1977

acm computer science conference

marriott hotel / atlanta / georgia / 31 january — 2 february 1977

abstracts program information
MESSAGE FROM THE CONFERENCE CHAIRMAN:

The annual ACM Computer Science Conference is establishing itself as a national forum for communication among researchers in computer science. Atlanta has the pleasure of hosting the Fifth Annual ACM Computer Science Conference, and it is my pleasure to welcome you to it on behalf of the CSC '77 planning committee.

Following the tradition of this conference, several foremost computer scientists will address CSC '77 at plenary sessions; some 200 reports on current research will be presented; and ample opportunity will be provided for informal meetings among individuals sharing research interests. I hope you will peruse the current computing literature exhibited by leading publishers, and take note of the manpower situation reflected by the extensive employment register operations. A new, and most appropriate, activity at CSC '77 is a national student programming contest bringing together teams of computer science undergraduates who won the 1976 regional programming contests. We are delighted to have among us the future generation of computer science researchers.

I would like to take this opportunity to thank everyone who has contributed to the organization of this conference. The CSC '77 planning committee — Phil Enslow, Rich DeMillo, Pete Jensen, Penti Honkanen, John Gchl, Ed Rumiano, and many members of the academic and professional communities of Atlanta — have been a pleasure to work with; they deserve our recognition and appreciation.

We sincerely hope that your visit to Atlanta is enjoyable, and that you will call on any one of us if we can make your attendance at CSC '77 more profitable.

Vladimir Slamecka
Chairman
### Conference at a Glance

**"The Human Factor"**  
Professor Henry F. Ledgard  
University of Massachusetts

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<th>Time</th>
<th>Session</th>
<th>Room 1</th>
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<td>9:00-10:15</td>
<td>Artificial Intelligence I: Cognition, Learning, Knowledge</td>
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<td>10:45-12:00</td>
<td>Artificial Intelligence II: Deduction and Problem Solving</td>
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<td>1:30-3:00</td>
<td>Artificial Intelligence III: Applications</td>
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<td>3:30-5:00</td>
<td>Artificial Intelligence IV: Natural Language and Speech</td>
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**"Steps Toward a Theory of Heuristic Algorithms"**  
Professor Richard Karp  
University of California

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<td>Artificial Intelligence III: General - A</td>
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**"New Approaches to Program Verification"**  
Professor Zohar Mano  
Stanford University

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<td>Artificial Intelligence III: General - B</td>
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**"The Theory of Computing I: Automata and Formal Languages"**  
Room 5

**"The Theory of Computing II: Complexity and Algorithms"**  
Room 6

**"Theory of Computing III: General - A"**  
Room 7
PROGRAM

1977 ACM Computer Science Conference
Atlanta, Georgia

SUNDAY, JANUARY 30, 1977

Registration, 3:00 pm - 8:00 pm, Convention Floor Lobby
Employment Register, 7:00 pm - 9:00 pm, Hall of Nations

MONDAY, JANUARY 31, 1977

Registration, 7:30 am - 5:00 pm, Convention Floor Lobby
Publishers' Exhibit, 8:00 am - 6:00 pm, Hall of Nations
Employment Register, 10:00 am - 8:00 pm, Hall of Nations

9:00-10:15  INVITED SPEAKER: Professor Henry F. Ledgard, University of Massachusetts, "The Human Factor"

10:45-12:00  PAPER SESSIONS 1, 8, 15, 22, 29

Session 1.  Software Engineering I: Testing and Reliability
Tara Rooms 4 and 5.  Chairman: R. Tobey

Session 8.  Applications I: Operations Research
Tara Room 1.  Chairman: P.V. O'Neill

Session 15.  Operating Systems I.
Ballroom South.  Chairman: S. Pollock

Session 22.  APL
Tara Room 2.  Chairman: L.D. Fosdick

Session 29.  Theory of Computing I: Automata and Formal Languages
Tara Room 3.  Chairman: J. Minker

12:00-1:00  LUNCH.  Sidewalk Cafe, Hall of Nations
1:30-3:00  PAPER SESSIONS 2, 9, 16, 23, 30

Session 2. Software Engineering II: Analysis
Tara Rooms 4 and 5. Chairman: E.A. Favre

Session 9. Applications II: Graphics
Tara Room 1. Chairman: C. Weiman

Session 16. Operating Systems II.
Ballroom South. Chairman: T.K. Flanigan

Session 23. Data Base I: Structure and Organization
Tara Room 2. Chairman: A.T. Berztiss

Session 30. Theory of Computing II: Complexity and Algorithms
Tara Room 3. Chairman: A.C.L. Barnard

3:00-5:00  PAPER SESSIONS 3, 10, 17, 24, 31

Session 3. Software Engineering III: Design Tools and Techniques
Tara Rooms 4 and 5. Chairman: M.L. Schneider

Session 10. Applications III: General - A
Tara Room 1. Chairman: S. Wolfson

Session 17. System Architecture and Organization
Ballroom South. Chairman: M. Yovits

Session 24. Data Base II: Query and Retrieval Systems
Tara Room 2. Chairman: T.M. Walker

Session 31. Theory of Computing III: General - A
Tara Room 3. Chairman: D.R. Clutterham

TUESDAY, FEBRUARY 1, 1977

Registration, 7:30 am - 8:00 pm, Convention Floor Lobby
Publishers' Exhibit, 8:00 am - 6:00 pm, Hall of Nations
Employment Register, 10:00 am - 8:00 pm, Hall of Nations

9:00-10:15  INVITED SPEAKER: Professor Richard Karp, University of California, "Steps Toward a Theory of Heuristic Algorithms"
10:45-12:00 PAPER SESSIONS 4, 11, 18, 25, 32, 36

Session 4. Artificial Intelligence I: Cognition, Learning, Knowledge
Tara Room 1. Chairman: H. Hellerman

Session 11. Applications IV: Medical - A
Tara Room 2. Chairman: S. Brunjes

Session 18. Evaluation
Tara Room 3. Chairman: B.L. Bateman

Session 25. Scientific Programming and Numerical Analysis I.
Tara Room 4. Chairman: J. Tartar

Session 32. Theory of Computing IV: General - B
Tara Room 5. Chairman: O.G. Johnson

Session 36. Programming Languages I: General - A
Ballroom South. Chairman: J.D. Lawson

12:00-1:30 LUNCH. Sidewalk Cafe, Hall of Nations

12:00-1:30 DEPARTMENTAL CHAIRMEN'S LUNCHEON. Hermitage Suite.
Speaker: Mr. Ray Yinger, U.S. Civil Service Commission

1:30-3:00 PAPER SESSIONS 5, 12, 19, 26, 33

Session 5. Artificial Intelligence II: Deduction and Problem Solving
Tara Room 1. Chairman: W.W. Peterson

Session 12. Applications V: System Design
Tara Room 2. Chairman: P. Bratley

Session 19. Education I: General
Tara Room 3. Chairman: R.T. Gregory

Session 26. Data Base III: Maintenance and Evaluation
Tara Room 4. Chairman: H. Hedges

Session 33. Programming Languages II: Parsing
Tara Room 5. Chairman: A.K. Joshi
3:30-5:00 PAPER SESSIONS 6, 13, 20, 27, 34

Session 6. Artificial Intelligence III: Applications
Tara Room 1. Chairman: D. Matula

Session 13. Applications VI: General B
Tara Room 2. Chairman: D.W. Loveland

Session 20. Education II: CAI and Languages
Tara Room 3. Chairman: F.Y. Wang

Session 27. Data Base IV: Applications
Tara Room 4. Chairman: W. Cotterman

Session 34. Programming Languages III: General - B
Tara Room 5. Chairman: V. Wallace

WEDNESDAY, FEBRUARY 2, 1977

Registration, 7:30 am - 5:00 pm, Convention Floor Lobby
Publishers' Exhibit, 8:00 am - 5:00 pm, Hall of Nations
Employment Register, 10:00 am - 3:00 pm, Hall of Nations

9:00-10:15 INVITED SPEAKER: Professor Zohar Manna, Stanford University, "New Approaches to Program Verification"

10:45-12:00 PAPER SESSIONS 7, 14, 21, 28, 35

Session 7. Artificial Intelligence IV: Natural Language and Speech.
Tara Room 1. Chairman: F.M. Johnson

Session 14. Applications VI: Medical - B
Tara Room 2. Chairman: J. Hamblen

Session 21. Networks
Tara Room 3. Chairman: G. Nagy

Session 28. Scientific Programming and Numerical Analysis II
Tara Room 4. Chairman: N.S. Coulter

Session 35. Programming Languages IV: General - C
Tara Room 5. Chairman: P. Gilmore
The purpose of the Register is to bring applicants and employers together in a professional manner to aid in the employment process. Listings of employer openings and applicants are available to all interested parties in the Hall of Exhibits of the Marriott Hotel during the following hours:

- Sunday - January 30 - 7:00 p.m. to 9:00 p.m.
- Monday - January 31 - 10:00 a.m. to 8:00 p.m.
- Tuesday - February 1 - 10:00 a.m. to 8:00 p.m.
- Wednesday - February 2 - 10:00 a.m. to 3:00 p.m.

Making contacts and arranging for interviews will be the responsibility of the employer and the applicant. However, the Employment Register Staff will facilitate making contacts by:

1. Operating a message desk -- Memo paper and envelopes are provided. A message should be placed in an envelope, addressed to the appropriate individual, and then placed in the appropriate pigeonhole in the set of mail boxes. Note that the Employment Register Staff are not involved in the exchange of messages. Messages not picked up by the end of the conference will be destroyed.

2. Posting sign-up sheets for interviews as provided by the employer. The applicant may choose a suitable time, sign up, and appear for an interview at the location designated by the employer.

Representatives of employing organizations need not be present at the conference. This can be determined by checking item 4 on the employer's form. In this case, applicants should direct their inquiries to the individual listed in item 3 of the form.

The applicant need not be present at the conference. This can be determined by checking item 5 on his form. In this case, the employer's representative should use the information in items 2, 3, and 4 to direct inquiries to the applicant.

An IBM copying machine is available in the Employment Register area so that individual pages from either the employer or applicant listing books may be duplicated.

Information on the availability of complete copies of employer or applicant listings may be obtained by directing a message during the conference to Professor Taulbee or writing to him immediately afterwards at the address:

Professor Orrin E. Taulbee  
Department of Computer Science  
University of Pittsburgh  
Pittsburgh, Pennsylvania 15260
CONFERENCE EXHIBITORS

Academic Press, Inc.
Addison-Wesley Publishing Co., Inc.
Computer Science Press, Inc.
Conference Book Service, Inc.
Elsevier North-Holland, Inc.
Hayden Book Company, Inc.
Holden-Day, Inc.
IEP-A-Dun-Donnelley
McGraw-Hill Book Co.
Petrocelli/Charter Publishers
Prentice Hall, Inc.
Science Research Associates
Springer-Verlag New York, Inc.
West Publishing Company
Wiley & Sons, Inc.
Winthrop Publishers, Inc.
WEDNESDAY, FEBRUARY 2, 1977

Registration, 7:00 am - 5:00 pm, Convention Floor Lobby
Publishers' Exhibit, 8:00 am - 5:00 pm, Hall of Nations
Employment Register, 10:00 am - 3:00 pm, Hall of Nations

9:00-10:15 Jointly with CSC '77:
INVITED SPEAKER: Professor Zohar Manna, Stanford University, "New Approaches to Program Verification"

10:30-11:15 OPENING SESSION
Chairman: J. Goda
Welcome: Richard Austing, SIGCSE Chairman

12:00-1:00 LUNCH. Sidewalk Cafe, Hall of Nations

1:30-3:00 Session 1-A: Hardware Facilities, Selection and Usage
Session 1-B: Structured Programming I
Session 1-C: The ACM C3S-CAJC Curriculum Report
Chairman: Joyce Little

3:30-5:00 Session 2-A: Aids for Compiler Writing Courses
Session 2-B: Structured Programming II
Session 2-C: Implementation Concerns for the C3S-CAJC Curriculum Report
Chairman: Frank Cable

3:30 Student Programming Contest - Bus leaves Marriott Hotel for Georgia Tech

4:00-5:00 Student Programming Contest - Briefing Session

5:00-12:00 Student Programming Contest - Competition

8:00-10:00 Birds of a Feather
Tutorial: Structured COBOL, Daniel D. McCracken
THURSDAY, FEBRUARY 3, 1977

Registration, 7:30 am - 12:00 noon, Convention Floor Lobby

9:00-10:30  
Session 3-A: Operating System Courseware  
Session 3-B: Structured Programming III  
WORKSHOP: Structured COBOL, Gary Shelly (at Georgia Tech)

10:45-12:00  
Session 4-A: Machine Language Concepts  
Session 4-B: First Courses in Computer Science I  
WORKSHOP: Structured COBOL, Gary Shelly (at Georgia Tech)

12:00-1:00  
Student Programming Contest - Awards Luncheon  
LUNCH. Sidewalk Cafe, Hall of Nations

1:30-3:00  
Session 5-A: Advanced Topics - A Potpourri  
Session 5-B: First Courses in Computer Science II  
TUTORIAL: Restructuring Programming Education, Gerald Weinberg

3:30- 5:00  
Session 6-A: Computer Literacy  
Session 6-B: A Round-Table Discussion - Community and Junior Colleges - "Where in ACM Do We Belong?"  
Chairman: B. Albert Friedman