FOCS '97

The 38th Annual
IEEE Computer Society
Conference on Foundations of Computer Science

October 20 – 22, 1997
Miami Beach, Florida

Sponsored by the IEEE Computer Society
Technical Committee on Mathematical
Foundations of Computing
In cooperation with ACM SIGACT

Registration Instructions for FOCS '97

The registration fees for FOCS '97 are listed on the registration form. To qualify for the early registration fee, your registration application must be postmarked by **Friday, September 26**. Refund requests will be honored until October 3. The registration fee includes the Sunday night reception, the Monday night business meeting, coffee breaks and lunches, and a copy of the proceedings.

Please completely fill out the top half of the registration form. Make check or money order (in U.S. $, drawn on a U.S. bank) payable to "IEEE - FOCS '97 Symposium," and send both to the address given at the bottom.

For those of you who find it inconvenient to pay by check or money order, particularly those attending from outside the U.S., it is possible this year to pay by credit card. Fill out credit card information and sign, making sure that you list your name exactly as it appears on your check or credit card. The following credit cards are accepted: Visa, Mastercard, American Express.

Machtey Award: The Machtey Award is presented for the most outstanding paper (or papers) written by a student or collaboration of students, as judged by the Program Committee. The award includes a grant to help defray expenses incurred in attending the Symposium. Please consider making a donation to the Machtey Award Fund so that this award tradition can be sustained. Please use a separate check for your donation.

Registration Form for FOCS '97

Name_____

Affiliation_____

Street Address_____

City_____ State_____

ZIP or Country & Postal code_____

E-mail_____

Phone_____

Dietary restrictions: Kosher___ Vegetarian___ None___

Please circle one category below and fill in your membership number if appropriate: #_____

Category	**Fee**	**After 9/26**
ACM or SIGACT member	280	295
IEEE or EATCS member	280	295
Author or Program Committee	280	295
Student	80	100
Other	350	375

Total registration _____

If paying registration fees by credit card please complete, using name as it appears on card:

Name_____

Credit Card Type_____

Credit Card Number_____

Expiration Date_____

Signature_____

Machtey Fund Contributions _____

(Make separate check to Machtey Award Fund)

Mail form and payment to:

Victor Milenkovic
Attn: FOCS '97 Registration
Dept. of Math and CS
University of Miami
P. O. Box 249085
Coral Gables, FL 33124

Hotel Reservations

The conference will be held at the Ramada Resort Deauville on Miami Beach, Florida. The rates for IEEE FOCS '97 are posted below. Please advise the hotel of late arrival. Reservations should be made by **September 27**. Reservations made after that will be accepted on a rate and space availability basis. Refer to IEEE FOCS '97 when making reservations to obtain the rates listed.

To make your reservations by phone, call (800) 327-6656 9-5pm U.S. east coast time, or (305) 865-8511, ext. 3200, or fax (305) 865-8154. To make reservations by mail or fax, fill out the form below and send it to the address below. A deposit in the form of a check or money order for one night's stay, or credit card information and your return phone and/or fax must be included. When filling out the form, make sure that you list your name exactly as it appears on your check or credit card. The following credit cards are accepted: American Express, Diners Club, Visa, Mastercard, and Discover. Deposits will be refunded if the hotel is notified at least 72 hours before your specified arrival.

Ramada Resort Deauville
Attn: IEEE FOCS '97 Reservations
6701 Collins Avenue
Miami Beach, FL 33141

Please check one:

Single \$79 _____ Double \$79 _____

Triple \$93 _____ Quad \$107 _____

Arrival Date: _____ Departure Date: _____

Please fill out:

Name_____

Address_____

_____

Fax:_____ Phone_____

Sharing room with_____

If paying for deposit by credit card please complete:

Credit Card Type_____

Credit Card Number_____

Expiration Date_____

I authorize the Ramada Resort Deauville to charge the above account for the amount equal to one night's stay as deposit.

Signature_____

SUNDAY, OCTOBER 19, 1997

RECEPTION: 8:00 pm – 11:00 pm, Ramada Resort Deauville

MONDAY, OCTOBER 20, 1997

Session 1A: 9:00am – 10:35am
Chair: Monika Rauch Henzinger

9:00 *Beyond Flow Decomposition Barrier.*
Andrew V. Goldberg and Satish Rao *NEC Research Institute, New Jersey.*

9:25 *Undirected Single Source Shortest Path in Linear Time.*
Mikkel Thorup *University of Copenhagen.*

9:50 *A Faster Deterministic Algorithm for Minimum Spanning Trees.*
Bernard Chazelle *Princeton University.*

10:15 *Flows in Undirected Unit Capacity Networks.*
Andrew V. Goldberg and Satish Rao *NEC Research Institute, New Jersey.*

Session 1B: 9:00am – 10:35am
Chair: Ronitt Rubinfeld

9:00 *Randomized and Deterministic Algorithms for the Dimension of Algebraic Varieties.*
Pascal Koiran *Ecole Normale Supérieure de Lyon.*

9:25 *Deciding Properties of Polynomials without Factoring.*
Tomas Sander *International Computer Science Institute, Berkeley* and M. Amin Shokrollahi *International Computer Science Institute, Berkeley and Institut für Informatik der Universität Bonn.*

9:50 *An Improved Algorithm for Quantifier Elimination over Real Closed Fields.*
Saugata Basu *Mathematical Science Research Institute, Berkeley.*

10:15 *On the Power of Quantum Finite State Automata.*
Attila Kondacs *Eötvös University, Budapest* and John Watrous *University of Wisconsin.*

Coffee Break: 10:35am – 11:00am

Invited Talk: 11:00am – 12:00pm
Two Decades of Temporal Logic: Achievements and Challenges
Amir Pnueli, *Weizmann Institute of Science*

Lunch: 12:00pm – 1:30pm

Session 2A: 1:30pm – 3:05pm
Chair: Nir Shavit

1:30 *Computable Obstructions to Wait-Free Computability.*
John Havlicek *University of Texas at Austin.*

1:55 *Reliable Cellular Automata with Self - Organization.*
Peter Gacs *Boston University.*

2:20 *Alternating-Time Temporal Logic.*
Rajeev Alur, Thomas Henzinger and Orna Kupferman *University of California, Berkeley.*

2:45 *On the Complexity of a Set-Union Problem.*
Richard J. Lipton *Princeton University and Bellcore*, Paul J. Martino and Andy Neitzke *Princeton University.*

Session 2B: 1:30pm – 3:05pm
Chair: Raimund Seidel

1:30 *Succinct Representation of Balanced Parentheses, Static Trees and Planar Graphs.*
Ian Munro *University of Waterloo* and Venkatesh Raman *The Institute of Mathematical Sciences, C.I.T., Chennai.*

1:55 *Deterministic Superimposed Coding with Applications to Pattern Matching.*
Piotr Indyk *Stanford University.*

2:20 *Optimal Suffix Tree Construction with Large Alphabets.*
Martin Farach *Rutgers University.*

2:45 *Pattern Matching with Swaps.*
Amihood Amir *Georgia Tech and Bar-Ilan University*, Yonatan Aumann *Bar-Ilan University*, Gad Landau *Polytechnic University and Haifa University*, Moshe Lewenstein and Noa Lewenstein *Bar-Ilan University.*

Coffee Break: 3:05pm – 3:30pm

Session 3A: 3:30pm – 5:05pm
Chair: Ken Clarkson

3:30 *Improved Bounds for k-sets and k-th Levels.*
Tamal Dey *India Institute of Technology, Kharagpur.*

3:55 *Computing Integral Points in Convex Semi-algebraic Sets.*
Leonid Khachiyan and Lorant Porkolab *Rutgers University.*

4:20 *The Computational Complexity of Knot and Link Problems.*
Joel Hass, Jeffrey C. Lagarias and Nicholas Pippenger *The University of British Columbia.*

4:45 *Approximating Shortest Paths on an Nonconvex Polyhedron.*
Kasturi R. Varadarajan and Pankaj K. Agarwal *Duke University.*

Session 3B: 3:30pm – 5:05pm
Chair: Steven Phillips

3:30 *Randomized Allocation Processes.*
Artur Czumaj *University of Paderborn* and Volker Stemann *International Computer Science Institute, Berkeley.*

3:55 *The Analysis of a List-Coloring Algorithm on a Random Graph.*
Dimitris Achlioptas and Michael Molloy *University of Toronto.*

4:20 *Contention Resolution with Guaranteed Constant Expected Delay.*
Leslie Ann Goldberg *University of Warwick* and Philip D. MacKenzie *Boise State University.*

4:45 *Path Coupling: A Technique for Proving Rapid Mixing in Markov Chains.*
Russ Bubley and Martin Dyer *University of Leeds.*

Business Meeting: 8:30pm – 10:00pm

TUESDAY, OCTOBER 21, 1997

Session 4A: 9:00am – 10:35am
Chair: Noam Nisan

9:00 *Separation of the Monotone NC Hierarchy.*
Ran Raz *Weizmann Institute of Science* and Pierre McKenzie *University of Montreal.*

9:25 *Making Nondeterminism Unambiguous.*
Klaus Reinhardt *Universität Tübingen* and Eric Allender *Rutgers University.*

9:50 *No Feasible Interpolation for TC^0 Frege Proofs.*
Maria Luisa Bonet *Universidad Politécnica de Cataluña*, Toniann Pitassi *The University of Arizona*, Ran Raz *Weizmann Institute of Science.*

10:15 *Weak Random Sources, Hitting Sets, and BPP Simulations.*
Alexander E. Andreev *University of Moscow*, Andrea E. F. Clementi *University of Rome "La Sapienza"*, Jose' D. P. Rolim and Luca Trevisan *University of Geneva.*

Session 4B: 9:00am – 10:35am
Chair: Greg Plaxton

9:00 *Parallel Gaussian Elimination with Linear Work and Fill.*
Claudson Bornstein, Bruce M. Maggs, Gary Miller and R. Ravi *Carnegie Mellon University.*

9:25 *Exploiting Locality for Data Management in Systems of Limited Bandwidth.*
Bruce M. Maggs *Carnegie Mellon University*, Friedhelm Meyer auf der Heide, Berthold Vocking and Matthias Westermann *University of Paderborn.*

9:50 *General Dynamic Routing with Per-Packet Delay Guarantees of O(distance + 1 / session rate).*
Matthew Andrews, Antonio Fernandez, Mor Harchol-Balter, Tom Leighton and Lisa Zhang *Massachusetts Institute of Technology.*

10:15 *Global Optimization using Local Information with Applications to Flow Control.*
Yair Bartal, John Byers and Danny Raz *The International Computer Science Institute and University of California, Berkeley.*

Coffee Break: 10:35am – 11:00am

Invited Talk: 11:00am – 12:00pm
New Directions in Cryptography: Twenty Some Years Later.
Shafi Goldwasser, *Massachusetts Institute of Technology*

Lunch: 12:00pm – 1:30pm

Session 5A: 1:30pm – 3:05pm
Chair: Anna Karlin

1:30 *Truly Online Paging with Locality of Reference.*
Amos Fiat and Manor Mendel *Tel Aviv University.*

1:55 *The Competitive Analysis of Risk Taking with Applications to Online Trading.*
Sabah al-Binali *Columbia University.*

2:20 *Minimizing Flow Time Nonclairvoyantly.*
Bala Kalyanasundaram and Kirk Pruhs *University of Pittsburgh.*

2:45 *Storage Management for Evolving Databases.*
Jon Kleinberg *IBM Almaden Research Center*, Rajeev Motwani *Stanford University*, Prabhakar Raghavan *IBM Almaden Research Center* and Suresh Venkatasubramanian *Stanford University.*

Session 5B: 1:30pm – 3:05pm
Chair: Uri Feige

1:30 *Replication Is NOT Needed: A SINGLE Database Computational PIR.*
Eyal Kushilevitz *Technion University* and Rafail Ostrovsky *Bellcore.*

1:55 *Does Parallel Repetition Lower the Error in Computationally Sound Protocols?*
Mihir Bellare, Russell Impagliazzo *University of California, San Diego* and Moni Naor *Weizmann Institute of Science.*

2:20 *Optimal Resilience Proactive Public Key Cryptosystems.*
Yair Frankel *CertCo LLC, N.Y.*, Peter Gemmell *University of New Mexico*, Phil MacKenzie *Boise State University* and Moti Yung *CertCo LLC, N.Y.*.

2:45 *A Concrete Security Treatment of Symmetric Encryption.*
Mihir Bellare, Anand Desai, Eron Jokipii *University of California, San Diego* and Phillip Rogaway *University of California, Davis.*

Coffee Break: 3:05pm – 3:30pm

Session 6A: 3:30pm – 5:05pm
Chair: Madhu Sudan

3:30 *A $(7/8 - \epsilon)$-Approximation Algorithm for* MAX 3SAT*?*
Howard Karloff *Georgia Institute of Technology* and Uri Zwick *Tel Aviv University and University of California, Berkeley.*

3:55 *Improved Approximations for Edge - Disjoint Paths, Unsplittable Flow, and Related Routing Problems.*
Aravind Srinivasan *National University of Singapore.*

4:20 *Improved Approximation Algorithms for Unsplittable Flow Problems.*
Stavros G. Kolliopoulos and Clifford Stein *Dartmouth College.*

Session 6B: 3:30pm – 5:05pm
Chair: Hugo Krawczyk

3:30 *Lower Bounds for the Signature Size of Incremental Schemes.*
Marc Fischlin *Johann Wolfgang Goethe Universität, Frankfurt am Main.*

3:55 *A Complete Promise Problem for Statistical Zero-Knowledge.*
Amit Sahai and Salil Vadhan *Massachusetts Institute of Technology.*

4:20 *Number-Theoretic Constructions of Efficient Pseudo-Random Functions and Other Cryptographic Primitives.*
Moni Naor and Omer Reingold *Weizmann Institute of Science.*

4:45 *An Improved Worst-Case to Average-Case Connection for Lattice Problems.*
Jin-yi Cai and Ajay P. Nerurkar *State University of New York at Buffalo.*

5:15pm – 6:15pm
KNUTH PRIZE CEREMONY AND TALK
CHAIR: Nicholas Pippenger

KNUTH PRIZE RECIPIENT: Leslie G. Valiant
Harvard University
TALK TITLE: **Learning is Computational**

WEDNESDAY, OCTOBER 22, 1997

Session 7A: 9:00am – 10:10am
Chair: Christos Papadimitriou

9:00 *Finding an Even Hole in a Graph.*
Michele Conforti *University of Padova*, Gerard Cornuejols, Ajay Kapoor *Carnegie Mellon University* and Kristina Vuskovic *University of Kentucky.*

9:25 *Edge-Connectivity Augmentation Preserving Simplicity.*
Joergen Bang-Jensen and Tibor Jordan *Odense University, Denmark.*

9:50 *Hamiltonian Cycles in Solid Grid Graphs.*
Christopher Umans *University of California, Berkeley* and William Lenhart *Williams College.*

Session 7B: 9:00am – 10:10am
Chair: Ravi Kannan

9:00 *A Random Sampling based Algorithm for Learning the Intersection of Half-spaces.*
Santosh Vempala *Carnegie Mellon University.*

9:25 *Learning Noisy Perceptrons by a Perceptron in Polynomial Time.*
Edith Cohen *AT&T Labs Research.*

9:50 *Nearly Tight Bounds on the Learnability of Evolution.*
Andris Ambainis *University of Latvia*, Richard Desper, Martin Farach *Rutgers University* and Sampath Kannan *University of Pennsylvania.*

Coffee Break: 10:10am – 10:30am

Session 8A: 10:30am – 12:05pm
Chair: Phil Klein

10:30 *Improved Approximations for Shallow-Light Spanning Trees.*
Joseph (Seffi) Naor *Technion University* and Baruch Schieber *IBM T.J. Watson Research Center.*

10:55 *Buy-at-Bulk Network Design Approximation Algorithms.*
Baruch Awerbuch *Johns Hopkins University* and Yossi Azar *Tel Aviv University.*

11:20 *A 2-Approximation Algorithm for the Directed Multiway Cut Problem.*
Joseph (Seffi) Naor and Leonid Zosin *Technion University.*

11:45 *Nearly Linear Time Approximation Schemes for Euclidean TSP and other Geometric Problems.*
Sanjeev Arora *Princeton University.*

Session 8B: 10:30am – 12:05pm
Chair: Tao Jiang

10:30 *Satisfiability Coding Lemma.*
Ramamohan Paturi *University of California, San Diego*, Pavel Pudlak *Mathematical Institute CSAV* and Francis Zane *University of California, San Diego.*

10:55 *The Minimization Problem for Boolean Formulas.*
Edith Hemaspaandra *Le Moyne College* and Gerd Wechsung *Friedrich-Schiller-Universität Jena.*

11:20 *Tight Bounds for Depth-Two Superconcentrators.*
Jaikumar Radhakrishnan *Tata Institute and The Hebrew University of Jerusalem* and Amnon Ta-Shma *Weizmann Institute of Science.*

11:45 *Constant Depth Circuits and the Lutz Hypothesis.*
Jin-Yi Cai *State University of New York at Buffalo*, Martin Strauss *AT&T Labs* and D. Sivakumar *University of Houston.*

End of Program: 12:05pm

General Information

Location

All conference events will take place at the Ramada Resort Deauville on the island city of Miami Beach, Florida. Miami Beach is a 15 minute drive east of Miami International Airport and the city of Miami, and it a 45 minute drive south of Fort Lauderdale.

Registration

The registration desk will the open Sunday, October 19 from 8 am to 10 pm and during the conference meeting times.

Accomodations

At the Ramada Resort Deauville, guests will enjoy everything that is Miami Beach. Bask in the sun or stroll endless stretches of golden beaches. Refresh your senses in the sparkling olympic sized swimming pool rimmed with a hundred dancing fountains. Relax those tired muscles in the rejuvenating Jacuzzi whirlpool spa. Enjoy the myriad of exciting attractions the area has to offer. Proudly displaying the coveted Gold Key Award for hospitality excellence, the Ramada Resort Deauville offers everything you would expect from a luxury resort and more.
Each of the Ramada Resort Deauville's 550 spacious guest rooms and suites have been redecorated and refurbished. The decor is tropically casual with oversized beds, walk-in closets, color television and individual climate controlled air conditioning. All rooms have smoke detectors and sprinkler systems. Oceanfront rooms have private balconies. In addition to 700 feet of private beach, there are three all weather tennis courts, a well equipped exercise room, solarium and paddle boats on the beach. The concierge is pleased at all times to help with travel arrangements, golf starting times, sport fishing charters, as well as arranging trips to Jai Alai, thoroughbred tracks and greyhound racing.
The Ramada Resort Deauville boasts two outstanding restaurants, each with its own specialty cuisine, plus a dinner buffet every evening in the lobby. Cafe De La Mer overlooking the pool, is a favorite for breakfast as well as lunch and dinner. For the super casual, come in your bathing suit to the Riviers Tap Grill. Meals are prepared from the freshest ingredients and served by a staff whose only desire is to please. Relax and enjoy the soft music in the Cyrano Lobby Bar. It's the perfect place to meet friends and unwind after a busy day of activities.

Other Services. For child care, the concierge can refer you to a bonded baby sitting service. Walgreens is open 24 hours across the street offering sundries, a full service pharmacy, and an ATM.

Transportation

Your most expeditious route is to fly into Miami International Airport (MIA). SuperShuttle service ((305) 871-2000) is available on the ground level (no reservation necessary) and can take you to the Ramada Resort Deauville on Miami Beach for $12. A taxi to the Ramada is about $30.

An alternative is to fly into Fort Lauderdale International Airport (FLL). From there you can reach Miami Beach by car in about 45 minutes (see driving instructions below).

Discount on American Airlines: In exchange for designation as the official airline of FOCS '97, American Airlines is offering the following discounts. If you are flying from the U.S. or Canada, you can receive an additional 5% discount off of all discount fares or a 10% discount off of all full fair tickets purchased 7 days in advance. To receive the group discount, you must call (800) 433-1790 to make your reservation and refer to star file A0807UC.

Discount on Alamo Rental Car: In exchange for designation as the official rental car agency of FOCS '97, Alamo Rental Car is offering a group discount. To obtain the discount, call (800) 732-3232 and refer to group ID number 526 569, Rate Code GR.

Driving directions: If you rent a car at Miami International Airport, ask for directions to exit the airport onto State Road 112 heading east. Drive on to I-195 east which becomes Arthur Godfrey Drive (41st Street). Turn left on Collins. The Deauville will be on your right at 6701 Collins Avenue.

From Fort Lauderdale International Airport, ask your rental agent for directions to I-95 south. After about a 30 minute drive, exit on to I-195 east, and continue with the directions given for Miami Airport above. If you miss I-195, take 836 east and the MacArthur Causeway on to Miami Beach. Exit to 5th Street and drive east to Collins Avenue. Turn left to go north to Ramada.

Parking at the Deauville is available for a fee of $5 per night.

Climate: The Average Daily Temperature for Miami for October is 72-83 F (22-28 C). Pack short-sleeved shirts, shorts, and of course, a swimming suit.

Things to Do

South Beach is a short bus or taxi ride away down Collins Avenue. It is famed for its pedestrian mall, restaurants, and nightlife, and its restored vintage Art Deco hotels.

Vizcaya Museum and Gardens. The 70-room house and gardens overlook Biscayne Bay on a 30-acre tract that includes a native hammock and more than 10 acres of formal gardens and fountains. In the house, 34 rooms of paintings, sculpture, antique furniture, and other decorative arts, are open to the public. 3251 S. Miami Ave., tel. 305/250-9133. Admission: $8 adults, $4 children 6-12. Guided 45-min tours available, group tours by appointment. House and ticket booth open daily 9:30-4:30; garden: daily 9:30-5:30. (Source: Fodors).

Little Havana. Hispanics and Anglos alike come to this area in downtown Miami to experience the flavor of traditional Cuban culture.

Everglades National Park. If you stay an extra day and have a car, consider visiting the Everglades. Alligators and nature's beauty await you.

Conference Information

Proceedings: Additional copies of the proceedings will be sold during the conference at the registration desk. There will also be a limited number of proceedings from FOCS '96 available at a discounted rate. There will be arrangements for shipping proceedings.

Organizing Committee Chair and Site Coordinator: Alok Aggarwal, IBM T.J. Watson Research Center.

Organizing Committee: Allan Borodin, Alok Aggarwal, Aditi Dhagat, Rene Peralta, Prabhakar Raghavan.

Program Committee Chair and Technical Chair: Anna Karlin, Department of Computer Science and Engineering, University of Washington, Box 352350, Seattle, WA 98195-2350. Email: focs-chair@cs.washington.edu.

Program Committee: Kenneth L. Clarkson, Uriel Feige, Monika R. Henzinger, Tao Jiang, Ravi Kannan, Anna R. Karlin, Philip N. Klein, Hugo Krawczyk, Noam Nisan, Christos H. Papadimitriou, Steven Phillips, Greg Plaxton, Ronitt Rubinfeld, Raimund Seidel, Nir Shavit, and Madhu Sudan.

Local Arrangements Chair and Treasurer: Victor J. Milenkovic, Department of Mathematics and Computer Science, University of Miami, P.O. Box 248095, Coral Gables, FL 33124. Email: focs97@cs.miami.edu.