, and third prizes.

For almost three decades, computers have been influencing the development of society. Frequently computers have turned out to be a real blessing. Nevertheless, they have also become controversial for various reasons, one being that computers are not yet used as efficiently as they could be and, secondly, that they threaten to have disturbing effects on society, if proper precautions are not taken.

Computers are not utilized as effectively, as economically, or as efficiently as they could be. This statement holds true not only for developing countries but also for the most developed.

The disturbing effect derives from the fact that computers may place immense power in the hands of a few over so many. This aspect is especially sensitive when the individuals who represent the many find themselves placed vis-a-vis the few who represent the government and the ruling power. The ability to retrieve information almost instantly from many sources on any one person and on any one topic may be dangerous if not counterbalanced by proper legislation and checked by proper organizational measures. At the very least such legislative and organizational steps may help to minimize the negative side effects of computerization. The controversy over the desirability of the further development and use of computers will thus continue to be a burning focus, as long as these two main issues have not been satisfactorily solved.

The Third Jerusalem Conference on Information Technology is another link in the growing awareness of the need for turning computer technology toward more beneficial use. If the conference succeeds in at least clarifying those controversial issues, this will be another step of progress within our profession.

Computer technology belongs to the class of human occupations which demand a close interface between theory and practice, thought and experiment. Bearing in mind that computer technology cannot be improved without implementation, experimentation and evaluation, it is a real "must" that computer professionals meet and discuss their problems. The theoretical structures presented in the papers need be filled in by face-to-face meetings and discussions. Theoretical principles, formulae and statistics cannot express to the full extent what has been achieved and how it has been achieved, and the complementary material aired in session and panel discussions, and informal meetings, is an important part of the way we can learn from the past, through the present, towards the future.

The structural contents of the Conference, in the form of formal papers, have been included in the Proceedings. They do not, however, include the important informal knowledge which will have been exchanged between the participants and which will be formalized again in yet another professional gathering like JCIT3.

Since the first JCIT in 1971 and the second JCIT in 1974, JCIT has become a highlight for professionals all over the world and a periodical meeting place for a fruitful exchange of ideas and experience. The motto of this JCIT is computers, communication and technology transfer, because communication has become the spearhead in the development and spread of computer technology and technological transfer.

JCIT3 has proved that small countries, like Israel, can play an important role in bringing together professionals from all over the world and facilitating the process of technology transfer from the more developed countries to the less developed ones.

We have outgrown the time of euphoria of the first and second decades of computer use. We know that it is much harder to achieve some of the aims we thought were attainable in the past. Problems of artificial intelligence, of integrated systems and of management information systems are good examples for over-estimation in the past.

Feelings of fear have crept in as to whether the computer will not become too powerful; whether it does not open too many loopholes, while closing others. Proper legislation, education and professional ethics will minimize the negative effects of computer technology and strengthen its beneficial influence on the developed and developing societies alike.

JCIT3 has proved anew that there is no better vehicle for the further advance and transfer of computer technology than a free exchange of knowledge. If this Conference has contributed toward the free flow of ideas in the fields of computers, communications, and transfer of technology, it will have fulfilled an important task.

We would like to express our thanks to the scores of people who put in so much dedicated effort over a period spanning nearly two years in preparing JCIT3.

Space does not allow us to name here all the members of the Conference Steering Committee, the Program Committee, the National Committees, the Chess Tournament Committee, the Youth Competition Committee, and the Exhibition Committee, who through their untiring efforts made this Conference possible, but we will mention at least the Chairmen of the Program Committee, Aaron Finerman and Allen Reiter, for their outstanding contribution.

Finally, it is a real pleasure to convey our thanks to Josef Moneta, Editor of the Proceedings, who did an excellent job under most severe time constraints and produced the beautiful volume that will remain for many years to testify to the important ideas vented in this Conference.

Anthony Ralston
Conference Chairman
Dov Chevion
Conference Co-Chairman

Foreword by Chairmen of Conference Program Committee

The Third Jerusalem Conference on Information Technology broadens the scope and breadth of the technical program of this conference series. There are approximately fifty plenary and parallel meetings composed of the following sessions:

Invited papers, submitted by invited speakers and discussants, presented in nine plenary sessions;

Contributed papers, submitted by authors in response to the call for papers, presented in parallel sessions;

Solicited papers, similar to the contributed papers, presented in parallel sessions. These sessions were arranged by solicited session organizers who took responsibility for soliciting contributed papers, having them refereed, and chairing the sessions;

Panels, also arranged by solicited organizers and with solicited panelists, presented in parallel sessions;

The International Youth Competition finals, presented in two plenary sessions. This marks the first such competition at the JCIT between high school teams from Israel and the United States selected in previous competition;

The International Chess Tournament, presented in special evening sessions. This also marks the first such tournament at the JCIT between six computer chess teams from the United States and Europe.

In general, the program is related to the conference them of Computers, Communications and Technology Transfer, although we have been liberal in interpreting that relation in order to have a broadly based program of international scope. In the same context, sessions fit within four subthemes: Technology Transfer, Computer and Communication Technology, Applications, and General Topics. The papers presented in the invited, contributed and solicited sessions are contained in these Proceedings.

Putting together such a rich technical program drew upon the efforts of many people. We are grateful to the members of the Program Committee for their many useful suggestions and for publicizing the Conference amongst colleagues in their countries. Ultimately, much of the work was performed by a smaller group of people:

In Great Britain, by Frank Land, Richard Grimsdale and Michael Mills, who arranged a number of sessions (particularly in the technology transfer area), secured additional contributed papers, and suggested the conference subthemes mentioned above;

In Israel, by Larry Pfeffer, who worked tirelessly, soliciting panelists and discussants; Moshe Nadir and Emanuel Sharon who made certain that Israeli achievements would get exposure at the Conference; and Joe Raviv, who assisted with the Israeli part of the program and also with some associated conferences. Furthermore, by Yoram Alster, who handled the technical arrangements for the Chess Tournament; and by Yona Peless and A. Eilon, who ran the Israeli part of the Youth Competition;

In the United States, by Daniel Berry (who, aided enthusiastically by Judy Estrin and Barbara Koalkin, organized the Youth Competition in the United States -- California), Bernard Galler (who organized the invited sessions), Jack Minker (who organized many of the panel sessions), Benjamin Mittman (who organized the chess tournament), Sidney Weinstein (who, aided considerably by Robert Pelech, did much of the necessary liaison and coordination), and Stanley Winkler (who organized the refereeing process for contributed papers and who helped put together all sessions into a meaningful program);

And, last but by no means least, by Josef Moneta who took on the most difficult task of editing these Proceedings.

But even more so, we are grateful to all the participants -- the authors, the panelists, the session organizers, the members of the selected high school teams, and the people who make it possible for computers to play chess. Their hard work helped fashion a broadly based technical program aimed at providing a forum for attendees from all countries to exchange views, to examine current developments and project the future, and to witness first hand the remarkable Israeli achievements in this dynamic field of information processing.

Aaron Finerman
Program Committee Chairman
Allen Reiter
Program Committee Co-Chairman

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FRAMEWORK OF THE CONFERENCE

ORGANIZED BY:

IPA -- Information Processing Association of Israel

PROMOTED BY:

JECCC -- Jerusalem Economic Conference Computer Committee

SPONSORED BY:

IFIP -- International Federation for Information Processing
AFCET -- Association Française pour la Cybernetique, Economique et Technique
BCS -- British Computer Society
CIPS -- Canadian Information Processing Society

IN COOPERATION WITH

ACM -- Association for Computing Machinery
IEEE-CS -- Institute of Electrical and Electronic Engineers-- Computer Society

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CONTENTS

Editor's Preface v
Contents vii
Foreword by Chairmen of Conference Steering Committee xiii
Foreword by Chairmen of Conference Program Committee xvii

TECHNOLOGY TRANSFER FROM DEVELOPED TO LESS-DEVELOPED COUNTRIES

D.A. GOLDEN, Technology transfer from developed to less developed countries (*Invited Paper*) 1

COMPUTER SYSTEMS, ARCHITECTURE, AND RELIABILITY

A. AVIZIENIS, J.W. BOND III, Fault-tolerance in large computing systems 9

C. LANDRAULT, J.C. LAPRIE, SURF - A program for modeling and reliability prediction for fault-tolerant computing systems 17

A.B. BARAK, M. MELMAN, The minimal configuration of a flexible expandable distributed processing system 27

W.J. KARPLUS, New computer structures for low-cost high-speed digital simulation 33

B. GAVISH, H. KOCH, A hierarchy of computer architectures 39

EDUCATION FOR BIBLIOGRAPHIC DATA BASE UTILIZATION

A.W. ELIAS, Education for the use of machine readable reference retrieval services 45

C. KEREN, Using modern information handling methods in small and/or developing countries 51

H. BORKO, Education and training of information specialists in data base utilization 55

SOFTWARE IN ISRAEL

M. ROTHSTEIN, ASD/I - A system design processor 59

M.W. MORRON, Software manufacturing and distribution 65

Z. LENEFSKY, Producing a minicomputer COBOL - A case study 69

W. SCHILD, A. HAUBER, R.D. LOGCHER, An approach to cost estimating for planning and design 77

TECHNOLOGY TRANSFER

S. ABBEY, Issues in export of a large computer software system 93

M. ROGSON, A.C. SHETLER, EDP technology transfer facilitated through the use of consultants: A recommendation 97

M. MORGENSTERN, Transferring technology from research systems to users 103

K. PRIEBE, The transfer of computer technology from developed to developing countries 109

N.V. FINDLER, The role of artificial intelligence in the transfer of technology within computer science 115
C. FOLEY, Why does technology transfer fail - A study based on administrative systems 119

FUTURE COMPUTER TECHNOLGOY
I.M. BARRON, The future of computer technology (*Invited Paper*) 125

BUILDING COMPUTERS IN DEVELOPING COUNTRIES
U. GALIL, Building computers in a developing country (*Invited Paper*) 133

COMPUTERS IN EDUCATION
H.J.A. GOODMAN, The educational potential of integrated information systems when combined with educational technology 761
S.W. SPERO, The classroom-television-terminal as a tool of instruction in developing countries 137
T. SIMONS, Environment, information processing and the participant citizen 143
B.Z. BARTA, M. JAVORSKY, D. MILLIN, A. ARTZI, Y. BEREZANSKY, A step toward low cost C.A.I. systems 151
V. RAJKOVIČ, On the role of computer science subjects at the secondary school level 157

DATA BASE SYSTEMS
E.H. SIBLEY, An introduction to the database sessions 163
D. COHEN, M.T. LIU, Derivation protection in data base systems 165
R. DEMOLOMBE, M. LEMAITRE, J.M. NICOLAS, The language of SYNTEX-2, an implemented relational - like DBMS 171
J.R. DRISCOLL, Two languages, and their environment, founded on basic data base management system constructs 177
B.C. SANGSTER, Natural language dialogue with data base systems: Designing for the medical environment 183

COMPUTER CHESS: THE NEXT TEN YEARS
M.M. NEWBORN, Computer chess: Recent progress and future expectations 189
D. SLATE, B. MITTMAN, CHESS 4.6 - Where do we go from here? 193
D.N.L. LEVY, Can computer programs play real chess? 199

NUMERICAL METHODS
B. PARHAMI, Optically weighted dot-matrix Farsi and Arabic numerals 207
Y. PERL, Shortest paths in a network with two cost functions 211
F. HIRST, Computer elucidation of the occurrence of third sub-harmonic motion and other related phenomena 217

E.C. GREANIAS, W.S. ROSENBAUM, Automatic spelling verification: Towards a system solution for the office 225
S. EVEN, The max flow algorithm of Dinic and Karzanov: An exposition 233
V. BRAILOVSKY, Concerning some procedures of function approximation based on the use of experimental data 769

A GENERAL APPROACH TO TECHNOLOGY TRANSFER
E. MUMFORD, Human values and the introduction of technical change 239
D.N. STREETER, A retrospective study of the technology transfer process 245
H.D. HUSKEY, The transfer of computer technology 253

THE STATE OF PROGRAMMING LANGUAGES
J.E. SAMMET, The state of programming languages (*Invited Paper*) 261

COMMUNICATION SYSTEMS
J. STERN, Communication systems (*Invited Paper*) 271

DATA BASE SYSTEMS - 2
B. SHNEIDERMAN, A framework for automatic conversion of network database programs under schema transformations 279
S.J. SCHINDLER, J.P. FRY, D.E. BAKKOM, The Michigan data translator: Capabilities for database conversion and restructuring 289
C. KEIL, E. HOLLER, Architectures for heterogeneous distributed database systems 299
K. ZIEGLER, Jr., Distribution: A new impetus toward understanding data 311

HISTORY OF COMPUTING
H.S. TROPP, Generation minus one - The Bell Labs relay computers 319
G. ESTRIN, Electronic digital computing in Israel: Between the Golems of Prague and Rehovot 323
H.D. HUSKEY, Early stored program computing in England 331

APPLICATIONS OF MACHINE DESCRIPTIONS - 1
G. ESTRIN, Application of machine descriptions to design of concurrent systems 337
A.C. PARKER, L. HAFER, The application of a hardware descriptive language for design automation 349
B. PRESS, M.R. LITTLE, Abstract devices in computer description 357

SOFTWARE AND APPLICATIONS
W.L. FRANK, The ten great myths of software 365
W.E. RIDDLE, J.H. SAYLER, A.R. SEGAL, A.M. STAVELY, J.C. WILEDEN, DREAM -- A software design aid system 373

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