



SIMULETTER is a quarterly publication of  
the ACM Special Interest Group on Simulation

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**SIMULETTER** is a quarterly publication of the ACM Special Interest Group on Simulation of the Association for Computing Machinery.

Editorial material should be sent to the Editor, Tuncer I. Ören, University of Ottawa. Subscriptions, address changes and other business communications should be sent to **SIMULETTER**, c/o ACM, 11 West 42nd Street, New York, NY 10036 USA. (212) 869-7440.

All contributions to **SIMULETTER** are unrefereed working papers unless otherwise indicated. Except for editorial items, all sources of material appearing in **SIMULETTER** will be clearly identified. Articles and items attributed to individuals are ordinarily to be interpreted as personal rather than organization opinions, and in no way does this non-editorial material represent the opinion of the editor regarding its accuracy or quality. Unless specifically stated, the contents of **SIMULETTER** do not represent the official position of SIGSIM or ACM.

All contributions should be sent to the editor in 'camera ready' form, typed single-spaced and clearly with margins ready for publication. Authors of longer articles are requested to write to the editor for copy paper. All correspondence must be signed; however, letter to the editor will be published anonymously if requested.

## TABLE OF CONTENTS

Chairman's Column	
Richard E. Nance (Letter) . . . . .	2
Editorial	
Tuncer I. Ören . . . . .	3
A Forum for the Synergy of ACM Special Interest Groups	
Tuncer I. Ören . . . . .	5
Report to SIGSIM Membership	
Stephen D. Roberts . . . . .	7
'84 Budget Summary . . . . .	8
* * * CONTRIBUTED PAPER:	
The Discrete Event Simulation Computer - DESC	
Meir Barel . . . . .	9
* * * INVITED PAPERS: (Reprinted from Proceedings of 1983 Winter Simulation Conference)	
A Tutorial View of Simulation Model Development	
Richard E. Nance . . . . .	16
Interactive Modelling and Simulation of Transaction Flow or Network Models using the Ada Simulation Support Environment	
Heimo H. Adelsberger . . . . .	23
- - -	
Simulation in China: An Episode	
Ji-hu Ma . . . . .	33
- - -	
Associations . . . . .	35
Journals . . . . .	36
Books . . . . .	40
Technical Reports . . . . .	42
Simscrip II.5 Publications . . . . .	44
Events	
Tuncer I. Ören and Murat Özmızrak . . . . .	45
Additional Information on Simulation Conferences . . . . .	56

CHAIRMAN'S COLUMN (LETTER)

This is my first letter to SIGSIM members, but I hope that the evidence of work on the part of your elected officers has already proved to be recognizable. With the last issue, SIMULETTER is back on the intended quarterly schedule.

I want to begin this first letter by presuming to speak for the membership of SIGSIM in expressing my heartfelt thanks to Harold Highland for his long, dedicated effort as editor of SIMULETTER. Paul Roth once said to me that Harold Highland, as an editor represented a national resource. Like most national resources, I am afraid that we used him and sometimes abused him. In Harold's case, his boundless energies and his enjoyable creativity proved too much a temptation too often for too many. Thank you, Harold, for so many things which we could see, and for the many, many other things that were just not apparent.

The next appreciation is extended to Tuncer Ören for his willingness to take on the difficult job of editor of SIMULETTER and his magnificent start in this new position. SIMULETTER is back on schedule, and we intend to keep it there.

My thanks to the members and non-members of SIGSIM who attended the called meeting at the 1983 Winter Simulation Conference. Among the issues discussed at this called meeting were the schedule for publication of SIMULETTER, the advisability of seeking to start a new ACM publication in simulation, cooperation with other simulation groups, and the projects which could contribute best to serving the membership. Let me share with you some of my thoughts, and invite (in fact, encourage or beg) your comments and advice.

1. In my campaign statement, I stated my intent to initiate an effort to establish an "ACM Transactions on Simulation." At least two issues surfaced in this regard at the WSC meeting:

Is this the appropriate time for such a venture by ACM? and

Should we even attempt to create a "single home" for simulation publications?

The sentiment of the group there was not strongly supportive of a move toward an ACM publication.

2. The absence of SIGSIM sponsored sessions at the ACM annual meeting and the NCC has contributed to a perception of inactivity on the part of SIGSIM. I do believe that we should attempt to reactivate SIGSIM participation in these meetings, primarily because of their visibility and potential for attracting new members, but we should continue to view the Winter Simulation Conferences, the Annual Simulation Symposium, the Computer Simulation Conference, and others as major meetings in the area.
3. I have stressed my belief that we should endeavor to cooperate with other simulation groups so as to form a composite with benefits that exceed those received from the individual parts. Tuncay Saydam has agreed to begin drawing together the necessary data for formulating a more expansive policy of collaboration and cooperation with other simulation groups. As noted in the meeting at WSC, this sometimes brings us into difficulty with ACM policies regarding co-sponsored meetings. We are working on this matter, and hope to have some resolution before too long.

In closing, let me assure you that SIGSIM is alive and on the road to full recovery. What is needed is the help of a much larger segment of the membership in order to make this recovery complete. A pint of blood from a large number is much more satisfactory than a couple of gallons from two or three, both from the standpoint of the patient receiving the transfusion as well as the contributors to it. If you are interested in working on publications, the organization of meetings, collaborative efforts with other groups, or some suggestion that you feel would be beneficial to the membership, please let us know.

Richard E. Nance

EDITORIAL

1. The Chairman's Column of this month covers several interesting and important topics. I would like to elaborate on some of the issues Dick raises:
  - 1.1 I concur with his comments about Harold J. Highland whom I had the pleasure of knowing for a long time. The mere coincidence that during my chairmanship of SIGSIM, his health and other commitments did not allow him to devote his time to continue generating SIMULETTER cannot undermine his previous and very important contributions to SIGSIM and our periodical. I hope he will continue contributing to SIMULETTER. In this issue, you will find information about his recently published and very clearly written book "Protecting Your Microcomputer System."
  - 1.2 I would fully support the idea of establishing an "ACM Transactions on Simulation." The details of the necessary logistics may of course be discussed and developed.

For a long time, I have been receiving all the publications of ACM on behalf of the Computer Science Department of the University of Ottawa. Hence, in addition to the considerations about the field of simulation, I am also considering the publication perspectives of ACM. If some of our members would not favor the idea of establishing an ACM Transactions on Simulation, it might be interesting to have their views whether or not they would endorse the current existence of ACM Transactions on some other topics.

- 1.3 There exists over thirty groups specialized on different aspects of Simulation. In the last issue of SIMULETTER, I provided information on one of the groups, i.e., the Society for Computer Simulation. In this issue, the readers will find information about another group. I have already contacted some other groups and the next issue of SIMULETTER will contain information about a few other groups. As the editor of SIMULETTER, I would like to extend an open invitation to the executives of all simulation and modelling associations or groups to use SIMULETTER as an international platform to disseminate information about their associations and their activities.

More specifically, I would appreciate receiving the following type of information:

- About one page of information to present the Association or Group.
- Information about the publications. Receiving a copy of their periodical and permission to reprint at least its table of contents would be appreciated. Receiving information about their other publications is very useful and I would like to include in SIMULETTER lists of publications of several groups. (In this issue you will find a list of publications by the Society for Computer Simulation.)
- Information about other activities. Any news item that I receive about conferences will be added to list of events.

2. In this issue you will find several useful items:
  - 2.1 Two select papers are reprinted, from the Proceedings of the 1983 Winter Simulation Conference, with the kind permissions of the authors and IEEE, the copyright holder of the Proceedings. You will also find a contributed paper from a European colleague, Dr. M. Barel.
  - 2.2 A special review titled "Simulation in China: An Episode" gives abstracts of a recent Chinese Simulation Conference and is edited by Mr. Ma, one of my current research associates.

In 1980 Dr. Achim Sydow organized a large Systems Analysis and Simulation Symposium in East Berlin. About twenty invited speakers, including your editor, provided state-of-the-art information to the attendees. The second symposium will be held in 1985 again in East Berlin. I am involved as a member of the International Program Committee.

I know that there are SIGSIM members who are responsible for the state-of-the-art of simulation and could offer excellent contributions to a Chinese Simulation Conference, should our colleagues in China opt to use this possibility.

- 2.3 You will find a new column to give abstracts of available technical reports.

I will appreciate receiving copies of your technical reports, so that I can include their abstracts in this newly established column.

- 2.4 A new Journal, "Systems Analysis Modelling Simulation" started this year under the editorship of Dr. Achim Sydow from East Berlin. You have and will continue to have the table of contents of this Journal reprinted in SIMULETTER.

I am planning to provide three types of information about simulation periodicals:

A bibliography, detailed information on most of the periodicals, and copies of tables of contents.

Cooperation of editors and publishers in sending copies of their periodicals and permission to print the tables of contents would be most appreciated.

3. SIMULETTER is the quarterly of ACM SIGSIM and should first of all serve the needs of our members. Feel free to write your wishes to any member of the executive of SIGSIM including to your editor and to use SIMULETTER as a good platform to share your experience and expertise with other members.

Tuncer I. Ören

A FORUM FOR THE SYNERGY OF ACM  
SPECIAL INTEREST GROUPS

Tuncer I. Ören, Editor SIMULETTER  
Computer Science Department  
University of Ottawa  
Ottawa, Ontario K1N 9B4  
CANADA

Simulation which is experimentation with models is an important model-based activity and can have two-way interaction with almost all of the fields of knowledge represented by ACM Special Interest Groups which are listed herebelow:

SIGACT	Automata and Computability Theory
SIGAPL	APL
SIGARCH	Computer Architecture
SIGART	Artificial Intelligence
SIGBDP	Business Data Processing and Management
SIGBIO	Biomedical Computing
SIGCAPH	Computers and the Physically Handicapped
SIGCAS	Computers and Society
SIGCHI	Computer and Human Interaction
SIGCOMM	Data Communication
SIGCPR	Computer Personal Research
SIGCSE	Computer Science Education
SIGCUE	Computer Uses in Education
SIGDA	Design Automation
SIGDOC	Documentation
SIGGRAPH	Computer Graphics
SIGIR	Information Retrieval
SIGMAP	Mathematical Programming
SIGMETRICS	Measurement and Evaluation
SIGMICRO	Microprogramming
SIGMOD	Management of Data
SIGNUM	Numerical Mathematics
SIGOA	Office Automation
SIGOPS	Operating Systems
SIGPC	Personal Computing
SIGPLAN	Programming Languages
SIGPLAN -	AdaTEC (SIGPLAN Technical Committee on Ada)
SIGPLAN -	FORTEC (SIGPLAN Technical Committee on Fortran)
SIGSAC	Security, Audit and Control
SIGSAM	Symbolic and Algebraic Manipulation
SIGSMALL	Small Computing Systems and Applications
SIGSOFT	Software Engineering
SIGUCCS	University and College Computing Services

I would like to publish in SIMULETTER two articles for each SIG group under the following categories:

1) Contributions of SIGSIM to SIGxxx

One article would survey the current and possible contributions of simulation in the field represented by this particular SIG. An additional bibliography would be also very useful.

2) Contributions of SIGxxx to SIGSIM

This article would cover just the opposite, i.e., it would be a survey of the current and possible contributions of the specific field of knowledge to any aspect of simulation. In this case also an additional bibliography would be very useful.

Some examples follow:

- For SIGARCH - A survey of simulation of computer architectures  
- A survey of influence of computer architectures in simulation
- For SIGART - A survey of cognitive simulation  
- A survey of possible contributions of AI in simulation, or Expert Simulation Systems, or Knowledge-based modelling and simulation systems
- For SIGBIO - A survey of simulation of biomedical systems  
- Biomedical concepts that can enhance simulation modelling (Several references exist for example, in Varela, F.J. (1979) Principles of Biological Autonomy, North-Holland, Amsterdam).

For SIGCOMM - A survey of simulation of data communication  
- A survey of possible contributions of communications in simulation such as distributed simulation, conferencing simulation

Ideally I would like to publish these types of articles in SIMULETTER. However, the same article could also simultaneously be submitted to the periodical of the relevant SIG in order to inform the particular membership and also to sparkle some further discussions.

If this project can have enough contributions as I foresee it could, the articles may be useful as separate publications in SIMULETTER and the corresponding SIG periodicals. I also foresee the possibility of editing them as a book.

By publishing this appeal in SIMULETTER I would like to invite SIGSIM members to consider writing articles along this line

To be able to reach members of other SIGs, I will be asking the assistance of the ACM Headquarter to send a copy of this appeal to each one of the Editors of SIG periodicals and another copy to the Chairmen of SIGs.

The cooperation of the Editors to publish this open invitation to their members and especially the contributions of SIG members would be invaluable.

The point of view of any SIG member who would feel that simulation can not be applicable for the activities of a particular SIG or that simulation can not benefit from the advances of the field of knowledge represented by a SIG, would still be worth publishing in SIMULETTER.

Thanks for the anticipated cooperation.

#### *Special Institutional Membership Package*

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*For further information about ACM's special Institutional Membership Package write to: Member Services, ACM, 11 West 42nd Street, New York, NY 10036.*

ASSOCIATION FOR COMPUTING MACHINERY  
 Report to SIGSIM Membership  
 Fiscal Year 1983 Actual Income and Expenses  
 as of June 30, 1983

INCOME	
SIG member dues	11,631
Newsletter Back Issue Sales	2,386
Proceedings Sales	2,189
Conference Net Income	100
Other	100
TOTAL INCOME	\$16,307
EXPENSES	
Travel and Subsistence	(12)
Temp. Help (Secretarial)	( 3)
Temp. Help (N/L Preparation)	89
Communications (Telephone)	55
Office Mailing and Handling	4
Stationery & Supplies	914
Minor Printing (Brochures, Announcements)	(103)
Copying and Duplicating	239
Pub. printing (production)	421
Wrapping, Handling	1,065
Shipping and Freight	398
Publication postage	4,964
Data Processing	3,067
Promotion/Advertising	398
Chapter Support	4,964
Meetings & Spec. Functions	3,067
Other Misc. Expenses	398
HDQTRS Allocation	4,964
TOTAL EXPENSES	\$ 3,067
NET FY '83	\$ 8,276
FUND BALANCE FY '83	\$21,021

prepared by  
 Stephen D. Roberts  
 SIGSIM Treasurer



## ASSOCIATION FOR COMPUTING MACHINERY

SIGSIM  
FISCAL YEAR '84 BUDGET SUMMARY\*

INCOME	
SIG member dues	11,000
Newsletter Back Issue Sales	65
Proceedings Sales	6,970
Conference Net Income	3,500
Air Options Income	450
Other	277
TOTAL INCOME	\$22,262
EXPENSES	
Travel and Subsistence	0
Temp. Help (Secretarial)	500
Temp. Help (N/L Preparation)	300
Communications (Telephone)	400
Office Mailing and Handling	550
Stationery & Supplies	300
Minor Printing (Brochures, Announcements)	400
Copying and Duplicating	100
Pub. printing (production)	6,100
Wrapping, Handling	900
Shipping and Freight	650
Publication postage	4,000
Data Processing	2,000
Promotion/Advertising	0
Chapter Support	800
Meetings & Spec. Functions	0
Other Misc. Expenses	0
HDQTRS Allocation	4,266
Contingency Funds	1,000
TOTAL EXPENSES	\$22,266
NET FY '84	\$ (4)
OUTSIDE FUNDS TO BE SPENT	0
TRUE NET FY'84	(4)
FUND BALANCE FY '83	21,021
FUND BALANCE BEFORE INTEREST FY '84	21,021
INTEREST INCOME	0
FUND BALANCE FY '84	\$21,017**

\* created by Waldo Magnuson

\*\* Fund balance is anticipated to be lower than budget due to unanticipated lower income and higher expense.

SIMULATION IN CHINA: AN EPISODE

Ma Jihu  
The Shenyang Automation Institute  
Academy of Sinica of China  
Shenyang, China

Visiting Research Associate  
Computer Science Department  
University of Ottawa  
Ottawa, Canada

In 1979 the Chinese Automation Society set up a Simulation Technical Committee on simulation, which sponsored the first Chinese Simulation Conference in the same year. Since then the Chinese Simulation Conferences have been convened every other year.

In the sequel you will find selected abstracts of the papers presented in the Simulation Conferences held in 1981 and 1982 in Beijing (Peking) and Shanghai, China. The abstracts are edited from the Journal of the Chinese Society of Automation, "Information and Control," Vol. 12, no. 4, 1983, pp. 85-87.

**The Technology of Digital Computer Simulation and its Application (Xiong Guangleng and Sun Guoji)**

In this paper the status quo of computer simulation in China is surveyed. Some important simulation software packages in China and related applications are presented. Finally, some suggestions with regard to this technique in China are given.

**A Combined Continuous/Discrete Simulation Package and its Applications (Ma Jihu)**

To meet the challenge from the world of modern technology, it is essential to develop better simulation tools, to embed new concepts into simulation languages, and to enhance the scope of the field with which the existing simulation languages are capable of dealing.

For this reason, the author presents a simulation package ZFX which combines continuous system simulation program (CSS) with some new simulation functions.

The expended functions include:

- The sampled system simulation module, which allows the user to describe the sampled system in a way of time discrete change model which can be different from other parts of the model. In this way the ZFX becomes a combined continuous/discrete simulation package.

- The two point boundary value module, which allows the user to solve multidimensional fixed-point boundary value problems.
- Parameter optimization package. In this package the simulation and the optimization techniques are tied together. A new strategy (SIMLX) is proposed which speeds up the convergence process considerably.

**Continuous System Simulation Language ECSL (Sun Guoji et al.)**

ECSL is an equation-oriented continuous system simulation language which can be used to simulate the linear and nonlinear systems of the order of 200. ECSL is compatible with FORTRAN and is machine-independent. The main features and the implementation flowchart of ECSL are also given.

**Continuous System Simulation Language CSSL-F2 (Bi Jiancheng et al.)**

CSSL-F2 is a machine-independent language written in FORTRAN for continuous system simulation and is consistent with the CSSL standards recommended by SCS (USA)

The CSSL-F2 consists of a translator and the run-time library, which includes a main program and thirty subroutines. Some important aspects of the implementation of the language are also explained.

**The Application of GPSS-F to Discrete Stochastic System Simulation (Han Huijung et al.)**

The paper presents briefly the basic structure and functions of GPSS-F simulation language, and gives the methods for establishing GPSS flowcharts. The language has been implemented on Chinese DJS-130 computer. Some examples of using GPSS-F on DJS-130 are also given.

### **The Flight Training Simulator and its Error Analysis (Wen Chunanyuan)**

The flight training simulator is a computerised, complicated system with man in the loop. The paper introduces the significance and the development of the simulator and its functions. It also introduces the constructions and the working principle of a typical flight simulator and analyzes the overall error and its distribution.

### **The Digital Ship Maneuvering Simulator for Training (Xiao Tianyuan et al.)**

This paper describes CCF-2S, a microcomputer-based digital ship maneuvering simulator for training.

The discussion in this paper centers around the construction, real time simulation methodology, as well as the software of the simulator.

### **The Application of Simulation Technique in Metallurgical Automation (Chen Zhenyu)**

Simulation technique is quite essential for the development of the process models, the research and design of automatic control systems, and for the optimization of management models.

This paper summarizes the applications of the simulation technique in mineral, metal processing, and management automations.

### **Digital Simulation of Distributed Systems Dynamics (Hu Shangxu)**

The state equations for distributed systems are in general partial differential equations which can scarcely be solved analytically. The present paper describes the versatility of the numerical method of lines (MOL) solution of Partial Differential Equations. In MOL, the author introduced the spline differentiation technique and developed a spectrum of adaptive grid algorithms, that greatly improved the precision of MOL solutions. The MOL is particularly effective for Parabolic Ordinary Differential Equations. The Author has proposed a series of algorithms which enable the MOL to be used in solving with ease certain kinds of PDEs other than parabolic.

### **Simulation for Nonlinear Systems with Functions Containing Discontinuities (Li Bohu et al.)**

A numerical method is presented for digital simulation of dynamic systems with functions containing discontinuities. Four examples are given to compare results obtained with those given elsewhere.

### **Calculation of Temperature Field of Hot Rolling Roller by Simulation - A Case of DSS/2 Program Application (Ma Zhenwu)**

Taking the production problem of hot roller as an example, this paper gives mathematical model and boundary conditions about distributed-parameter system, namely, the temperature field of hot rolling

about a roller. It then shows the use of DSS/2 program for the roller simulation.

### **A Review of the Development of Simulation Computers (Wang Zhenzhong)**

There is a variety of simulation computers today. They include micro and minicomputers, superminicomputers, peripheral array processors and multiprocessing hybrid computers. Peripheral array processor plays an important role in high speed digital simulation. In this paper, the major representatives of these kind of computers are compared and their performances discussed and assessed.



International Association for the advancement  
of Modelling and Simulation techniques in Enterprises

16, Avenue de Grange Blanche, 69160 Tassin-la-Demi-Lune, France

**GENERAL PRESENTATION**

**Scope**

Modelling concerns the schematic description of systems and devices, whereas Simulation is the use of models to investigate and/or optimize the processes without experimenting on the real systems. The aim of the Association is to strengthen the contacts between all developers and users of modelling and simulation techniques and related ones, whose importance is constantly increasing for analysis and synthesis in all areas of knowledge and activities.

AMSE gathers specialized workers, but all people who wish for information or knowledge improvement are also invited to participate to all activities. Emphasis is on practical problems.

**Topics**

Activities concern all modelling and simulation methods and applications and all related problems (such as CAD, measurement and control, pattern recognition, operations research,...). They subdivide in four fields of work :

- F1. Methodology: Systems and models
- F2. Tools: Mathematics and computers
- F3. Applications to 'exact' sciences and engineering ('Hardsciences')
- F4. Applications to environmental, biomedical, human and social systems ('Softsciences')

**Organization**

The President is assisted by a Council which proceeds from Technical and Regional Groups (see special Sheets).

**Activities of the Association**

- FOR ALL PEOPLE (via Announcements)
  - A1. AMSE Publications ('AMSE Press'): participation as authors and as readers.
    - Periodicals (see special Sheet): AMSE Review  
Advances in Modelling and Simulation  
Modelling, Simulation & Control
    - Other Publications (see the special Sheet for Publications available): Proceedings of Conferences,...
  - A2. Conferences, Symposia, Workshops and Seminars on large or specific subjects  
Exhibitions, visits,...
  - A3. Education and Research to obtain degrees (see the special Sheet 'AMSE University')
- SUPPLEMENTARY ACTIVITIES FOR MEMBERS
  - A4. Access to AMSE Documentation (copies,...)
  - A5. Coordinated activities: Research and Development. Contracts, exchanges. Common purchase,...

**Categories of Members**

- Correspondent Members (C.M.): They receive all informations to participate to A4 and A5 activities
  - Full Members (F.M): They receive detailed supplementary informations by receiving the Periodical 'AMSE News'. Besides they have got a credit for copies of documents without payment.
- Members may ask to become Members of Technical and of Regional Groups (see special Sheets)

**Fees for 1984**

- Private persons (payment to AMSE by personal cheque):
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  - F.M.: \$8 more (total: \$10)
- Institutions: multiply by 2 (cheque to AMSE or Official order with payment on receipt of an Invoice).

**Correspondence**

For supplementary informations and to ask for membership, use the accompanying Form.

# Systems Analysis Modelling Simulation

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Journal of Mathematical Modelling and Simulation in Systems Analysis

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Edited at the  
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Mathematical Society of the G.D.R.

by

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## Contents

SYDOW, A.:	
Keynote Address to the New Journal .....	3
GREENSPAN, D.:	
A New Mathematical Approach to Biological Cell Rearrangement with Application to the Inversion of Volvox .....	5
PESCHEL, M.; MENDE, W.:	
A Unified Modelling Concept for Nonlinear Systems with Lotka-Volterra Equations .....	17
KOCH, G.:	
Stochastic Models in Biology. I .....	27
KORN, G. A.:	
Interactive Simulation with a Direct-Executing, Floating-Point Equation Language .....	45
CELLIER, F. C.:	
How to Enhance the Robustness of Simulation Software .....	55
ÖREN, T. I.:	
New Directions of Systems Simulation Methodology and Software .....	63

### Journal "Systems Analysis - Modelling - Simulation"

The journal is devoted to art and techniques and applications of modelling and simulation in systems analysis. Systems analysis is an interdisciplinary activity. Articles will be published on systems analysis and systems theory, modelling and mathematical models and tools for decision and control, computer simulation, systems, modelling and simulation in environmental protection, macroeconomics agricultural production, regional planning, biosciences, traffic control, large engineering systems, resources distribution, management systems etc. In addition to original papers, survey articles and reports on conferences etc. are published. Finally, books covering the above mentioned and related subjects are reviewed.

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**CONTENTS** VOLUME 41 : NUMBER 5 : NOVEMBER 1983

---

**TECHNICAL PAPERS**

---

- 175 Use of computer simulation in oil spill response training  
*C.H. Peabody R.H. Goodman*
- 181 A simulation model of stock exchange trading  
*Kalman J. Cohen Steven F. Maier Robert A. Schwartz David K. Whitcomb*

**FEATURES**

---

- 193 Software aids for simulation  
*Charles R. Standridge*
- 194 Automation simulation: Utilizing computer graphics in industry  
*Marty R. Levy*
- 196 Justification of purchase of simulators or simulation equipment  
*A. Ben Clymer*
- 199 SIMSCRIPT II.5 User Meeting sponsored by C.A.C.I.

**DEPARTMENTS**

---

- v ACROSS MY DESK  
*Charles A. Pratt*
- 202 INDUSTRY NEWS
- 208 CALL FOR PAPERS
- 210 CALENDAR OF EVENTS
- 211 CLASSIFIED ADVERTISING  
*Professional Placement, Serv*
- 212 OUR MAILBOX
- 213 SIMULATION IN THE SERVICE C  
*P.C.s - ANOTHER IMPACT  
John McLeod*

**CONTENTS** VOLUME 41 : NUMBER 6 : DECEMBER 1983

---

**TECHNICAL PAPERS**

---

- 219 CROGRO: An interactive forest growth simulator  
*David M. Fellows Gregory L. Sprague Gordon L. Baskerville*
- 229 Simulation based design of hydraulic servo-controlled apparatus for damping measurement  
*Colin G. Foster Robert J. Hooker*

**FEATURES**

---

- 242 THE SCS EXECUTIVE COMMITTEE
- 245 Issues in simulation in the chemical sciences  
*A. Ben Clymer*
- 248 Cloud modeling aids research  
*Malcolm Ritter*
- 253 Annual Index for *Simulation*  
Issues from Volume 40, Number 1, through Volume 41, Number 6

**DEPARTMENTS**

---

- 217 ACROSS MY DESK  
*Charles A. Pratt*
- 250 CALENDAR OF EVENTS
- 251 CLASSIFIED ADVERTISING  
*Professional Placement, Services, Hardware, Software, Short Courses*
- 252 CALL FOR PAPERS
- 263 SIMULATION IN THE SERVICE OF SOCIETY  
*This Too Is Simulation  
John McLeod*
- 267 INDUSTRY NEWS

**TECHNICAL PAPERS**

- 5 Synchronous debugging of real-time microprocessor-based control systems  
*Henry G. Pajak*
- 13 Microcomputer implementation of simulation benchmarks in heat-transfer and dynamic process analysis  
*Michael St. Jacques*
- 21 Digital simulation of guidance and control system of an advanced supersonic fighter  
*Ching-Fang Lin Kai-Li Hsu*

**FEATURES**

- 31 *Annals of the History of Computing*
- 32 SCS reviewers
- 40 An artificially intelligent locomotive mechanic  
*Charles A. Pratt*

**DEPARTMENTS**

- 3 Presenting . . . Paul F. Roth
- 4 ACROSS MY DESK  
*Charles A. Pratt*
- 20 CALL FOR PAPERS . . . CALL FOR ST
- 36 Advances in simulation technology: /
- 42 CALENDAR OF EVENTS
- 43 CLASSIFIED ADVERTISING  
Professional Placement, Services,
- 44 CONSULTING AND SERVICES DIREC
- 49 SIMULATION IN THE SERVICE OF S  
The Mighty Colorado  
*John McLeod*

**CONTENTS**

**TECHNICAL PAPERS**

- 57 A methodology for building a simulation model for efficient design and performance analysis of local area networks  
*Imrich Chlamtac Raj Jain*
- 67 Simulation tools for the investigation of mobile radio telephone traffic problems  
*Saad Haj Bakry*

**FEATURES**

- 77 *Trauma I, for paramedic training*  
*Charles A. Pratt*
- 81 Using aerial photography in flight simulation  
*Marty R. Levy*
- 87 Simulation research coup at IBM  
*Glenn Alpaugh*
- 88 ADDITIONS TO THE CATALOG OF SIMULATION SOFTWARE

**DEPARTMENTS**

- 54 ACROSS MY DESK  
*Charles A. Pratt*
- 55 Presenting . . . Ronald Y. Wada
- 75 CALL FOR STUDENT PAPERS  
Southeastern Simulation Council Student Competition
- 92 MEETINGS AND CONFERENCES  
Conference announcement: The Frontiers of Large-Scale Computational Problems
- 93 INDUSTRY NEWS
- 96 CONSULTING AND SERVICES DIRECTORY
- 98 CALENDAR OF EVENTS
- 100 CLASSIFIED ADVERTISING  
Professional Placement, Services, Software, Short Courses
- 100 CALL FOR PAPERS
- 101 SIMULATION IN THE SERVICE OF SOCIETY  
FROM HUNGARY . . . WITH IMPLICATIONS  
*John McLeod*



Harold Joseph Highland (1984) **Protecting Your Microcomputer System**, John Wiley, New York. 244 p.

Harold who is currently the Editor-in Chief of "Computers and Security" (North-Holland) is well qualified to publish this timely and very useful book. The book is commendable to every serious user of microcomputers.

The following is taken from the preface of the book. The presentation of the layers of protection is taken from Harold's book but re-arranged by Tuncer I. Ören.

**Microcomputer Security** in this volume is used in its broadest sense. It is the protection of a person's or a company's assets, its computer hardware, its computer programs, and its data files. It is also the assurance that the microcomputer system will operate accurately and without interruption.

This volume has been written for the home user, businessman, or professional who has purchased, or intends to purchase, a microcomputer system. It is a **security guidebook** to make the reader aware of the many problems that may arise and recommend procedures to reduce the risks faced. It covers all microcomputer environments, from a single microcomputer with one user through networks with many microcomputers and many users.

It has been written in nontechnical language. Where it is necessary to use technical computer terms, they are explained clearly in separate lists for easy reference. Even sections that may look technical at first sight will be found quite understandable when read with the accompanying text.

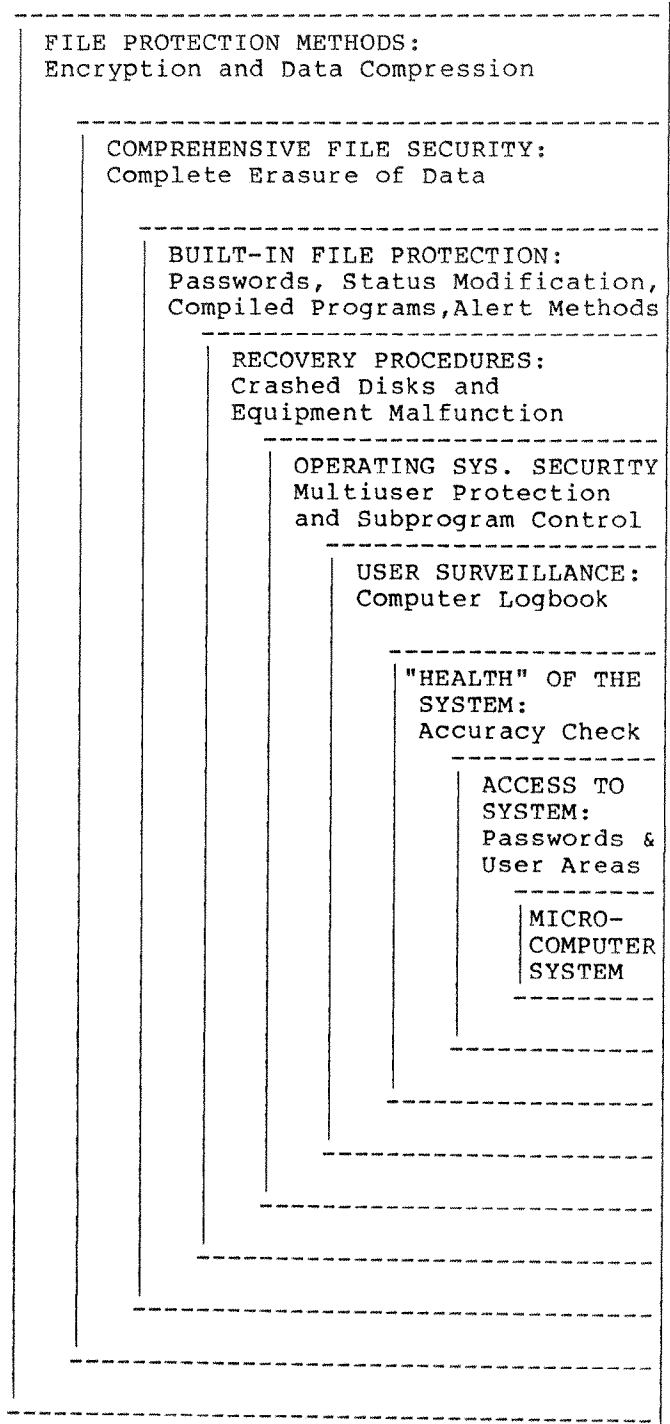
Among its special features, this book includes:

- checklists for a quick review of what needs to be done,
- programs written in CBASIC (easy translatable into other popular BASICs) that provide software security techniques,
- step-by-step instructions to increase security through modifications of the system, computer programs, and data files (like setting up user areas on a disk to limit access to protected files, and built-in password protection in both programs and data files), and
- a list of selected sources of special software and hardware.

Most of the step-by-step instructions are illustrated using an 8-bit microcomputer and the CP/M operating system, since this configuration is widely used in business. Many of these techniques have also been tested using other operating systems, as well as a 16-bit microcomputer. The concepts are the same, and it is easy for any user to translate the step-by-step procedures and the programs included in the text to fit his or her system.

The book has been written in six parts, which can be read from the first through the last chapter, or may be used for specific sections in which the reader is most interested.

Many possible security measures are discussed and evaluated in the chapters on software protection and networks. There is more choice in this area than in providing physical security of the microcomputer system or in limiting physical access to it. Which methods are most advantageous in a particular situation will depend on the number of people involved and the technical sophistication of the users. The techniques discussed should be thought of as **layers of protection**, with each new layer adding to the value of those already in place. In software security the whole is often greater than the sum of its parts.



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February 1984
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Ray Bryant, PhD, and  
Brian W. Unger, PhD, Editors  
February 1984

ORDER FROM: THE SOCIETY FOR COMPUTER SIMULATION  
P.O. Box 2228, La Jolla California 92038

## TECHNICAL REPORTS

**Technical Reports available from:**

Wayne State University, Department of Computer Science, Detroit, Michigan 48202 USA

Arturo I. Concepcion and Bernard P. Zeigler (December 1982). **Distributed Simulation of Distributed System Models**, Technical Report CSC-82-016.

Simulation on a conventional, single processor can be very much improved by using a network of processors. The real system is abstracted in the model as an interconnection graph where each node is a discrete event model of a corresponding component of the real system. Synchronization is done by sending messages through the edges that interconnect the nodes. The simulator of the model is a network of processors. The synchronization of these processors to carry out the distributed simulation is the problem discussed in this report. Included in this report are some synchronization algorithms: time incrementation and time acceleration methods, link time method, and the virtual ring acceleration methods. We propose the cellular synchronization algorithm as applied to a one-dimensional cellular automaton and the tree structured cellular automaton to solve the synchronization problem. These algorithms can be extended to solve a particular class of interconnection graph, the directed acyclic graph.

**Keywords:** simulation, microprocessors, network, event list, distributed system, distributed simulation, cellular synchronization algorithm.

**Technical Reports available from:**

University of Ottawa, Computer Science Department, Ottawa, Ontario K1N 9B4 Canada

Tuncer I. Ören (December 1983) **Simulation: A Taxonomy**; Technical Report TR-83-10.

A taxonomy of simulation is developed based 1) on the characteristics of models used in simulation studies and 2) on the nature, generation characteristics of model behavior, and the agent which generates model behavior.

Tuncer I. Ören (December 1983) **Simulation Models: A Taxonomy**, Technical Report TR-83-11.

A taxonomy of simulation models is developed based on the following criteria:

- 1) Time set
- 2) Existence and range of variables
- 3) Trajectory of descriptive variables
- 4) Functional relationships of variables
- 5) Spatial distribution
- 6) Organization of the component models
- 7) Goals to be pursued

Tuncer I. Ören (January 1984) **Symbolic Processing of Simulation Models: A Taxonomy**, Technical Report TR-84-01.

Models can be used either for behavior generation or for symbolic processing. The latter can be done either for model analysis or for model transformation.

Model analysis can be descriptive or evaluative. The provided taxonomy of possible model analysis and model transformation techniques may be useful in systematic inclusion of model processing abilities in advanced model-based systems.

Tuncer I. Ören (February 1984). **Model Behavior: A Taxonomy of Types and Generation and Processing Techniques**, Technical Report TR-84-02.

After brief reviews of the main issues related with model behavior and terminology of different types of time as used in simulation, three types of model behavior (i.e trajectory, structural, and point behavior) and their combination (mixed behavior) are explained. A taxonomy of model behavior based on the goal of the model is developed. A taxonomy of model behavior generation is given based on time, purpose, and procedure used. Lastly, possibilities for behavior processing are outlined.

Tuncer I. Ören (February 1984). **Simulation and Model-Oriented Languages: A Taxonomy**, Technical Report TR-84-03.

A Taxonomy of simulation languages is developed based on: 1) Implementation (status and languages), 2) Computer (2.1 Architecture and hardware requirements, 2.2 Access to computer, 2.3 Level and nature of computer assistance), 3) Application area, 4) Model (4.1 Modelling style and facilities, 4.2 Trajectories of descriptive variables and time scale of models, 4.3 Spatial distribution of component models, 4.4 Organization of component models, 4.5 Goal(s) to be pursued by model), and 5) Model behavior and behavior generation.

### Technical Reports available from:

Tilburg University (Katholieke Hogeschool Tilburg), Department of Business and Economics, P.O. Box 90153, 5000 LE Tilburg, The Netherlands

Jack P.C. Kleijnen (October 1983) **On the Interpretation of Variables.**

The input of a computer program, say a simulation program, specifies parameters, variables, and behavioral relationships. Parameters are not directly observable. Variables can be specified through enumeration, mathematical functions, and scenarios. In regression models the scenarios correspond to binary variables. Regression models accept different measurement scales: nominal, interval, ratio, absolute scales. The interpretation of interval variables may be misleading if there are interactions between regression variables. The interpretation of quantitative and qualitative variables (in regression versus ANOVA models) is different. The user distinguishes between environmental and controllable variables. Environmental variables involve validation, risk analysis, and sensitivity analysis. Controllable variables lead to optimization, control, and what-if questions.

Jack P.C. Kleijnen (December 1983). **Regression Analysis: Assumptions, Alternatives, Applications.**

Are the assumptions of regression analysis realistic; how can they be verified; if an assumption is violated, are there alternative regression techniques? Recent developments are surveyed, emphasizing practical aspects and using only elementary statistical formulas. The specific assumptions are: (i) a non-singular matrix of independent variables (ii) a regression model linear in its parameters (iii) responses with constant variances (iv) independent responses (v) normally distributed responses (vi) a valid or correctly specified regression model. More than fifty selected references to the recent literature are included.

### Technical Reports available from:

Virginia Polytechnic Institute and State University, Department of Computer Science, Blacksburg, Virginia 24061 USA

Balci, O. (1983), "Requirements for Model Development Environments," Tech Report CS83022-R.

This report presents the fundamental requirements for Model Development Environments (MDEs) and offers guidance for MDE designers and implementers. A MDE provides an integrated and comprehensive collection of computer-based tools to (1) offer cost-effective, integrated, and automated support of model development throughout its entire life cycle, (2) improve the model quality by effectively

assisting in the quality assurance of the model, (3) significantly increase the efficiency and productivity of the project team, and (4) substantially decrease the model development time. The structure of the MDEs is composed of four layers, namely, hardware and operating system, kernel MDE, minimal MDE, and MDEs. Although the requirements perceived for each layer of the environment are generically applicable for simulation (discrete event, continuous, combined) and mathematical programming modeling tasks, the focus of this report is on discrete event simulation model development. A scenario is included to illustrate the uses of minimal MDE tools and to provide a view of the operation of a MDE.

*Key Words and Phrases:* automated support, mathematical programming, modeling, model development, model management, model quality assurance, simulation.

This research was supported by the U.S. Navy under Contract No. N60921-83-G-A165 through the Systems Research Center, Virginia Tech.

Balci, O. and R.E. Nance (1983), "Introducing Formulated Problem Verification as an Explicit Requirement of Model Credibility," Tech Report CS83021-R.

This paper deals with the formulation and formulation verification of a class of problems to which "modeling solutions" are applied. The two main objectives of this paper were to develop a procedure for problem formulation and to verify the formulated problem.

The class of problems considered is analyzed in two categories as requiring prescriptive or descriptive solutions. A detailed study of each category resulted a procedure to guide the analyst during the problem formulation. This procedure is illustrated by an example traffic intersection problem of first category.

The formulated problem is measured by using indicators to accomplish an evaluation for the formulated problem verification. Indicators are developed to measure (1) the probability of committing type III error, (2) the acceptability of an alternative set of possible outcomes, and (3) how well the formulated problem is structured. An evaluation questionnaire is prepared to contain these indicators and is presented in the Appendix of this paper.

The accuracy of the formulated problem verification is dependent upon the validity and reliability of the measurement. Determination of measurement validity and reliability was found to be extremely difficult, however, due to the broad scope of the class of problems considered. Therefore, the indicators suggested in this paper should be viewed as potential ones for application to a specific problem area within this class.

**Key Words and Phrases:** formulated problem verification; measurement; modeling; model credibility; problem formulation.

This research was supported in part by the U.S. Navy under Contract No. N60921-83-G-A165 through the Systems Research Center, Virginia Tech.

Nance, R.E. and O. Balci (1983), "The Objectives and Requirements of Model Management," Tech Report CS83024-R.

Model management is a technology evolving by necessity, pushed by the attempts to deal with increasingly complex systems and the perceived inadequacies of past efforts. This rapid evolution of Model Management Systems (MMS) has created different perspectives of the role of the MMS: one arising in the database and decision support systems research community stressing the user's interaction with a model data bank and the other view from the modeling community emphasizing the model development functions. These two perspectives are clarified and reconciled by relating each to the model life cycle, which leads to a more comprehensive statement of MMS requirements.

**CR Categories and Subject Descriptors:** H.4.2 [Information Systems]: Types of Systems - decision support; D.2.2 [Software Engineering]: Tools and Techniques; I.6.0 [Simulation and Modeling]: General.

**General Terms:** Documentation, Management  
**Additional Key Words and Phrases:** model management, model life cycle, problem definition, model development, requirements.

This research was supported in part by the U.S. Navy under Contract No. N60921-83-G-A165 through the Systems Research Center, Virginia Tech.

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### Honeywell H/600-6000 SIMSCRIPT II.5 User Manual

Reference guide to the H/600-6000 implementation of SIMSCRIPT II.5.

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### IBM SIMSCRIPT II.5 User Manual

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February 2-4, 1984  
THIRD ANNUAL SCS MULTICONFERENCE  
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Topics: Modelling and Simulation on Microcomputers; Simulation in Health Care Delivery Systems; Simulation in Strongly Typed Languages, ADA, PASCAL, SIMULA,...; Aerospace Simulation; Professional Development Seminars.  
Contact: Simulation Councils, Inc.  
P.O. Box 2228  
La Jolla, CA 92038, USA

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Tuncer I. Ören  
Murat Özmızrak

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J A N U A R Y  
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January 4-6, 1984  
HAWAII INTERNATIONAL CONFERENCE ON SYSTEM SCIENCES  
Honolulu, Hawaii, USA

Topics: Signal Processing, Multi-Processing Organizations, Fifth Generation Machines, ADA and Other Programming Language Issues, Data-Bases, Distributed Systems, Graphics, Medical Information Processing, Decision Support Systems.  
Contact: HICSS-17  
c/o Center for Executive Development  
University of Hawaii  
2404 Maile Way, C-202  
Honolulu, HI 96822, USA

January 30-February 3, 1984  
NUMERICAL SIMULATION IN FLUID MECHANICS  
Rocquencourt, France

Scope: Numerical simulation in fluid mechanics by the finite elements methods.  
Contact: INRIA  
Service des Relations Exterieures  
Cours et Seminaires, B.P. Box 105  
78153 Le Chesnay Cedex, France

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F E B R U A R Y  
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February 2-3, 1984  
AEROSPACE SIMULATION  
San Diego, California, USA

Contact: Professor Monte Ung  
Electrical Engineering Department  
University of Southern California  
Los Angeles, CA 90089-0781, USA

February 6-9, 1984  
1984 INTERNATIONAL SYMPOSIUM ON LOGIC PROGRAMMING  
Atlantic City, NJ, USA

Contact: Doug DeGroot  
IBM Research  
P.O. Box 218  
Yorktown Hgts., NY 10598, USA  
Phone (914) 945-3497

February 14-17, 1984  
MODELLING IDENTIFICATION AND CONTROL MIC'84  
Innsbruck, Austria

Topics: Modelling, Simulation, Identification, Estimation, Fitting, Measurement, Pattern Recognition, Image Processing, Languages, Algorithms, Optimum Control, Adaptive Control, Robust Control Systems; Computer-aided Design, On-line Computer Control, Mathematical Programming Methods.  
Contact: The Secretary  
IATED Innsbruck Conferences  
Institut für Informatik  
Universität Innsbruck  
Tschurtschenthalerstr., 5/11  
A-6020 Innsbruck, Austria

February 26-March 2, 1984  
FIRST INTERNATIONAL SYMPOSIUM ON MODELLING AND CONTROL IN MINERAL PROCESSING AND PROCESS METALLURGY  
Los Angeles, California, USA

Contact: J.A. Herbst  
Department of Metallurgy  
University of Utah  
412 Browning Building  
Salt Lake City, Utah 84112, USA

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M A R C H  
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March 12-15, 1984  
INTERNATIONAL CONFERENCE ON MATHEMATICAL, STATISTICAL, AND COMPUTATIONAL METHODS IN PETROLEUM EXPLORATION AND EXTRACTION  
Houston, Texas, USA

Contact: H.B. Hair, SIAM Services Manager  
1405 Architects Building  
117 South 17. Street  
Philadelphia, PA 19103, USA

March 12-17, 1984  
STOCHASTIC DIFFERENTIAL SYSTEM  
Working Conference  
Organized by IFIP (WG 7.1)  
Marseille, France

March 14-16, 1984  
SEVENTEENTH ANNUAL SIMULATION SYMPOSIUM  
Old Tampa Bay, Florida, USA

Objectives: Provide a continuation of the forum for the exchange of working experience in the field of discrete or continuous computer simulation.

The Technical Committee on Simulation will be presented a Workshop on Network Simulation and Analysis to be held on March 12, 1984 as part of the Simulation Week in Tampa, Florida.

Contact: Mr. Alexander Kran  
IBM Corp. B/300-40E  
Hopewell Junction, NY 12533, USA  
Phone (914) 894-7142

March 19-21, 1984  
THE SEVENTH ANNUAL WORKSHOP OF CROP  
SIMULATION  
Lincoln, Nebraska, USA

Contact: Prof. Donald Holt  
Department of Agronomy, Turnel Hall  
University of Illinois  
1102 South Goodwin Ave.  
Urbana, Illinois, USA  
Phone (217) 333-3420

March 21-23, 1984  
PERFORMANCE OF COMPUTER-COMMUNICATION  
SYSTEMS  
Working Conference  
Organized by IFIP (WG 7.3)  
Zurich, Switzerland

March 26-28, 1984  
SYSTEMS ENGINEERING APPROACHES IN CONTROL  
ENGINEERING  
Noorderwijkerhout, The Netherlands

Topics: Digital Systems, Urban Systems, Communication and Information Systems, Energy Systems, Transportation Systems, Industrial Systems, Chemical Systems.

A part of the Workshop will also be devoted to the introduction of new methods in the Systems Engineering area including aspects of: Economics and Management, Technological and Engineering problems, Social and Man-Machine interactions.

Contact: H. Feikema  
Foundation for Post-degree Education in Control Engineering  
Lorentzweg, 1, 2628 CJ Delft  
The Netherlands

March 26-29, 1984  
SEVENTH INTERNATIONAL CONFERENCE ON  
SOFTWARE ENGINEERING  
Hyatt Orlando Hotel  
Orlando, Florida, USA

Scope: The Conference will focus on the new methods that have been invented and evaluated in the last years, on the state of this new engineering discipline, and what to expect of it in the future. The Conference will also include papers on practice and experience with different software engineering tools and methods as well as advanced development and research papers.

Topics: Software Engineering Environments, Case Studies, Software Life Cycle Management Issues, ADA - The Language and Tools, Expert Systems for Software Engineering, Human Engineering.

March 30, 1984  
INTERNATIONAL WORKSHOP ON MODELS AND  
LANGUAGES FOR SOFTWARE SPECIFICATION AND  
DESIGN  
Orlando, Florida, USA

Contact: Garry Kampen  
BCS MS 7A-04, P.O. Box 24346  
Seattle WA 98124, USA

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A P R I L  
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April 2-4, 1984  
THIRD ACM SIGACT-SIGMOD SYMPOSIUM ON  
PRINCIPLES OF DATABASE SYSTEMS  
Waterloo, Ontario, Canada

Scope: The Conference will cover new developments in both the theoretical and practical aspects of database systems. Papers are solicited which describe original and novel research about the theory, design, specification, or implementation of database systems and query languages.

Topics: Artificial Intelligence for Databases, Concurrency Control, Database Design, Database Security, Data Models, Data Structures for Databases, Dependency Theory, Distributed Databases, File Organization, Logic for Databases, Performance Evaluation of Database Systems, Query Languages, and Schema Design.

Contact: ACM  
Association for Computing Machinery  
11 West 42. Street  
N.Y., N.Y., 10036 USA

April 3-5, 1984  
CAD 84. SIXTH INTERNATIONAL CONFERENCE AND  
EXHIBITION ON COMPUTERS IN DESIGN  
ENGINEERING  
Brighton, Sussex, United Kingdom

Contact: Judy Vare  
Conference Secretary  
Butterworth Scientific Ltd.  
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Westbury House, Bury St.  
Guildford GU2 5BH, UK  
Phone 0483 31261  
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April 11-13, 1984  
EAI COMPUTER USERS' GROUP MEETING  
Hopkins University, Laurel, Maryland, USA

Contact: EAI Computer Users' Group  
185 Monmouth Parkway  
West Long Branch, NJ 07764, USA

April 18-20, 1984  
1984 SIMULATORS MINICONFERENCE  
Norfolk, Virginia, USA

Topics: Simulator Development Technology,  
Training with Simulators, The Simulator  
Industry and its Customers, Simulators for  
RD&E.

Contact: Ben Clymer  
Program Chairman  
1984 Simulators Miniconference  
32 Willow Drive, Apt. 1B  
Ocean, New Jersey 07712, USA

April 19-20, 1984  
FIFTEENTH ANNUAL PITTSBURGH CONFERENCE ON  
MODELLING AND SIMULATION  
Pittsburgh, Pennsylvania, USA

Topics: Special emphasis for the 1984  
Conference will be microprocessors, robot-  
ics, and social, economic, and global mod-  
elling and simulation and papers on all  
traditional areas of modelling and simula-  
tion.

Contact: William G. Vogt/Mickle H. Mickle  
Modelling and Simulation Conference  
348 Bendeum Engineering Hall  
University of Pittsburgh  
Pittsburgh, Pennsylvania 15261, USA

April 19-May 4, 1984  
APPLICATION OF ARTIFICIAL INTELLIGENCE:  
SPIE ANNUAL CONFERENCE  
Washington D.C., USA

Contact: J.F. Gilmore  
Georgia Tech. EES/EML/EOD  
Atlanta, GA 30302, USA

April 24-25, 1984  
CONFERENCE ON INTELLIGENT SYSTEMS AND  
MACHINES  
Rochester, Michigan, USA

Contact: Professor Donald R. Falkenburg  
Director, Center for Robotics and Advanced  
Automation  
School of Engineering and Computer Science  
Oakland University  
Rochester, Michigan 48063, USA  
Phone (313) 377-2218

April 24-27, 1984  
SEVENTH EUROPEAN MEETING ON CYBERNETICS  
AND SYSTEMS RESEARCH  
University of Vienna, Vienna, Austria

Scope: General Systems Methodology, Sys-  
tems and Decision Theory, Cybernetics in  
Biology and Medicine, Cybernetics in  
Organization and Management, Economic and  
Social Systems, Ecological Systems, Health  
Care Systems, Fuzzy sets-meeting on the  
EURO Working Group, Communication and Com-  
puters, Humanity, Architecture and Concep-  
tualisation, Artificial Intelligence, Gen-  
eralized Information Theory, Management as  
Applied Cybernetics, Systems and Cybernet-  
ics for the Progress of Developing Coun-  
tries.

Contact: Prof. Robert Trappl  
Department of Medical Cybernetics  
University of Vienna  
Freyung 2-6, A-1010 Vienna, Austria

April 29-May 4, 1984  
1984 SPIE CONFERENCE: APPLICATIONS OF  
ARTIFICIAL INTELLIGENCE  
Washington, D.C., USA

Contact: John F. Gilmore  
Artificial Intelligence Branch  
Georgia Tech. EES/EML/EOD  
Atlanta, GA 30332, USA  
Phone (404) 894-2000

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M A Y  
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May 1-4, 1984  
MATHEMATICS OF FINITE ELEMENTS AND  
APPLICATION: MAFELAP'1984  
Uxbridge, United Kingdom

Contact: Institute of Computational Math-  
ematics  
Brunel University  
Uxbridge, Middlesex, UB8 3PH, UK

May 2-4, 1984  
OPTIMIZATION DAYS 1984  
Montreal, Quebec, Canada

Topics: Mathematical Programming, Optimal  
Control Theory, Numerical Methods of Opti-  
mization, Systems Theory, Statistical  
Methods, Estimation and Identification,  
and Applications.

Contact: G. Pederzoli or C.L. Sandblom  
Department of Quantitative Methods  
Concordia University  
7141 Sherbrooke Street West  
Montreal, Quebec H4B 1R6, Canada

May 2-4, 1984  
FIRST EUROPEAN CARS/TRUCKS SIMULATION  
SYMPOSIUM  
Schliersee (Munich), W. Germany

Topics: Simulation Tools, Software and  
Numerical Methods, Hardware and Driveline  
Simulator, Mechanical Systems Simulation,  
Noise Simulation, Aerodynamics for Car  
Designers, Crash Mechanic Simulation.



Contact: Control Data GMBH  
Mr. M.R. Heller  
Berg-am-Laim Str. 47  
D-8000 Munchen 80, W. Germany

May 6-18, 1984  
INTERNATIONAL CONFERENCE ON MODELLING  
TECHNIQUES AND TOOLS FOR PERFORMANCE  
ANALYSIS  
Paris, France

Contact: INRIA  
Conférence Secretariat  
Domaine de Voluceau  
Rocquencourt, B.P. 105  
78153 Le Chesnay Cedex, France  
Phone 954 90 20

May 9-11, 1984  
COMPUTER SCIENCE ASSOCIATION CONFERENCE  
Calgary, Alberta, Canada

Theme: Computer Science Education  
Contact: Program Committee  
Department of Computer Science  
University of Alberta  
Edmonton, Alberta T6G 2H1, USA

May 14-16, 1984  
SEVENTH INTERNATIONAL CONFERENCE ON  
AUTOMATED DEDUCTION  
Napa, California, USA

Contact: Robert Shostak  
EL386, SRI International  
333 Ravenswood Ave.  
Menlo Park, CA 94025, USA  
Phone (415) 859-2897

May 14-17, 1984  
FOURTH INTERNATIONAL CONFERENCE ON  
DISTRIBUTED COMPUTING SYSTEMS  
San Francisco, California, USA

Contact: Distributed Computing  
P.O. Box 639  
Silver Spring, MD 20901, USA  
Phone (301) 589-8142

May 15-18, 1984  
SIXTH INTERNATIONAL CONFERENCE ON SYSTEMS  
ENGINEERING  
Karlovy Vary, Czechoslovakia

Topics: Principal problems of systems  
engineering conception, Theoretical and  
methodological aspects of systems  
engineering, Identification and simulation  
of systems, System design, Implementation  
and operations of systems.  
Contact: House of Technology  
Ing. Vera Doruskova  
Gorkeho nam. 23  
112 82 Prague, Czechoslovakia

May 16-18, 1984  
INTERNATIONAL CONFERENCE ON MODELLING  
TECHNIQUES AND TOOLS FOR PERFORMANCE  
ANALYSIS  
Paris, France

Topics: Measurement Technology, Simula-  
tion, Analytic Methods and Modelling,  
Packaging, Case Studies.  
Contact: Th. Bricheteau  
INRIA, Service des Relations Exterieurés  
Domaine de Voluceau  
Rocquencourt, B.P. 105  
78153 Le Chesnay Cedex, France

May 16-18, 1984  
THIRD INTERNATIONAL CONFERENCE ON SYSTEMS  
DOCUMENTATION  
Mexico City, Mexico

Contact: Sergio Figueroa  
Basic Sciences & Eng. Div.  
Univ. Autonoma Metropolitana  
Azcapotzalco Ave.  
San Pablo 180, Mexico  
Phone (905) 382-4198

May 17-18, 1984  
IMACS INTERNATIONAL SYMPOSIUM ON MODELLING  
AND SIMULATION OF ELECTRICAL MACHINES AND  
CONVERTERS  
Liege, Belgium

Topics: Modelling of electrical machines,  
Modelling and simulation of machine-con-  
verter associations, Modelling and simula-  
tion of transformers and static devices.  
Contact: Professor H. Buysse  
Unité Courant Fort et Electrotechnique  
Université Catholique de Louvain  
Batiment Maxwell-Place du Levant 3  
B-1348 Louvain-La-Neuve, Belgium

May 20-25, 1984  
FOURTH JERUSALEM CONFERENCE ON INFORMATION  
TECHNOLOGY  
Jerusalem, Israel

Contact: JCIT-4  
P.O. Box 639  
Silver Spring, MD 20901, USA  
Phone (301) 589-8142

May 22-24, 1984  
1984 CANADIAN CONFERENCE ON INDUSTRIAL  
COMPUTER SYSTEMS  
Ottawa, Ontario, Canada

Contact: R.E. Butler, INCO Ltd.  
2060 Flavelle Boulevard  
Mississauga, Ontario L5K 1Z9, Canada  
Phone (416) 822-3323

May 28-June 1, 1984  
GRAPHICS INTERFACE '84  
Ottawa, Ontario, Canada

Topics: Office Automation, CAD/CAM, Computer-Aided Building Design, Computer-Aided Engineering, Videotex, Geocartographics, Graphics and the Arts, Image Processing, Interaction Techniques, Image Synthesis, Geometric Modelling, Robotics, Dynamics.

Contact: Ms. Danielle Baum  
7. Floor Coates Bldg., Section P  
Statistics Canada  
Tunneys Pasture  
Ottawa, Ontario K1A 0T6, Canada  
Phone (613) 996-7017

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J U N E  
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June 4-6, 1984  
SECOND SOFTWARE ENGINEERING CONFERENCE  
Nice, France

Contact: AFCET  
156 Blvd. Pereire  
F 75017, Paris, France  
Telex 290163 EURTEL Code 235

June 6-8, 1984  
WORKING CONFERENCE ON INDUSTRIAL ROBOTICS  
IN DISCRETE MANUFACTURING  
Como, Italy

Contact: Guiseppina Gina  
Dipartimento di Elettronica  
Politecnico di Milano  
Piazza I., da Vinci 32  
1-20133 Milan, Italy

June 10-13, 1984  
COGNITIVE SCIENCE MEETING  
Boulder, Colorado, USA

Contact: Perle Bochert  
Department of Psychology  
University of Colorado  
Boulder, CO 80309, USA

June 13-15, 1984  
CONFERENCE 1984 ON ECONOMIC DYNAMICS AND  
CONTROL  
Nice, France

Contact: INRIA  
Service des Relations Exterieures  
Domaine de Voluceau  
Rocquencourt, B.P. 105  
78153 Le Chesnay Cedex, France

June 13-15, 1984  
SIXTH ANNUAL NATIONAL EDUCATIONAL  
COMPUTING CONFERENCE  
Dayton, Ohio, USA

Contact: Lawrence A. Jehn  
Computer Science Department  
University of Dayton  
Dayton, OH 45469, USA  
Phone (513) 229-3831

June 17-21, 1984  
INTERNATIONAL TIMS MEETING  
Copenhagen, Denmark

Contact: TIMS

June 18-22, 1984  
FIFTH INTERNATIONAL CONFERENCE ON FINITE  
ELEMENTS IN WATER RESOURCES  
University of Vermont, Burlington, USA

Scope: The conference will bring together  
researchers, scientists and engineers  
working in the theory and application of  
finite elements to a broad range of prob-  
lems in the water resources area.

Contact: Dr. Jeffrey P. Laible  
Department of Civil Engineering  
University of Vermont  
Burlington, Vermont 05405, USA  
Phone (802) 656-3800

June 19-21, 1984  
FIFTH IMACS INTERNATIONAL SYMPOSIUM ON  
COMPUTER METHODS FOR PARTIAL DIFFERENTIAL  
EQUATIONS  
Lehigh University, Pennsylvania, USA

Topics: Methods, Applications, Program-  
ming, Hardware  
Contact: Prof. W.E. Schiesser  
Department of Chemical Engineering  
Whitaker Lab. 5  
Lehigh University  
Bethlehem, PA 18015, USA

June 19-22, 1984  
SIXTH INTERNATIONAL CONFERENCE ON ANALYSIS  
AND OPTIMIZATION OF SYSTEMS  
Nice, France

Topics: Control of non-linear dynamical  
systems; Signal processing, identifica-  
tion, filtering, and stochastic control;  
Control of large and distributed parameter  
systems; Optimization in networks; Special  
interest sessions: Computer aided control  
systems design (CACSD), Bioengineering and  
biotechnological systems, Aeronautical  
systems.

Contact: INRIA  
Service des Relations Exterieures  
Domaine de Voluceau  
Rocquencourt, B.P. 105  
78153 Le Chesnay Cedex, France

June 20-22, 1984  
FIRST INTERNATIONAL CONFERENCE ON  
COMPUTERS AND APPLICATIONS  
Beijing (Peking), China

Topics: Authors are invited to submit  
papers describing recent advances on all  
aspects of computers and applications.

Contact: E.A. Parrish  
Department of Electrical Engineering  
Thornton Hall  
University of Virginia,  
Charlottesville VA 22901, USA

June 25-27, 1984  
THE FOREFRONTS OF LARGE SCALE  
COMPUTATIONAL PROBLEMS  
Washington D.C.

Contact: David S. Wehrly  
IBM Corporation, P.O. Box 6  
Endicott, New York 13760, USA

June 27-29, 1984  
FIFTH EUROPEAN WORKSHOP ON APPLICATIONS  
AND THEORY OF PETRI NETS  
Aarhus, Denmark

Contact: Kurt Jensen  
Computer Science Department  
Aarhus University  
Ny Munkegade  
DK 8000 Aarhus C, Denmark

June 27-July 2, 1984  
SECOND INTERNATIONAL CONFERENCE ON  
COMPUTATIONAL METHODS AND EXPERIMENTAL  
MEASUREMENTS  
On the board of the Queen Elizabeth II  
from New York to Southampton.

Theme: Experimental versus analytical or  
numerical models, Interaction of computer  
codes and experimental models, Material  
property characterization through numerical  
models and experimental prototypes,  
Computer interaction and/or control of  
real time experiments, Interface with  
computational models and calibration of  
mathematical models, Real time simulations,  
Microprocessor implementation for data  
acquisition and processing phases.  
Contact: Dr. G. Keramidas  
Naval Research Lab.  
Washington DC 20375 USA

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J U L Y  
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July 2-7, 1984  
SECOND INTERNATIONAL LOGIC PROGRAMMING  
CONFERENCE  
Uppsala University, Uppsala, Sweden

Deadline: March 15, 1984  
Contact: S.A. Tarnlund,  
School of Computer and Information Science  
313 Link Hall  
Syracuse University  
Syracuse, New York 13210, USA

July 9-11, 1984  
EUROSAM 84 INTERNATIONAL SYMPOSIUM ON  
SYMBOLIC AND ALGEBRAIC COMPUTATION  
Cambridge, England

Topics: Algebraic Computation and Sym-  
bolic Manipulation including Applications  
Contact: M. Mignotte  
Centre de Calcul  
Universite Louis Pasteur  
7 Rue de Rene Descartes  
F67084 Strasbourg, France

July 9-12, 1984  
1984 NATIONAL COMPUTER CONFERENCE  
Las Vegas, Nevada, USA

Contact: Dennis J. Frailey  
Senior Member of Technical Staff  
Texas Instruments Inc.  
8642-A Spicewood Springs Road, Suite 1984  
P.O. Box 10998  
Austin, TX 78766-1998, USA  
Phone (512) 250 6663

July 9-12, 1984  
DIGITECH'84 - DIGITAL TECHNIQUES IN  
SIMULATION, COMMUNICATION, AND CONTROL  
Patras, Greece

Theme: The Meeting is aimed to promote  
the exchange of ideas and results concern-  
ing the theoretical development and appli-  
cation of digital techniques to system  
simulation, communication, and control.  
Contact: Prof. S.G. Tzafestas  
DIGITECH'84  
Control Systems Lab.  
University of Patras  
Patras, Greece

July 10-12, 1984  
FIRST EUROPEAN WORKSHOP ON THE REAL TIME  
CONTROL OF LARGE SCALE SYSTEMS  
Patras, Greece

Scope: The Workshop is aimed to promote  
the exchange of ideas and results on the  
real time control of large scale systems  
using distributed computing facilities.  
Topics: Decentralized control; Real time  
hierarchical optimization, estimation, and  
control; Fault detection techniques and  
reliability of large scale systems.  
Contact: Prof. S.G. Tzafestas  
I. European Workshop on RTC of LSS  
Electrical Engineering Department  
University of Patras  
Patras, Greece

July 16-20, 1984  
ELEVENTH INTERNATIONAL COLLOQUIUM ON  
AUTOMATA, LANGUAGES AND PROGRAMMING  
Antwerp, Belgium

Contact: ICALP 84  
Department of Mathematics  
University of Antwerp-UIA  
Universiteitsplein 1  
B-2610, Antwerpen, Belgium

July 19-21, 1984  
FIFTH IMACS INTERNATIONAL SYMPOSIUM ON  
COMPUTER METHODS FOR PARTIAL DIFFERENTIAL  
EQUATIONS  
Bethlehem, Pennsylvania, USA

Contact: Dr. R.S. Stepleman  
Exxon Research & Engineering Company  
P.O. Box 51  
Linden, New Jersey 07036, USA

July 23-25, 1984  
SUMMER COMPUTER SIMULATION CONFERENCE -  
SCSC'84  
Boston, Massachusetts, USA

Topics: Simulation Methodology, Simulation Computer Systems, Simulation Credibility and Validation, Physical and Engineering Sciences, System Engineering, Chemical Sciences, Energy Systems and Resource Management, Biomedical and Life Sciences, Ecology and the Environment, Management and the Social Sciences, Training and Research Simulators, Government Simulation Facilities, Simulation and CAD/CAM.  
Contact: Charles A. Pratt  
Executive Director  
Simulation Councils Inc.  
P.O. Box 2228  
La Jolla, CA 92038, USA

July 24-27, 1984  
INTERNATIONAL CONGRESS ON COMPUTATIONAL  
AND APPLIED MATHEMATICS  
University of Leuven, Belgium

Contact: F. Broeckx  
University of Antwerp (RUCA)  
Faculteit Toegepaste Economische Wetenschappen  
Middelheimlaan 1  
B-2020, Antwerpen, Belgium

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A U G U S T  
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August 2-5, 1984  
THE 1984 INTERNATIONAL SYSTEM DYNAMICS  
CONFERENCE  
Oslo, Norway

Contact: Jorgen Randers  
Dean, Norwegian School of Management  
Hans Brums vei 30  
1340 Bekkestua, Norway  
Phone (472) 12 30 50

August 5-8, 1984  
SYMPOSIUM ON LISP AND FUNCTIONAL  
PROGRAMMING  
Austin, Texas, USA

Contact: Robert Boyer  
2100 Main  
University of Texas at Austin  
Austin, TX 78712, USA  
Phone (512) 471-1901

August 6-7, 1984  
ARTIFICIAL INTELLIGENCE APPLICATIONS  
CONFERENCE  
Austin, Texas, USA

Contact: R. Haralick  
Department of Electrical Engineering  
Virginia Polytechnic Institute and State  
University  
Blacksburg, VA 24061, USA  
Phone (703) 961-5816

August 6-10, 1984  
NATIONAL CONFERENCE ON ARTIFICIAL  
INTELLIGENCE  
Austin, Texas, USA

Contact: Ronald Brachman  
Fairchild Lab. for Artificial Intelligence  
Research  
4001 Miranda Ave., MD 30-888  
Palo Alto, CA 94304, USA

August 8-12, 1984  
SECOND IMACS INTERNATIONAL SYMPOSIUM ON  
BIOMEDICAL SYSTEMS MODELLING  
Bethesda, Maryland, USA

Contact: Dr. Charles DeLisi  
Mathematical Biology, DCBD, NCI  
National Institute of Health, Bldg. 10  
Bethesda, MD 20205, USA

August 13-15, 1984  
SIXTH BIENNIAL CONFERENCE  
Adelaide, Australia

Contact: SSA Conference 1984  
Mr. F.G. Phillips  
P.O. Box 195, Henley Beach  
South Australia 5022  
Australia

August 20-24, 1984  
SECOND LATIN AMERICAN CONGRESS ON  
OPERATIONAL RESEARCH AND SYSTEMS  
ENGINEERING / FOURTEENTH ARGENTINA MEETING  
ON INFORMATICS AND OPERATIONS RESEARCH  
Buenos Aires, Argentina

Deadline: May 15, 1984  
Contact: Hugo Scolnic  
SADIO  
Santa Fe 1145  
1059 Buenos Aires, Argentina

August 21-24, 1984  
1984 INTERNATIONAL CONFERENCE ON PARALLEL  
PROCESSING  
Bellville, Michigan, USA

Scope: All Aspects of Parallel/Distributed Processing  
Contact: Dr. Robert M. Keller  
Computing Research Group  
Lawrence Livermore National Lab. L-306  
P.O. Box 808, Livermore, CA 94550, USA

August 21-24, 1984  
MODELLING FOR THE THIRD WORLD: NATIONAL,  
REGIONAL, GLOBAL  
Working Conference  
Organized by IFIP (WG 7.)  
Buenos Aires, Argentina

August 22-24, 1984  
ACM SIGMETRICS CONFERENCE ON MEASUREMENT  
AND MODELLING OF COMPUTER SYSTEMS  
Boston, USA

Contact: Ray Bryant  
IBM, T.J. Watson Research Center  
P.O. Box 218  
Yorktown Heights, NY 10598, USA

September 1984  
STOCHASTIC DIFFERENTIAL SYSTEMS  
Working Conference  
Organized by IFIP (WG 7.1)  
Baku, USSR

August 26-29, 1984  
SECOND IMACS INTERNATIONAL SYMPOSIUM ON  
MODELLING AND SIMULATION OF ENERGY SYSTEMS  
Brookhaven National Laboratory, Upton, New  
York, USA

Autumn 1984  
ARTIFICIAL INTELLIGENCE AND PRODUCTIVITY  
Paris, France

Contact: Dr. A.S. Kydes  
Mail Stop 1H053, Forrestal Building  
US Department of Energy/EIA  
1000 Independence Avenue  
SW, Washington, D.C. 20585, USA

Topics: Artificial Intelligence and Pro-  
ductivity (Robotics, CAD-CAM, Automation,  
Voice and Vision Processing); Artificial  
Intelligence and Simulation; Artificial  
Intelligence and Expert Systems; Artifi-  
cial Intelligence and CAL/CBT.  
Contact: Simtec Consultants  
211 Rue Saint Honore  
75001 Paris, France

August 27-30, 1984  
EUROPEAN MEETING ON SIMULATION IN RESEARCH  
AND DEVELOPMENT  
Eger, Hungary

September 2-6, 1984  
IFIP CONFERENCE ON SYSTEM MODELLING AND  
OPTIMIZATION  
Budapest, Hungary

Scope: Both theoretical (methodological)  
and practical (application) problems.  
Deadline: April 1, 1984  
Contact: Dr. A. Javor  
Central Research Institute for Physics of  
the Hungarian Academy of Sciences  
H-1525 Budapest 114  
P.O. Box 49, Hungary

Contact: IFIP Secretariat  
3 Rue du Marche  
CH-1204 Geneva, Switzerland

August 27-September 1, 1984  
RECENT ADVANCES IN MODELLING AND  
OPTIMIZATION  
Working Conference  
Organized by IFIP (WG 7.1)  
Santiago, Chile

September 5-7, 1984  
SIXTH European CONFERENCE ON ARTIFICIAL  
INTELLIGENCE  
Pisa, Italy

Contact: Tim O'Shea  
Institute of Educational Technology  
Open University  
Walton Hall  
Milton Keynes, MK7 6AA, United Kingdom

August 28-31, 1984  
VECTOR AND PARALLEL PROCESSORS IN  
COMPUTATIONAL SCIENCE II  
Oxford, England

September 6-7, 1984  
SIMULATION AND SIMSCRIPT II.5 CONFERENCE  
Washington, D.C., USA

Contact: Mr. Joe Annino  
CACI, 3344 N. Torrey Pines Court  
La Jolla, California 92037, USA  
Phone (619) 457-9681

Contact: Les Evans  
Building 455  
AERE Harwell, Didcot  
Oxon OX11 0QJ, England

August 29-31, 1984  
ACM SIGMETRICS CONFERENCE ON MEASUREMENT  
AND MODELLING OF COMPUTER SYSTEMS  
Minneapolis, Minnesota, USA

September 10-12, 1984  
SECOND INTERNATIONAL CONFERENCE ON  
COMPUTER SECURITY  
Toronto, Canada

Contact: Larry Dowdy,  
Vanderbilt University,  
Minneapolis, USA  
Phone (615) 322-6591

Contact: IFIP/SEC 84  
Suite 1806, 2 Carlton St.  
Toronto, Ontario M5B 1J3, Canada

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S E P T E M B E R  
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September 1984  
STOCHASTIC DIFFERENTIAL SYSTEMS  
Working Conference  
Organized by IFIP (WG 7.1 Hungarian Acad-  
emy of Sciences)  
Visegrad, Hungary

September 10-14, 1984  
SIXTH INTERNATIONAL CONGRESS OF  
CYBERNETICS AND SYSTEMS  
Paris, France

Topics: Foundations, epistemology, anal-  
ogy, modelisation, general methods of sys-  
tems, history of cybernetics, system

science ideas, information, organization, morphogenesis, self-reference, autonomy, dynamical systems, complex systems, fuzzy systems.

Contact: 6. Congres Int. de la WOGSC  
Comite de lecture, AFCET  
156 Bld. Pereire, F-75017 Paris, France

September 11-14, 1984  
WORKING CONFERENCE ON KNOWLEDGE  
ENGINEERING IN CAD  
Budapest, Hungary

Contact: John Gero  
Department of Architectural Science  
University of Sydney  
N.S.W 2006, Australia

September 12-14, 1984  
CONFERENCE ON COMPUTER SIMULATION - UKSC  
'84  
University of Bath, United Kingdom

Topics: Simulation Methodology and Systems, Simulation Applications, Simulation in Education and Training.  
Contact: Dr. D. Murray-Smith  
Department of Electronics & Electrical Engineering  
University of Glasgow, Glasgow G12 800  
United Kingdom

Septembre 17-20, 1984  
FUTURE ADA ENVIRONMENT WORKSHOP  
Santa Barbara, USA

Contact: Hal Hart  
TRW R271127  
One Space Park  
Redondo Beach, CA 90278, USA  
Phone (213) 535-1623

Septembre 17-21, 1984  
FOURTH WORLD CONGRESS AND EXHIBITION ON  
FINITE ELEMENT METHODS  
Interlaken, Switzerland

Contact: J. Robinson  
Robinson and Associates  
Horton Road, Woodlands  
Wimborne, Dorset BH21 6NB  
United Kingdom

Septembre 24-28, 1984  
SOUTH EAST REGIONAL COMPUTER CONFERENCE  
AND EXHIBITION  
Hong Kong

Contact: Stephen Lau  
Government Data Processing Agency  
New Mercury House, 16/F  
Hong Kong

September 25-27, 1984  
SYMPOSIUM SIMULATIONSTECHNIK  
Vienna, Austria

Contact: Hybridrechenzentrum  
Technische Universität  
Herr Dr. Kleinert or  
Herr Dr. Breitenecker  
Gusshausstrasse 27-29  
A-1040 Wien, Austria

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O C T O B E R  
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October 8-10, 1984  
ACM 1984 ANNUAL CONFERENCE: THE FIFTH  
GENERATION CHALLENGE  
San Francisco, California, USA

Topics: System Architectures, Circuit and Computer Design, Supercomputers, Operating Systems, Programming Languages, Developments in Artificial Intelligence, Database, Expert, and Knowledge-based Systems, Simulation and Modelling, Robotics and Sensing, Graphics, Voice and Touch Technologies, Office and Industrial Applications of CAD/CAM, Integrated Microcomputer Systems, Intelligent Workstations, Local Area and Long Haul Networks.  
Contact: Alexander D. Roth  
Program Chairman, ACM'84  
9900 Main Street, Suite 303  
Fairfax, Virginia 22031, USA  
Phone (703) 385-0211

October 10-12, 1984  
TWENTY-THIRD NORTH AMERICAN SIMULATION AND  
GAMING ASSOCIATION (NASAGA) CONFERENCE  
Iowa City, Iowa, USA

Contact: John McLure  
N236 Lindquist Center  
Division Of Secondary Education  
The University of Iowa  
Iowa City, Iowa 52242, USA  
Phone (319) 353-5681

October 15-18, 1984  
1984 ADA APPLICATIONS AND ENVIRONMENTS  
CONFERENCE  
St. Paul, Minnesota, USA

Topics: Education, embedded computer applications, programming techniques, empirical experience, software development and maintenance tools, or distributed systems and proposals.  
Deadline: May 15, 1984  
Contact: David A. Fisher  
Gensoft Corporation  
319 South Craig St.  
Pittsburgh, PA 15213, USA

October 23-25, 1984  
FIFTH ISRAELI CONFERENCE ON SOFTWARE  
QUALITY ASSURANCE  
Tel Aviv, Israel

Contact: Ben Livson  
Dept. 4540, Israel Aircraft Industries  
Ben Gurion International Airport  
Lod 70100, Israel

October 29-31, 1984  
ROLE OF LANGUAGE IN PROBLEM SOLVING  
Laurel, Maryland, USA

Deadline: August 1, 1984  
Contact: Robert Jernigan  
Database, Expert, Knowledge-based Systems  
The Johns Hopkins University  
Laurel, MD 20707, USA

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N O V E M B E R  
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November 1-4, 1984  
1984 MEETING OF THE AMERICAN SOCIETY FOR  
CYBERNETICS  
Philadelphia, USA

Theme: Autonomy, Intervention, and Dependence as they relate to Cybernetics and: Family Systems/Family Therapy, Organizations/Management Consulting, International Development, Artificial Intelligence, Cognitive Systems, Architectural Systems, Information Systems, Biological Systems, Planning/Evaluation, Ecosystems, Education, Science Fiction.  
Contact: Dr. Frederick Steiner  
Annenberg School of Communications  
University of Pennsylvania  
Philadelphia, PA 19104, USA  
Phone (215) 898-5233 - (215) 243-2794

November 6-9, 1984  
FGCS 84 INTERNATIONAL CONFERENCE ON FIFTH  
GENERATION COMPUTER SYSTEMS  
Tokyo, Japan

Deadline: April 15, 1984  
Contact: Hideo Aiso  
ICOT, Mita Kokusai Building  
21F 1-4-28 Mita  
Minato-ku, Tokyo 108, Japan  
Phone 3-456-3195  
Telex 32964

November 7-9, 1984  
EIGHTH ANNUAL INTERNATIONAL COMPUTER  
SOFTWARE AND APPLICATIONS CONFERENCE  
(COMPSAC 84)  
Chicago, Illinois, USA

Deadline: April 6, 1984  
Contact: Albert Hawkes  
Sargent and Lundy Engineers  
55 East Monroe St.  
Chicago, IL 60603, USA

November 15-16, 1984  
San Diego, California, USA  
CALIFORNIA EDUCATIONAL COMPUTING  
CONSORTIUM

Deadline: April 1, 1984  
Contact: Virginia S. Lashley  
Glendale College  
1500 North Verdugo Road  
Glendale, CA 91208, USA

November 19-21, 1984  
POWER PLANT SIMULATION  
Mexico City, Mexico

Topics: Use of simulation in power plant analysis, Use of simulation in power plant design, Training simulators, Model validation, Power plant modelling, Simulation Languages, Numerical methods, New developments.

Deadline: May 15, 1984  
Contact: Prof. David L. Hetrick  
Department of Nuclear and Energy Eng.  
University of Arizona  
Tucson, Arizona 85721, USA  
Phone (602) 621-2514

.....  
D E C E M B E R  
.....

December 6-8, 1984  
1984 REAL TIME SYSTEMS SYMPOSIUM  
Austin, Texas, USA

Contact: Mirosla Malek  
University of Texas at Austin  
Computer Science Department  
Austin, TX 78712, USA  
Phone (512) 471-5704

December 10-15, 1984  
STOCHASTIC MODELLING AND FILTERING  
Working Conference  
Organized by IFIP (WG 7.1)  
Rome, Italy

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J A N U A R Y  
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January 2-4, 1985  
EIGHTEENTH HAWAII INTERNATIONAL CONFERENCE  
ON SYSTEM SCIENCE  
Honolulu, Hawaii, USA

Contact: Ralph Sprague  
University of Hawaii  
2404 Maile Way  
Honolulu, HI 96822, USA  
Phone (808) 948-7430

January 24-26, 1985  
SCS MULTICONFERENCE

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M A R C H  
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March 1985  
EIGHTEENTH ANNUAL SIMULATION SYMPOSIUM

March 12-14, 1985  
ACM COMPUTER SCIENCE CONFERENCE  
New Orleans, Louisiana, USA

Deadline: April 30, 1984  
Contact: Terry M. Walker  
Computer Science Department  
University of Southwestern Louisiana  
P.O. Box 44330  
Lafayette, LA 70504, USA  
Phone (318) 231-6339

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J U N E  
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June 3-6, 1985  
1985 NATIONAL COMPUTER CONFERENCE  
Chicago, Illinois, USA

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J U L Y  
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July 1985  
SUMMER COMPUTER SIMULATION CONFERENCE  
Chicago, Illinois, USA

July 29-August 2, 1985  
1985 WORLD CONFERENCE ON COMPUTERS IN  
EDUCATION  
Norfolk, Virginia, USA

Contact: Mr. John McGregor  
Department of Computer Studies  
Murray State University  
Murray, Kentucky 42071, USA

.....  
A U G U S T  
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August 5-9, 1985  
ELEVENTH IMACS WORLD CONGRESS / SYSTEM  
SIMULATION AND SCIENTIFIC COMPUTATION  
Oslo, Norway

Topics: Systems modelling and simulation,  
model identification and validation,  
numerical methods for differential and  
integral equations, simulation of large  
scale systems, simulation of discrete sys-  
tems, control and optimization theory and  
applications, simulation tools, parallel  
computation, special computers and soft-  
ware for simulation and scientific compu-  
tation.

Abstract Deadline: September 1, 1984  
Registration Deadline: June 15, 1985  
Contact: Eleventh IMACS World Congress  
NFA, Kronprinsengt. 17  
N-Oslo 2, Norway  
Phone (02) 41 87 35  
Telex 18213 XFIN

.....  
S E P T E M B E R  
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September 2-6, 1985  
TWELFTH IFIP CONFERENCE ON SYSTEM  
MODELLING AND OPTIMIZATION  
General Conference  
Organized by IFIP (TC 7)  
Budapest, Hungary

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June 1986  
MATHEMATICAL MODELLING IN IMMUNOLOGY  
Working Conference  
Organized by IFIP (WG 7.1)  
Vienna, Austria

June 16-19, 1986  
NATIONAL COMPUTER CONFERENCE  
Las Vegas, Nevada, USA

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J U L Y  
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July 1986  
SUMMER COMPUTER SIMULATION CONFERENCE

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J U N E  
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June 15-18, 1987  
NATIONAL COMPUTER CONFERENCE  
Chicago, Illinois, USA



# ALL ABOUT SIMULATORS

PRELIMINARY PROGRAM

## 1984 SCS Simulators Conference

April 18-20, 1984

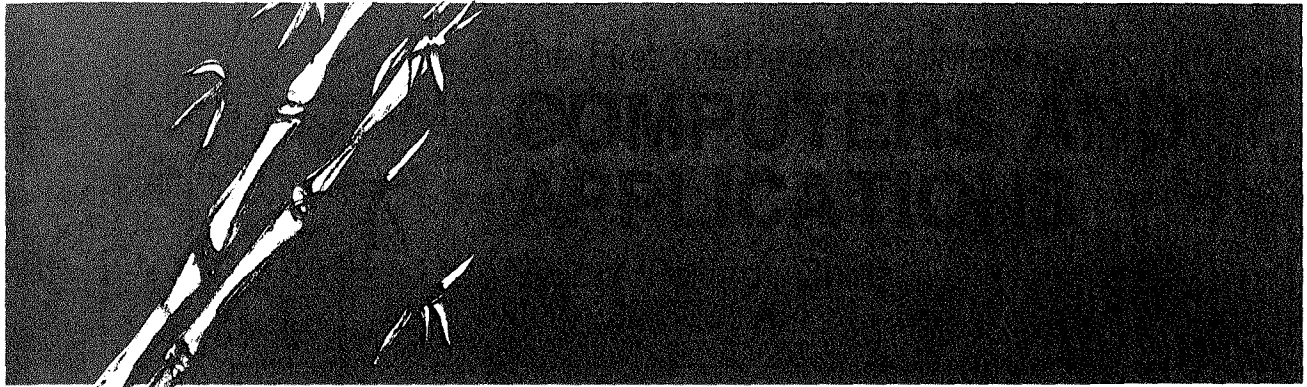
OMNI INTERNATIONAL HOTEL  
Norfolk, Virginia

- Simulator Development Technology
- Training with Simulators
- The Simulator Industry and Its Customers
- Simulators for Research/Development/Engineering

*For more information phone SCS (619) 459-3888*

*Advance registrants will receive final program publication in March 1984. Others should request final program from:*

**SCS, P.O. Box 2228, La Jolla, CA 92038**



Co-Sponsored by



**CIE COMPUTER SOCIETY**

CIE: CHINESE  
INSTITUTE OF ELECTRONICS



**IEEE COMPUTER SOCIETY**

IEEE: INSTITUTE OF ELECTRICAL AND  
ELECTRONICS ENGINEERS, INC./

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WU Jikang  
*Academia Sinica*

Tse-yun FENG  
*Ohio State University*

**PROGRAM CO-CHAIRMEN**

JIANG Shifei  
*Academia Sinica*

E.A. PARRISH, J.R.  
*University of Virginia*

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*Louisiana State Univ.*  
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*Univ. of Massachusetts*  
WANG Xianghao  
*Jilin University*  
Xu Jiafu  
*Nanjing Univ.*  
ZHANG Xiao Xiang  
*Academia Sinica*

**Wednesday, June 20, 1984**

- Session 1A  
Parallel Processing - 1
- Session 1B  
Office Information Systems - 1
- Session 1C  
Software and Methodology - 1
- Session 2A  
Software for  
Distributed Systems - 1
- Session 2B  
Data Base Systems- 1
- Session 2C  
Applications of Computers - 1
- Session 3A  
Distributed Processing - 1
- Session 3B  
Applications of Computers - 2
- Session 3C  
Software and Methodology - 2

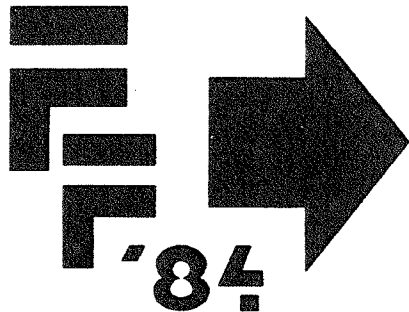
**Thursday, June 21, 1984**

- Session 4A  
Parallel Processing - 2
- Session 4B  
Office Information Systems - 2
- Session 4C  
Performance Evaluation
- Session 5A  
Software for Distributed  
Systems - 2
- Session 5B  
Data Base Systems - 2
- Session 5C  
Software and Methodology -3
- Session 6A  
Applications of Computers - 3
- Session 6B  
Computer Graphics - 1
- Session 6C  
Designing Computers and  
Subsystems -1
- Session 7A  
Design and Test of ICs - 1
- Session 7B  
Office Information Systems - 3
- Session 7C  
Image Processing - 1

**Friday, June 22, 1984**

- Session 8A  
Distributed Processing - 2
- Session 8B  
Data Base Systems - 3
- Session 8C  
Software and Methodology - 4
- Session 9A  
Local Area Networks - 1
- Session 9B  
Computer Graphics - 2
- Session 9C  
Design of Computers and  
Subsystems - 2
- Session 10A  
Design and Test of ICs - 2
- Session 10B  
Data Base Systems - 4
- Session 10C  
Software and Methodology - 5
- Session 11A  
Local Area Networks - 2
- Session 11B  
Application of Computers - 4
- Session 11C  
Image Processing - 2

**PRELIMINARY PROGRAM  
AND REGISTRATION**  
**CONFERENCE ON  
THE FOREFRONTS OF  
LARGE-SCALE  
COMPUTATIONAL PROBLEMS**



**FOREFRONTS OF LARGE-SCALE  
COMPUTATIONAL PROBLEMS**

**JUNE 25-27, 1984  
NATIONAL BUREAU OF STANDARDS  
GAITHERSBURG, MARYLAND**

**Sponsored by:**

- |   |                                    |   |                              |
|---|------------------------------------|---|------------------------------|
| Air Force Office of Scientific Research                 | Control Data Corporation           | GTE   | National Bureau of Standards |
| American Federation of Information Processing Societies | Cornell University                 | General Electric Company                      | Office of Naval Research     |
| Argonne National Laboratory                             | Cray Research Inc.                 | International Business Machines Corporation   | Philip Morris                |
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|   | E.I. DuPont de Nemours & Co., Inc. | Los Alamos National Laboratory                |                              |
|   | ETA Systems Incorporated           | The MacNeal-Schwendler Corporation            |                              |
|   | Exxon Corporation                  | NASA Numerical Aerodynamic Simulation Program |                              |
|   | Floating Point Systems             |   |                              |

June 25-27, 1984  
National Bureau of Standards  
Gaithersburg, Maryland

**CONFERENCE ON  
THE FOREFRONTS OF  
LARGE-SCALE  
COMPUTATIONAL PROBLEMS**

In order to encourage the interdisciplinary nature of this conference, formal talks will be interspersed with formal panel discussions and informal breaks: talks will focus on results from specific areas and opportunities in related areas. Panel discussions will focus on general problems in exploiting opportunities and problems individuals have in taking advantage of computers. Breaks and lunches will allow time for informal discussion. The meeting is planned to run from 9 a.m. to 5:30 p.m. each day.

**SCHEDULED  
SPEAKERS**

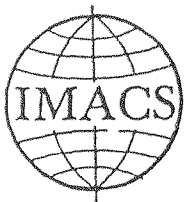
The Program Committee is proud to announce that the scheduled speakers include:

- |   |   |
|---|---|
| Lawrence R. Klein<br>1980 Nobel Laureate,<br>Economics<br>University of Pennsylvania<br>Topic — <b>Economic Modeling</b>    | Gary Demos<br>Digital Productions<br>Topic — <b>Computer Generated Movies</b>     |
| James A. Swanson<br>Swanson Analysis Systems, Inc.<br>Topic — <b>Structural Analysis</b>                                    | Roger W. Cohen<br>Exxon<br>Topic — <b>Large Scale Fluid Dynamics Calculations</b> |
| Kenneth G. Wilson<br>1982 Nobel Laureate,<br>Physics<br>Cornell University<br>Topic — <b>Impact of Computers on Physics</b> | David A. Pensak<br>DuPont<br>Topic — <b>Chemical Synthesis</b>                    |
| Enrico Clementi<br>IBM Corporation<br>Topic — <b>Biology/Pharmacology</b>   | Gabor T. Herman<br>University of Pennsylvania<br>Topic — <b>Medical Imaging</b>   |
| James D. Gunton<br>Temple University<br>Topic — <b>Materials Science</b>  |   |

Roland W. Schmitt, General Electric  
**Keynote Address**

The final program will be available to all attendees on-site.

PLEASE POST



FIRST ANNOUNCEMENT - CALL FOR PAPERS

SECOND IMACS INTERNATIONAL  
SYMPOSIUM ON  
BIOMEDICAL SYSTEMS MODELING  
August 8-12, 1984  
(NIH Campus)  
Bethesda, MD, USA

CONTACT:

Dr. Charles DeLisi  
Mathematical Biology, DCBD, NCI  
Nat'l. Inst. of Health, Bldg. 10  
Bethesda, MD 20205 USA

-or-

Dr. J. Eisenfeld  
Department of Mathematics  
University of Texas-Arlington  
Arlington, TX 76019 USA

Detach and Return: -----

Name: \_\_\_\_\_

Full Mailing Address: \_\_\_\_\_

Phone: \_\_\_\_\_

- Please keep me on the mailing list for the Second IMACS International Symposium on Biomedical Systems Modeling.
- I intend to participate.
- I intend to submit a paper. Tentative title: \_\_\_\_\_
- \_\_\_\_\_
- I would be interested in organizing a Session on the topic: \_\_\_\_\_
- \_\_\_\_\_

Mail to:

- OR -

Dr. Charles DeLisi  
Mathematical Biology, DCBD, NCI  
National Institute of Health, Bldg. 10  
Bethesda, MD 20205 USA

Dr. J. Eisenfeld  
Department of Mathematics  
University of Texas-Arlington  
Arlington, TX 76019 USA

## MODELLING & SIMULATION

Organized by

MINNEAPOLIS, Minnesota (USA)

AUGUST 13-17, 1984

AMSE, Association for the Advancement of  
Modelling and Simulation techniques in Enterprises

### **Scope and Main Topics**

All Modelling and Simulation Methods and Applications are of interest.

#### METHODOLOGY

**Mathematical techniques** : Signals and data. Statistics. Numerical analysis and Algorithms.

**Modelling** : Systems analysis and synthesis. Estimation, identification, pattern recognition. Control, operations research, computer aided design, man-machine systems.

**Computers and Simulation Methods** : General and particular software and hardware. Microcomputers. Modelling of information systems.

#### APPLICATIONS

**Electrical and Electronics Engineering** : Phenomena, components, devices. Circuits and Networks. Electronic systems and applications, instrumentation. Power systems, electrical machines.

**Mechanical Engineering** : Mechanics of solids and fluids. Machines and vehicles. Robotics.

**Civil Engineering** : Structures, water resources, transportation, traffic, soil mechanics, groundwater, environmental.

**Energy and thermal devices** : heat transfer, thermal machines. Radiation. Nuclear, solar and other new energies.

**General Physics** : Matter and waves. Optics. Acoustics.

**Materials and Resources** : Petroleum, Mining. Transformation and use of materials. Metallurgy, Chemistry, Biochemistry.

**Environment** : Geology, hydrology, soils. Atmosphere, space. Forest, plant and animal resources. Ecological systems.

**Life and men** : Biology, physiology, medicine. Psychology, education, language, humanities.

**Organization** : Management, trade, economics, problems of societies.

**Urban planning** : Housing and infrastructure.

### **Categories of papers**

Tutorials and Survey papers (indicate if your paper belongs to this category)

Regular and Short papers (duration of presentation from 15 to 30 minutes). Proposals for Panel discussions.

LANGUAGES : Preferably English, but French and other common languages are accepted.

### **Acceptance on the basis of a Submission**

Two copies of an about 300 words summary. It must be typed, with a good typewriter and ribbon, on one standard sheet of paper (such as "A4": 21X29.7 cm), with margins to obtain a 16 cm wide text. Spacing between lines: 1.5 or 2. Top of the page : title of the paper, name(s) of the author(s), country. Send to the address below.

### **Deadlines**

**Submissions** : April 25, 1984

**Notification of acceptance by the Selection Committee** : sent about 15 days after receipt of the submission.

**Full text for the Proceedings** : They are accepted up to the Conference, but we recommend submission as soon as possible for an earlier publication of the Proceedings. A Volume of the Summaries will be given to all participants. The publication in the Proceedings implies the participation of at least one of the authors to the Conference. Other accepted papers will be planned for publication in one of the AMSE periodicals

### **Other nearest AMSE Conference : Athens (Greece) : June 27-29, 1984**

Those who are interested in the Athens Conference and who have not received the corresponding 'Call for Papers' are informed that the topics are the same as for the Minneapolis Conference. They are invited to send their submissions for this Conference to AMSE (same rules apply). Deadline: March 25, 1984.

### **Correspondence**

The final Announcement, with detailed program and practical information, will be mailed on April 15 to all authors.

All others are invited request this information by mailing the accompanying form. For all correspondence the address is :

**AMSE, 16 Avenue de Grange Blanche, 69160 Tassin-la-Demi-Lune, France**

President of the AMSE, Chairman  
G. MESNARD

U.S. Organization Committee (to be completed)  
Y.J. STEPHANEDES (Chairman), P.G. MICHALOPOULOS (Co-chairman),  
W.W. & W.T. LIN, A.G. OWENS



EUROPEAN SIMULATION MEETING

on

SIMULATION IN RESEARCH AND DEVELOPMENT

27-30 August 1984  
Eger, HUNGARY

SECOND ANNOUNCEMENT AND CALL FOR PAPERS

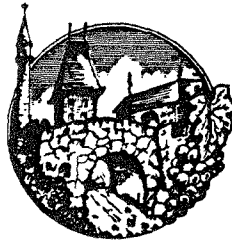
organized by

IMACS/Hungary

under the auspices of

the Scientific Society of Measurement and Automation

Budapest, HUNGARY



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Á. Vigh (Secretary)	(Hungary)
L. Bakocs	(Hungary)
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A. Sydow	(GDR)
K. Tarnay	(Hungary)
S.G. Tzafestas	(Greece)
B.P.Th. Veltman	(The Netherlands)

SCOPE

The scope of the Meeting will include both theoretical (methodological) and practical (application) problems. In addition to the lectures a Round Table Discussion will be organized.

REGISTRATION

Kindly complete the attached form in typescript or block letters and return to

Dr. A. Jávör  
Central Research Institute for Physics  
of the Hungarian Academy of Sciences  
H-1525 Budapest 114, P.O.Box 49,  
HUNGARY  
Phone: 166540  
Telex: 224722

Registration should be undertaken using the attached Proforma to be returned not later than 1 April 1984. Abstracts as well as further inquiries should also be sent to the above address.

CONTRIBUTIONS

Those who intend to give a lecture are asked to send a short abstract of about 10 lines that should arrive not later than 1 March 1984.

On acceptance, the final text of the paper should arrive not later than 1 June 1984.

Instructions as well as the necessary stationary for the preparation of the final text: will be sent to all authors. It is essential that the above deadlines be kept so that contributions can be included in the proceedings to be distributed at the beginning of the Meeting.

The official language of the Meeting and of the Proceedings volume will be English.

PRELIMINARY PROGRAMME

27 Aug.	Arrival, Registration
28 Aug.	Opening of the Meeting, Lectures
29 Aug.	Lectures, Round Table Discussion, Excursion
30 Aug.	Lectures, Closing of the Meeting, Banquet
31 Aug.	Departure

GENERAL INFORMATION

The Meeting will take place in the House of Techniques and the participants will be accommodated in the Hotel Eger. An endeavour will be made to transport participants to the site of the Meeting if the Organizing Committee is informed well in advance of exact time of arrival in Budapest.

A social programme will be arranged to contribute to the pleasant atmosphere of the Meeting. It is planned that this programme will include an organ concert in the Cathedral of Eger, sightseeing in the town, and an excursion to the neighbouring mountains. It is hoped that the historical surroundings of one of the most famous wine producing regions of Hungary will provide a pleasant venue for the Meeting.

For those who are interested, a sightseeing tour of Budapest will be organized on 31st August for which advance registration will be required.

## REGISTRATION PROFORMA

## EUROPEAN SIMULATION MEETING

on

Simulation in Research and Development

27-30 August 1984, Eger, Hungary

1. Mr  Mrs  Miss   
 .....  
 (family name) (forename)
2. ....  
 .....  
 (mailing address  home or  office)
3. ....  
 .....  
 (institution/company and address, phone, telex)
4. ....  
 (name of accompanying person)

## REGISTRATION

Registration fee: approximately \$100

I intend to give a lecture with the following provisional title the abstract of which is/has been submitted:

## HOTEL RESERVATION

Arriving on: ..... 1984. Leaving on: ..... 1984.

No. of nights: .....

HOTEL EGER, EGER

Room per person per day /breakfast included/

	with bath		without bath	
single room	\$30 <input type="checkbox"/>		\$17 <input type="checkbox"/>	
double room	category "A"	category "B"		
	\$16 <input type="checkbox"/>	\$13 <input type="checkbox"/>	\$9 <input type="checkbox"/>	

As the number of rooms is limited, accomodation cannot be guaranteed for those registering late. Details of payment of registration fee and hotel reservation will be indicated on the Final Registration Form.

KFKI-84-10

## CALL FOR PAPERS

ACM 1984 ANNUAL CONFERENCE  
October 8-10, 1984 • San Francisco Hilton Hotel  
San Francisco, California

# THE FIFTH GENERATION CHALLENGE

The 1984 ACM Annual Conference will explore the advanced integrated systems and new techniques of the 1990s—the “Fifth Generation”. The papers may include discussions of the building blocks of the Fifth Generation now emerging from laboratories and production facilities, as well as advanced techniques and research.

- You are invited to submit
- a technical paper which is an original contribution to the computing art on a building block or issue of the Fifth Generation
  - a survey of a field of interest, or
  - a proposal for a tutorial or panel.

Topics may be drawn from any of the following areas:

### *Building Blocks of the Fifth Generation*

- System architectures
- Circuit and computer design
- Supercomputers
- Operating systems
- Programming languages
- Developments in artificial intelligence
- Database, expert, and knowledge-based systems
- Simulation and modelling
- Robotics and sensing
- Graphics, voice and touch technologies
- Office and industrial applications of CAD/CAM
- Integrated microcomputer systems
- Intelligent workstations
- Local Area and Long Haul Networks

### *The Objectives and Character of Integration in the Fifth Generation*

- Interface and data communications technologies (software and hardware)
- Software development tools and environments

- Portability and adaptability of programs, subsystems and databases
- Standardization issues  
*The Impact of the Fifth Generation*
- Security, privacy and controls
- Limits on technology transfer
- Applications for the 1990s in business, education, manufacturing, research and the professions
- Anticipated changes in society



All papers and proposals for panels or tutorials must be received by **February 15, 1984**. Notification whether submissions have been accepted will be sent by April 30, 1984. Panels or tutorials which will be accepted must submit an outline or summary by each participant by June 1, 1984.

Papers or proposals shall be selected on the basis of their expected value to the attendees at the Conference and to the readers of the Conference Proceedings. Authors need not

be members of ACM to submit papers or proposals. All papers which are to be published in full will be refereed.

Following selection, authors will be sent special paper and instructions for preparing camera-ready copy (due June 30, 1984) and must sign the copyright release form which will be included in the instructions.

**Send papers and proposals by February 15, 1984 to**

**Alexander D. Roth**  
Program Chairman, ACM '84  
9900 Main Street, Suite 303  
Fairfax, Virginia 22031  
(703) 385-0211

For further information contact Mr. Roth at the above address.





## WINTER SIMULATION CONFERENCE

November 28 through 30, 1984  
Sheraton Dallas Hotel  
Dallas, Texas

### Call for Papers

The 1984 Winter Simulation Conference will feature Papers, Tutorials, State-of-the-Art Review Sessions, and Panel Discussions on discrete and combined (discrete continuous) simulation.



#### Conference participation is invited in the following categories:

- Contributed papers on applications and methodological topics.
- Tutorials on fundamental simulation concepts and languages.
- State-of-the-Art reviews on current practice and research.
- Regular paper sessions on specific topics.
- Panel discussions on current issues.
- Software and systems demonstrations sessions.

#### Topics to be included:

- |                               |                                 |
|-------------------------------|---------------------------------|
| ■ Decision Support Systems    | ■ Health Care Systems           |
| ■ Simulation System Software  | ■ Transportation                |
| ■ Distributed Simulation      | ■ Energy and Petroleum Systems  |
| ■ Offshore Technology         | ■ Communications                |
| ■ Manufacturing               | ■ Military Systems              |
| ■ Environmental Systems       | ■ Aerospace Applications        |
| ■ Mini and Micro Applications | ■ Planning, Scheduling          |
| ■ Graphics Applications       | ■ Any topic not mentioned above |

#### Deadlines and Requirements

**March 15, 1984** – One to three page proposals to present tutorials, present state-of-the-art surveys, organize and chair regular paper sessions, or to organize and chair panel discussion.

**April 15, 1984** – Contributed Papers. Only original papers which have not been published or presented elsewhere should be submitted. Submission implies that the author will attend the 1984 WSC to present the paper. Send four copies of the full length paper or extended abstract and a list of key words.

**June 15, 1984** – Contributors notified of acceptance.

**August 17, 1984** – Camera ready manuscript for the proceedings due.

Direct all correspondence to Dennis Pegden, program chairman. Please include full address, affiliation and telephone number.

#### General Chairman

Udo W. Pooch  
Dept. of Computer Science  
College of Engineering  
Texas A&M University  
College Station, Texas 77843  
(409) 845-5498

#### Program Chairman

Dennis Pegden  
Industrial Engineering Dept.  
207 Hammond Building  
Pennsylvania State University  
University Park, PA 16802  
(814) 863-1675

**PLEASE POST**

**PLEASE POST**