

9200 IEEE (FOCS Advance Program) Dir. JF45
IEEE9200

25th Annual Symposium ON FOUNDATIONS OF COMPUTER SCIENCE

October 24-26, 1984
Colonnades Beach Hotel
Singer Island, Florida

Sponsored by the

IEEE Computer Society
Technical Committee on
Mathematical Foundations
of Computing

in cooperation with

ACM Special Interest Group for
Automata and Computability Theory*

and

Florida Atlantic University

HOTEL RESERVATION FORM

(Colonnades Beach Hotel)

All Symposium functions will be held at the Colonnades
Beach Hotel

Mail to:

FOCS Symposium
Colonnades Beach Hotel
Box 12633
Palm Beach Shores, Florida 33403
Telephone (305) 844-5221

_____ 544 Single or Double

Block of rooms will be held until October 10th
7% sales tax will be added to the above rates

Arrival date _____ a.m./p.m.

Departure date _____ a.m./p.m.

Name _____

Address _____

City _____ State _____ Zip _____
(Country)

Reservations will be held only until 6:00 p.m. on the day of
arrival, unless guaranteed. To guarantee your room fill out
below, OR send deposit for first night.

Credit Card _____ Number _____

ADVANCE REGISTRATION FORM

Advance Registration closes Wednesday, October 10, 1984. All
non-student fees will be \$50 higher after close of advance registra-
tion. Requests for refunds will be honored until October 10, 1984.

FEES (Check one)	Before 10/10	After 10/10
Member of SIGACT or IEEE Computer Society	\$105 <input type="checkbox"/>	\$155 <input type="checkbox"/>
Non-member	\$130 <input type="checkbox"/>	\$180 <input type="checkbox"/>
Author of Program Committee Member	\$100 <input type="checkbox"/>	\$150 <input type="checkbox"/>
Student (includes only sessions, Proceedings and coffee)	\$ 25 <input type="checkbox"/>	\$ 30 <input type="checkbox"/>
Unemployed or Retired (includes only sessions, Proceedings and coffee)	\$ 25 <input type="checkbox"/>	\$ 40 <input type="checkbox"/>
Optional:		
Extra FOCS 25 T-Shirt(s) _____ @ \$ 4.50	\$ _____	
Indicate number and size # S M L XL		
Extra tickets Tuesday Reception	_____ @ \$ 7.00	\$ _____
Extra tickets Thursday Party	_____ @ \$15.00	\$ _____
Contributions to Machtey Fund for Best Student Paper		\$ _____
TOTAL ENCLOSED		\$ _____

Make checks payable to **Florida Atlantic University**. Send check
and completed form to:

Dean, Division of Continuing Education
FOCS Symposium
Florida Atlantic University
Boca Raton, Florida 33431

Name _____

Affiliation _____

Address _____

City _____ State _____ Zip _____
(Country)

Office Phone _____

CSNET Address: _____

T-Shirt size for complimentary shirt _____

Special dietary restrictions: _____ Kosher _____ Vegetarian

Contributions to Machtey Fund
for Best Student Paper
 \$ _____ || TOTAL ENCLOSED | \$ _____ |

Make checks payable to "**FOCS Symposium**." Send check and
completed form to:

Professor Frederick Hoffman
FOCS Symposium
Department of Mathematics
Florida Atlantic University
Boca Raton, Florida 33431

* SIGACT cooperation is
subject to approval by ACM

• PROGRAM •

RECEPTION: Tuesday evening, October 23,
7-10 PM in the Bob Hope Suite

NOTE: *During technical sessions, which will be held in the Crystal Ballroom, coffee will be available in the Ocean Room*

SESSION 1: Wednesday Morning, October 24
Crystal Ballroom
Chair: Leslie Valiant
Harvard University

- 8:40 **Log Depth Circuits for Division and Related Problems**
S. A. Cook, P. W. Beame, J. Hoover, *University of Toronto*
- 9:00 **Sublinear Parallel Algorithms for the Greatest Common Divisor of Two Integers**
R. Kannan, *Carnegie-Mellon Univ. and M.I.T.*,
G. Miller, *Mass. Institute of Technology*,
L. Rudolph, *Carnegie-Mellon University*
- 9:20 **Finding Biconnected Components and Computing Tree Functions in Logarithmic Parallel Time**
U. Vishkin, *New York University*, R. E. Tarjan,
Bell Labs
- 9:40 **Very Fast Parallel Inversion of Special Matrices**
W. Eberly, *University of Toronto*
- 10:00 **Parallel Powering**
J. von zur Gathen, *University of Toronto*
- 10:20 **Break**
- 10:40 **Polymorphic Arrays: A Novel VLSI Layout for Systolic Computers**
A. Shamir, A. Fiat, *Weizmann Institute of Science*
- 11:00 **Designing Systolic Algorithms Using Sequential Machines**
O. H. Ibarra, M. A. Palis, *University of Minnesota*,
S. M. Sam, *Rensselaer Polytechnic Inst.*
- 11:20 **On the Limits to Speed Up Parallel Machines by Large Hardware and Unbounded Communication**
R. Reischuk, *Universität Bielefeld*,
F. Meyer auf der Heide, *J. W. Goethe Universität*
- 11:40 **River Routing, Any Which Way, But Loose**
R. Cole, *New York University*
- 12:00 **Embedding Planar Graphs in Seven Pages**
L. Heath, *University of North Carolina*
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12:30-1:45 LUNCH, French Room and
Palm Beach Room

SESSION 2: Wednesday afternoon, October 24
Crystal Ballroom
Chair: Larry Stockmeyer
IBM San Jose Research Lab.

- 2:00 **A Communication-Time Tradeoff**
C. H. Papadimitriou, J. D. Ullman, *Stanford University*

- 2:20 **A Comparative Study of X-Tree, Pyramid and Related Machines**
A. Aggarwal, *The Johns Hopkins University*
- 2:40 **Interactive Data Compression**
A. El Gamal, A. Orlitsky, *Stanford University*
- 3:00 **Lower Bounds on Communication Complexity in Distributed Computer Networks**
P. Tiwari, *University of Illinois*
- 3:20 **Probabilistic Communication Complexity**
R. Paturi, J. Simon, *Pennsylvania State University*
- 3:40 **Break**
- 4:00 **Parallel Communication with Limited Buffers**
N. Pippenger, *IBM San Jose Research Lab.*
- 4:20 **The Multi-Tree Approach to Reliability in Distributed Networks**
A. Itai, *Technion*, M. Rodeh, *IBM Israel Ltd.*
- 4:40 **A Polynomial Time Algorithm for Fault Diagnosability**
G. F. Sullivan, *Yale University*
- 5:00 **Flipping Coins in Many Pockets**
A. Z. Broder, *Stanford University*, D. Dolev,
The Hebrew University
- 5:20 **How to Share Memory on a Distributed System**
A. Wigderson, E. Upfal, *University of California, Berkeley*
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9:00 EVENING BUSINESS MEETING
Ocean Room

SESSION 3: Thursday morning, October 25
Crystal Ballroom
Chair: Richard M. Karp
University of California, Berkeley

- 8:40 **Graph Bisection Algorithms with Good Average Case Behavior**
T. Leighton, T. Bui, S. Chaudhuri, M. Sipser, *Mass. Institute of Technology*
- 9:00 **The Average-Case Analysis of Some On-Line Algorithms for Bin-Packing**
P. Shor, *Mass. Institute of Technology*
- 9:20 **Linear Verification for Spanning Trees**
J. Komlos, *University of California, San Diego*
- 9:40 **An Efficient Algorithm to Find All 'Bidirectional' Edges of an Undirected Graph**
B. Mishra, *Carnegie-Mellon University*
- 10:00 **An Efficient Algorithm for the Matroid Parity Problem on Linear Matroids**
M. Stallman, *University of Denver*, H. N. Gabow,
University of Colorado, Boulder
- 10:20 **Break**
- 10:40 **On the Complexity of Group Membership Testing**
L. Babai, E. Szemerédi, *Eötvös University*
- 11:00 **Coordinating Pebble Motion on Graphs, The Diameter of Permutation Groups, and Applications**
D. M. Kornhauser, G. L. Miller, *Mass. Institute of Technology*, P. Spirakis, *New York University*
- 11:20 **Multiplication of Polynomials Over the Ring of Integers**
M. Kaminski, *University of Waterloo*

- 11:40 **Slowing Down Sorting Networks to Obtain Faster Sorting Algorithms**
R. Cole, *New York University*
- 12:00 **Evaluating Rational Functions: Infinite Precision is Finite Cost and Tractable on Average**
L. Blum, *Mills College*, M. Shub, *Queens College and C.U.N.Y.*

12:30-1:45 LUNCH, French Room and Palm Beach Room

SESSION 4: Thursday afternoon, October 25
Crystal Ballroom
Chair: Michael O'Donnell
The Johns Hopkins University

- 2:00 **A Model-Theoretic Analysis of Knowledge**
R. Fagin, J. Y. Halpern, M. Y. Vardi, *IBM San Jose Research Lab.*
- 2:20 **A Semantic Characterization of Full Abstraction**
K. Mulmuley, *Carnegie-Mellon University*
- 2:40 **Semantic Models for Second-Order Lambda Calculus**
J. C. Mitchell, *Mass. Institute of Technology*
- 3:00 **Minimal Degrees and Polynomial Reducibilities**
S. Homer, *Boston University*
- 3:20 **Sparse Oracles and Uniform Complexity Cases**
R. V. Book, *Univ. of California, Santa Barbara*, J. Balcázar, *New Mexico State University*, T. Long, *Univ. Politècnica de Barcelona*, U. Schöning, *Universität Stuttgart*, A. Selman, *Iowa State University*
- 3:40 **Break**
- 4:00 **Constructing $O(n \log n)$ Size Monotone Formulae for the k -th Elementary Symmetric Polynomial of n Boolean Variables**
J. Friedman*, *Harvard University*
*Recipient of Machtey Award for Best Student Paper
- 4:20 **Nonlinearity of a Generalized Path Compression Scheme and of Davenport-Schnizel Sequences**
M. Sharir, S. Hart, *Tel Aviv University*
- 4:40 **Eigenvalues, Expanders and Superconcentrators**
N. Alon, *Mass. Institute of Technology*, V. D. Milman, *Tel Aviv University*
- 5:00 **A Lower Bound for Probabilistic Algorithms for Finite State Machines**
A. G. Greenberg, A. Weiss, *Bell Labs.*
- 5:20 **Two Applications of Ramsey Theorem to Decision Trees Complexity**
U. Manber, *University of Wisconsin*, S. Moran, *Technion*, M. Snir, *Hebrew University*

6:30-8:30 COCKTAIL PARTY AND BUFFET
Ocean Room

8:30-10:30 FOCS FOLLIES

SESSION 5: Friday morning, October 26
Crystal Ballroom
Chair: Leo Guibas
Stanford University and Digital Equipment Corporation

- 8:20 **Fibonacci Heaps and Their Uses in Improved Network Optimization Algorithms**
R. E. Tarjan, *Bell Labs.*, M. L. Fredman, *Univ. of California, San Diego*
- 8:40 **Efficient Implementation of Graph Algorithms Using Contraction**
Z. Galil, *Columbia University*, H. N. Gabow, *Univ. of Colorado, Boulder*
- 9:00 **Computing on a Free Tree Via Complexity-Preserving Mappings**
B. Chazelle, *Brown University*
- 9:20 **An Implicit Data Structure for the Dictionary Problem that Runs in Polylog Time**
J. I. Munro, *University of Waterloo*
- 9:40 **Fishspears: A Priority Queue Algorithm**
M. J. Fischer, *Yale University*, M. S. Paterson, *University of Warwick*
- 10:00 **Break**
- 10:20 **Space Searching for Intersection Objects**
D. Dobkin, *Princeton University*, H. Edelsbrunner, *Technical University of Graz*
- 10:40 **Dynamic Segment Intersection Search with Applications**
H. Imai, T. Asano, *University of Tokyo*
- 11:00 **A Fast Approximation Algorithm for Minimum Spanning Trees in k -Dimensional Space**
P. M. Vaidya, *University of Illinois*
- 11:20 **A Polynomial Solution for Potato-Peeling and Other Polygon Inclusion and Enclosure Problems**
C. K. Yap, J. S. Chang, *New York University*
- 11:40 **Shortest Paths in Euclidean Graphs**
R. Sedgwick, J. S. Vitter, *Brown University*

12:30-1:45 LUNCH, French Room and Palm Beach Room

SESSION 6: Friday afternoon, October 26
Crystal Ballroom
Chair: Martin Tompa
University of Washington

- 2:00 **Independent Unbiased Coin Flips from a Correlated Biased Source: A Finite State Markov Chain**
M. Blum, *Univ. of California, Berkeley*
- 2:20 **Generating Quasi-Random Sequences from Slightly-Random Sources**
M. Santha, U. Vazirani, *Univ. of California, Berkeley*
- 2:40 **A 'Paradoxical' Signature Scheme**
R. L. Rivest, S. Micali, S. Goldwasser, *Mass. Institute of Technology*
- 3:00 **RSA/Rabin Bits are $1/2 + 1/poly(\log N)$ Secure**
O. Goldreich, B. Chor, C. P. Schnorr, *Mass. Institute of Technology*, W. Alexi, *Universität Frankfurt*
- 3:20 **Efficient and Secure Pseudo-Random Number Generation**
U. Vazirani, V. Vazirani, *Univ. of California, Berkeley*
- 3:40 **Break**
- 4:00 **How to Construct Random Functions**
O. Goldreich, S. Goldwasser, S. Micali, *Mass. Institute of Technology*

- 4:20 **Linear Congruential Generators Do Not Produce Random Sequences**
R. Kannan, *Carnegie-Mellon Univ. and M.I.T.*,
A. M. Frieze, *Carnegie-Mellon Univ. and Queen Mary College*
- 4:40 **The Power of Probabilistic Algorithms for Inductive Inference**
L. Pitt, *Yale University*
- 5:00 **Complexity Measures for Public-Key Cryptosystems**
A. L. Selman, J. Grollman, *Iowa State University*

LOCATION

All technical sessions and social functions will be held at the Colonnades Beach Hotel, Singer Island, Palm Beach Shores, Florida 33403 (telephone: 305-844-5221; Telex 513-467). The Colonnades Beach Hotel is located directly on 1500 feet of white sandy beach approximately 18 minutes from Palm Beach International Airport. A block of rooms has been reserved (Until October 10, 1984) at the Colonnades Beach Hotel at the rate of \$44 single or double. Please mail the enclosed Hotel Reservation Form directly to the hotel by October 10, 1984 to ensure obtaining the special Symposium rate. The special rate will be extended for early arrivers and late stayers.

TRANSPORTATION

Palm Beach International Airport is located approximately 18 minutes west of the Colonnades Beach Hotel. Airport limousine service is available to the hotel at \$10.50 for one or two persons and \$5.25 for each additional person. Advance arrangements for transportation can be made by calling A&A Yellow Cap at (305) 689-2222. On the final day of the program the hotel will provide a van for group return trips to the airport at a nominal fee. Fort Lauderdale-Hollywood International Airport is about 60 minutes from the Colonnades and Miami International Airport is about 90 minutes away. Rental cars are plentiful and rates are reasonable.

If you drive from the airport (any of the three): Get on I-95 going north. Exit east on Blue Heron Boulevard through Riveria Beach and continue over the Intracoastal Waterway to Singer Island. Go south on Ocean Avenue to the Hotel. If you drive from the north, exit the Florida Turnpike at PGA Boulevard, in Palm Beach Gardens, and go east. Cross the Intracoastal Waterway, after which the road turns south and becomes Ocean Boulevard and Ocean Avenue on its way to the Colonnades.

CLIMATE

The temperature should range from the low 70°s to low 80°s, with a good chance of short periods of rain.

THINGS TO DO

On premises you will find a large olympic size swimming pool and a children's wading pool, two tennis courts, shuffle board, croquet, bowling on the green, golf-practice cages/driving nets, putting green, scuba diving-snorkeling, scuba lessons by professional instructors and supervision-qualification tests, swimming and surfing.

Adjacent to the hotel the following is available: deep water docks and boat service, fishing boat charter (1/2 or full day), deep sea and drift fishing, lake fishing-fly casting, reef exploring, water skiing, surfcasting, surfing, sailing, ice skating. Special guest privileges are available at three famous championship golf courses, all located within 15 minutes from the hotel. All guests are rendered special golfing rates and preferred starting times.

There are many restaurants within walking distance from the hotel, as well as ample shopping facilities. There is also a Scenic Tropical Parkway Sidewalk leading to the Lake Worth Inlet (opposite Palm Beach), which features tropical plantings, and is equipped with park benches.

The hotel Social Director will arrange for shopping tours to Worth Avenue, world famous stores, shops and boutiques, high fashion or beach wear fashion shows on the lawn, pool side, on the lagoon or in the "Rue De Paris" with strolling players, bridge parties-games or visits to Flagler Museum, Society of the Four Arts, Norton Gallery and School of Arts or Lion Country Safari.

REGISTRATION FEES

The regular registration fee for the symposium includes all technical sessions, a copy of the proceedings, coffee during the sessions, the reception Tuesday evening, three luncheons, the cocktail party on Thursday evening and one FOCS 25 T-Shirt (Please indicate size on registration form). All non-student registration fees increase by \$50 after October 10, 1984, so be sure to register in advance. The student registration fee includes only: technical sessions, a copy of the proceedings and coffee during sessions.

MACHTEY AWARD FOR BEST STUDENT PAPER

When you send in your Advance Registration, consider including a contribution to the Machtey Award fund. The award is made annually by the Program Committee to that paper voted most outstanding among those written entirely by a student or students. Up to \$400 is awarded to help defray authors' expenses in attending the Symposium. We encourage your contributions to help maintain this tradition. With each contribution a receipt will be provided for tax purposes.

REGISTRATION DESK

The symposium registration desk will be open 7:00-10:00 p.m. Tuesday October 23, in the Bob Hope Suite.

The desk will be open from 7:30-5:00 p.m. Wednesday and from 7:30 a.m. to noon on Thursday and Friday, outside the main sessions.

Extra copies of the Symposium Proceedings will be on sale at the registration desk.

INFORMATION

Local Arrangements Chairman:

Professor Frederick Hoffman
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Telephone: (305) 393-3345

Program Committee Chairman:

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