

## Sponsored by

Association for Computing Machinery  
(ACM SIGACT)

## With Support from

Microsoft Research  
Ministère Recherche,  
Science et Technologie, Québec  
Centre de recherches mathématiques (CRM)  
Université de Montréal  
SIGACT Institutional Sponsors :

Academic Press, Inc., Akamai Technologies,  
AT&T Laboratories, IBM Research,  
Lucent Technologies-Bell Laboratories,  
NEC Research Institute, STAR Lab

May 19-21, 2002

[STOC '02]



Microsoft  
**Research**

Recherche, Science  
et Technologie  
Québec



Université  
de Montréal

Graphic Design : Seyjebec Inc.

< STOC '02 >

< 34th ACM Symposium on Theory of Computing >

< Montréal, Québec, Canada >

< May 19-21, 2002 >

May 19-21  
34th ACM Symposium  
on Theory of Computing

Montréal, Québec, Canada  
2002

[STOC'02]

**Sponsored by**

Association for Computing Machinery  
(ACM SIGACT)

**With Support from**

Microsoft Research  
Ministère Recherche,  
Science et Technologie, Québec  
Centre de recherches mathématiques (CRM)  
Université de Montréal

**SIGACT Institutional Sponsors :**

Academic Press, Inc., Akamai Technologies,  
AT&T Laboratories, IBM Research,  
Lucent Technologies-Bell Laboratories,  
NEC Research Institute, STAR Lab

<http://www.crm.umontreal.ca/STOC02>  
[stoc02@crm.umontreal.ca](mailto:stoc02@crm.umontreal.ca)

---

## < Program Committee >

Pankaj Agarwal  
*Duke University, USA*

Allan Borodin  
*University of Toronto, Canada*

Sam Buss  
*University of California, San Diego, USA*

Shafi Goldwasser  
*MIT, USA*

Rao Kosaraju  
*Johns Hopkins University, USA*

Richard Ladner  
*University of Washington, USA*

Gary Miller  
*Carnegie Mellon University, USA*

Michael Mitzenmacher  
*Harvard University, USA*

Satish Rao  
*University of California, Berkeley, USA*

John H. Reif (Chair)  
*Duke University, USA*

Micha Sharir  
*Tel Aviv University, Israel*

Paul Spirakis  
*Computer Technology Institute, Greece*

Mikkel Thorup  
*University of Copenhagen, Denmark*

Leslie Valiant  
*Harvard University, USA*

## < Organizing Committee >

Pierre McKenzie (Co-Chair)  
*Université de Montréal, Canada*

Denis Thérien (Co-Chair & Treasurer)  
*McGill University, Canada*

John H. Reif (Program Chair)  
*Duke University, USA*

Ian Parberry  
(Publicity Chair)  
*University of North Texas, USA*

Louis Pelletier (Local Arrangements Chair)  
*Université de Montréal, Canada*

## < Program >

### Important Note:

There will be a day long Joint Session  
with the 17th IEEE Conference  
on Computational Complexity  
(CCC 2002)  
on Tuesday, May 21, 2002.

---

Saturday, **May 18**

---

7:00 pm - 9:00 pm

**Welcome Reception & Registration**  
(Wyndham Hotel, Room Salon des Arts)

8:00 am – 9:00 am

***Continental Breakfast***

(Wyndham Hotel, Room Grand Salon C)

**Session 1A**

(Wyndham Hotel, Room Grand Salon AB)

Chair: Rao Kosaraju

---

8:30 am

*Recognizing String Graphs in NP*

Marcus Schaefer, Eric Sedgwick  
and Daniel Stefankovic

---

8:55 am

*Dynamic Subgraph Connectivity  
with Geometric Applications*

Timothy M. Chan

---

9:20 am

*New Results on Monotone Dualization  
and Generating Hypergraph Transversals*

Thomas Eiter, Georg Gottlob  
and Kazuhisa Makino

---

9:45 am

*Combinatorial Optimization Problems  
in Self-Assembly*

Leonard Adleman, Qi Cheng, Ashish Goel,  
Ming-Deh Huang, David Kempe,  
Pablo M. de Moisset  
and Paul W. K. Rothmund

---

10:10 am - 10:30 am

***Coffee Break***

(Wyndham Hotel, Foyer Grand Salon)

**Session 1B**

(Wyndham Hotel, Room Alfred Rouleau AB)

Chair: Michael Mitzenmacher

---

8:30 am

*The Importance of Being Biased*

Irit Dinur and Shmuel Safra

---

8:55 am

*On the Advantage over a Random Assignment*

Johan Hastad and S. Venkatesh

---

9:20 am

*The Complexity of Choosing*

*an H-Colouring (Nearly) Uniformly at Random*

Leslie Ann Goldberg, Steven Kelk  
and Mike Paterson

---

9:45 am

*Random Sampling in Residual Graphs*

David R. Karger and Matthew S. Levine

**Session 2A**

*(Wyndham Hotel, Room Grand Salon AB)*

Chair: John Reif

---

10:30 am

*On the Complexity of Equilibria*

Xiaotie Deng, Christos Papadimitriou  
and Shmuel Safra

---

10:55 am

*Competitive Generalized Auctions*

Amos Fiat, Andrew V. Goldberg,  
Jason D. Hartline and Anna R. Karlin

---

11:20 am

*Competitive Recommendation Systems*

Petros Drineas, Iordanis Kerenidis  
and Prabhakar Raghavan

---

11:50 am

*Lunch*

(Wyndham Hotel, Room Jeanne-Mance)

---

1:00 pm

*Knuth Prize Plenary Talk*

(Wyndham Hotel, Room Grand Salon AB)

*The Joy of Theory*

Christos Papadimitriou

**Session 2B**

*(Wyndham Hotel, Room Alfred Rouleau AB)*

Chair: Paul Spirakis

---

10:30 am

*The Glauber Dynamics on the Colourings of a  
Graph with High Girth and Maximum Degree*

Michael Molloy

---

10:55 am

*Clairvoyant Scheduling of Random Walks*

Peter Gacs

---

11:20 am

*Solving Convex Programs by Random Walks*

Dimitris Bertsimas and Santosh Vempala

**Session 3A**

*(Wyndham Hotel, Room Grand Salon AB)*  
Chair: Michael Mitzenmacher

---

2:10 pm

*Improved Decremental Algorithms for  
Transitive Closure and All-pairs Shortest Paths*  
Surender Baswana, Ramesh Hariharan  
and Sandeep Sen

---

2:35pm

*Lower Bounds and Competitive Algorithms  
for On-Line Scheduling of Unit-Size Tasks  
to Related Machines*  
Spyros Koutogiannis

---

3:00 pm

*On Randomized Online Scheduling*  
Susanne Albers

3:25 pm - 4:45 pm

***Coffee Break***

(Wyndham Hotel, Foyer Grand Salon)

**Session 3B**

*(Wyndham Hotel, Room Alfred Rouleau AB)*  
Chair: Allan Borodin

---

2:10 pm

*On the Complexity of Matrix Product*  
Ran Raz

---

2:35pm

*Near-Optimal Sparse Fourier Representations  
via Sampling*  
Anna C. Gilbert, Sudipto Guha, Piotr Indyk,  
S. Muthukrishnan and Martin J. Strauss

---

3:00 pm

*Fitting Algebraic Curves to Noisy Data*  
Sanjeev Arora and Subhash Khot

**Session 4A**

(Wyndham Hotel, Room Grand Salon AB)  
Chair: Gary Miller

---

4:45 pm

*A New average Case Analysis  
for Completion Time Scheduling*  
Mark Scharbrodt, Thomas Schickinger  
and Angelika Steger

---

5:10 pm

*A Unified Analysis of Hot Video Schedulers*  
Wun-Tat Chan, Tak-Wah Lam,  
Hing-Fung Ting and Wai-Ha Wong

---

5:35 pm

*Optimal Rate-based Scheduling on  
Multiprocessors*  
Anand Srinivasan and James H. Anderson

---

8:30 pm

***Business Meeting***

(Wyndham Hotel, Room Grand Salon AB)

**Session 4B**

(Wyndham Hotel, Room Alfred Rouleau AB)  
Chair: Paul Spirakis

---

4:45 pm

*Almost all graphs with average degree 4  
are 3-colorable*  
Dimitris Achlioptas and Cristopher Moore

---

5:10 pm

*Models and Thresholds for Random Constraint  
Satisfaction Problems*  
Michael Molloy

---

5:35 pm

*Remier's Inequality and Tardos' Conjecture*  
Clifford Smyth

8:00 am – 9:00 am

***Continental Breakfast***

(Wyndham Hotel, Room Grand Salon C)

**Session 5A**

(Wyndham Hotel, Room Grand Salon AB)

Chair: Allan Borodin

8:30 am

*Clifford algebras and Approximating the Permanent*

Steve Chien, Lars Rasmussen  
and Alistair Sinclair

8:55 am

*Random Sampling and Approximation of MAX-CSP Problems*

Noga Alon, W. Fernandez de la Vega,  
Ravi Kannan and Marek Karpinski

9:20 am

*A Polynomial Time Algorithm to Approximately Count Contingency*

Mary Cryan and Martin Dyer

9:45 am

*Approximate Clustering via Core-Sets*

Mihai Badoiu, Sarel Har-Peled  
and Piotr Indyk

10:10 am -10:30 am

***Coffee Break***

(Wyndham Hotel, Foyer Grand Salon)

**Session 5B**

(Wyndham Hotel, Room Alfred Rouleau AB)

Chair: Michael Mitzenmacher

8:30 am

*On Paging with Locality of Reference*  
Susanne Albers, Lene M. Favrholdt  
and Oliver Giel

8:55 am

*Cache-Oblivious Priority Queue and Graph Algorithm Applications*

Lars Arge, Michael A. Bender,  
Erik D. Demaine, Bryan Holland-Minkley  
and J. Ian Munro

9:20 am

*Average Case Analysis for Batched Disk Scheduling and Increasing Sequences*

E. Bachmat

9:45 am

*Selfish Traffic Allocation for Server Farms*

Artur Czumaj, Piotr Krysta  
and Berthold Voecking



**Session 6A**

*(Wyndham Hotel, Room Grand Salon AB)*  
Chair: Satish Rao

---

10:30 am

*Approximation Schemes  
for Preemptive Weighted Flow Time*  
Chandra Chekuri and Sanjeev Khanna

---

10:55 am

*Approximation Algorithms for Minimum-Cost  
k-Vertex Connected Subgraphs*  
Joseph Cheriyan, Santosh Vempala  
and Adrian Vetta

---

11:20 am

*Equitable Truth-Revealing Cost Allocations  
via Primal-Dual-Type*  
Kamal Jain and Vijay Vazirani

---

11:50 am

**Lunch**  
(Wyndham Hotel, Room Jeanne-Mance)

**Session 6B**

*(Wyndham Hotel, Room Alfred Rouleau AB)*  
Chair: Sam Buss

---

10:30 am

*2-Round Zero Knowledge and Proof Auditors*  
Cynthia Dwork and Larry Stockmeyer

---

10:55 am

*Concurrent Zero-Knowledge  
With Timing Revisited*  
Oded Goldreich

---

11:20 am

*Tight Security Proofs  
for the Bounded-Storage Model*  
Stefan Dziembowski and Ueli Maurer

**Session 7A**

*(Wyndham Hotel, Room Grand Salon AB)*  
Chair: Mikkel Thorup

---

1:00 pm

*Hardness Results  
for Approximate Hypergraph Coloring*  
Subhash Khot

---

1:25 pm

*Space Lower Bounds for Distance  
Approximation in the Data Stream Model*  
Michael Saks and Xiaodong Sun

---

1:50 pm

*Approximate Counting of Inversions in a Data  
Stream*  
Miklos Ajtai, T.S. Jayram, Ravi Kumar  
and D. Sivakumar

---

2:15 pm

*Similarity Estimation Techniques from  
Rounding Algorithms*  
Moses Charikar

---

2:40 pm

*Fast Small-space Algorithms for Approximate  
Histogram Maintenance*  
Anna Gilbert, Sudipto Guha, Piotr Indyk,  
Yannis Kotidis, S. Muthukrishnan and  
Martin J. Strauss

3:05 pm - 3:30 pm

*Coffee Break*

(Wyndham Hotel, Foyer Grand Salon)

**Session 7B**

*( Wyndham Hotel, Room Alfred Rouleau AB)*  
Chair: Gary Miller

---

1:00 pm

*Load Balancing  
in Dynamic Adversarial Systems*  
Elliot Anshelevich, David Kempe  
and Jon Kleinberg

---

1:25 pm

*Tradeoffs in Probabilistic Packet Marking  
for IP Traceback*  
Micah Adler

---

1:50 pm

*Crawling on Web Graphs*  
Colin Cooper and Alan Frieze

---

2:15 pm

*The Price of Anarchy is Independent of the  
Network Topology*  
Tim Roughgarden

---

2:40 pm

*Combinatorial Logarithmic Approximation  
Algorithm for the Directed Telephone  
Broadcast Problem*  
Michael Elkin and Guy Kortsarz

**Session 8A**

*(Wyndham Hotel, Room Grand Salon AB)*

Chair: Sam Buss

---

3:30 pm

*An Exponential Separation between Regular and General Resolution*

Michael Alekhovich, Jan Johannsen,  
Toniann Pitassi and Alasdair Urquhart

---

3:55 pm

*Size Space Tradeoffs for Resolution*

Eli Ben-Sasson

---

4:10 pm

*Exact learning of DNF formulas using DNF hypotheses*

Lisa Hellerstein and Vijay Raghavan

---

4:35 pm

*Monotonicity Testing over General Poset Domains*

Eldar Fischer, Eric Lehman, Ilan Newman,  
Sofya Raskhodnikova, Ronitt Rubinfeld  
and Alex Samorodnitsky

---

7:00 pm

*Conference Banquet*

Marché Bonsecours  
350, Saint Paul E. Street, Old Montréal  
Salle de Bal

**Session 8B**

*(Wyndham Hotel, Room Alfred Rouleau AB)*

Chair: Pankaj Agarwal

---

3:30 pm

*Strict Polynomial-time in Simulation and Extraction*

Boaz Barak and Yehuda Lindell

---

3:55 pm

*Universally Composable Two-party Computation*

Ran Canetti and Yehuda Lindell, Rafail Ostrovsky and Amit Sahai

---

4:10 pm

*The Invasiveness of Off-line Memory Checking*

Miklos Ajtai

---

4:35 pm

*On the Composition of Authenticated Byzantine Agreement*

Yehuda Lindell, Anna Lysyanskaya  
and Tal Rabin

---

5:00 pm

*Wait-Free Consensus with Infinite Arrivals*

James Aspnes, Gauri Shah and Jatin Shah

8:00 am – 9:00 am

***Continental Breakfast***

(Wyndham Hotel, Room Grand Salon C)

**Session 9A**

(Wyndham Hotel, Room Grand Salon AB)

(Joint Session with Complexity 2002)

Chair: Sam Buss

---

8:30 am

*Relations between Average Case Complexity  
and Approximation Complexity*

Uriel Feige

---

8:55 am

*Vertex Cover on 4-regular Hyper-graphs  
is Hard to Approximate Within 2-epsilon*

Jonas Holmerin

---

9:20 am

*Resolution Lower Bounds  
for the Weak Pigeon Hole Principle*

Ran Raz

---

9:45 am

*Hard Examples for Bounded Depth Frege*

Eli Ben-Sasson

---

10:10 am - 10:30 am

***Coffee Break***

(Wyndham Hotel, Foyer Grand Salon)

**Session 9B**

(Wyndham Hotel, Room Alfred Rouleau AB)

Chair: Mikkel Thorup

---

8:30 am

*Meldable Heaps and Boolean Union-Find*

Haim Kaplan, Nira Shafir  
and Robert E. Tarjan

---

8:55 am

*Optimal Finger Search Trees  
in the Pointer Machine*

Gerth S. Brodal, George Lagogiannis,  
Christos Makris, Athanasios Tsakalidis  
and Kostas Tsichlas

---

9:20 am

*Verifying Candidate Matches in Sparse and  
Wildcard Matching*

Richard Cole and Ramesh Hariharan

---

9:45 am

*Deterministic Sorting in  $O(n \log \log n)$  Time  
and Linear Space*

Yijie Han

## Session 10A

*(Wyndham Hotel, Room Grand Salon AB)  
(Joint Session with Complexity 2002)*  
Chair: Anne Condon

---

10:30 am

*Improved Cryptographic Hash Functions with  
Worst-case/Average-case Connection*  
Daniele Micciancio

---

10:55 am

*Algorithmic Derandomization  
via Complexity Theory*  
D. Sivakumar

---

11:20 am

*Pseudo-Random Generators for all Hardnesses*  
Christopher Umans

---

11:50 am

**Lunch**

(Wyndham Hotel, Room Jeanne-Mance)

## Session 10B

*(Wyndham Hotel, Room Alfred Rouleau AB)*  
Chair: John Reif

---

10:30 am

*Quantum Lower Bound for the Collision  
Problem*  
Scott Aaronson

---

10:55 am

*Secure Multi-party Quantum Computing*  
Claude Crépeau, Daniel Gottesman  
and Adam Smith

---

11:20 am

*Polynomial-Time Quantum Algorithms for Pell's  
Equation and the Principal Ideal Problem*  
Sean Hallgren

**Session 11A**

*(Wyndham Hotel, Room Grand Salon AB)*  
*(Joint Session with Complexity 2002)*  
 Chair: Michael Saks

1:00 pm  
*Randomness Conductors and Constant-Degree Lossless Expanders*  
 Michael Capalbo, Omer Reingold, Salil Vadhan and Avi Wigderson

1:25 pm  
*Expanders from Symmetric Codes*  
 Roy Meshulam and Avi Wigderson

1:50 pm  
*The Complexity of Approximating the Entropy*  
 Tugkan Batu, Sanjoy Dasgupta, Ravi Kumar and Ronitt Rubinfeld

2:15 pm  
*Time-Space Tradeoffs Multiparty Communication Complexity and Nearest Neighbor Problems*  
 Paul Beame and Erik Vee

2:40 pm  
*On Communication over an Entanglement-Assisted Quantum Channel*  
 Ashwin Nayak and Julia Salzman

3:00 pm - 3:20 pm  
**Coffee Break**  
 (Wyndham Hotel, Foyer Grand Salon)

**Session 11B**

*(Wyndham Hotel, Room Alfred Rouleau AB)*  
 Chair: Pankaj Agarwal

1:00 pm  
*Girth and Euclidean Distortion*  
 Nathan Linial, Avner Magen and Assaf Naor

1:25 pm  
*Computing the Betti Numbers of Arrangements*  
 Saugata Basu

1:50 pm  
*Space-Efficient Approximate Voronoi Diagrams*  
 Sunil Arya, Theodoros Malamatos and David M. Mount

2:15 pm  
*A New Greedy Approach for Facility Location Problems*  
 Kamal Jain, Mohammad Mahdian and Amin Saberi

2:40 pm  
*Finding Nearest Neighbors in Growth-restricted Metrics*  
 David Karger and Matthias Ruhl

## Session 12A

*(Wyndham Hotel, Room Grand Salon AB)  
(Joint Session with Complexity 2002)*  
Chair: Sam Buss

---

3:20 pm

*Hardness Amplification Within NP*  
Ryan O'Donnell

---

3:45 pm

*3-MANIFOLD KNOT GENUS is NP-complete*  
Ian Agol, Joel Hass  
and William P. Thurston

---

4:10 pm

*On the Power of Unique 2-Prover  
1-Round Games*  
Subhash Khot

---

4:35 pm

*Learnability Beyond ACO*  
Jeffrey C. Jackson, Adam R. Klivans  
and Rocco A. Servedio

## Session 12B

*(Wyndham Hotel, Room Alfred Rouleau AB)*  
Chair: Rao Kosaraju

---

3:20 pm

*Huffman Coding with Unequal Letter Costs*  
Mordecai J. Golin, Claire Kenyon  
and Neal E. Young

---

3:45 pm

*Approximating The Smallest Grammar:  
Kolmogorov Complexity in Natural Models*  
Moses Charikar, Eric Lehman, Ding Liu,  
Rina Panigrahy, Manoj Prabhakaran,  
April Rasala, Amit Sahai and Abhi Shelat

---

4:10 pm

*Limits to List Decodability of Linear Codes*  
Venkatesan Guruswami

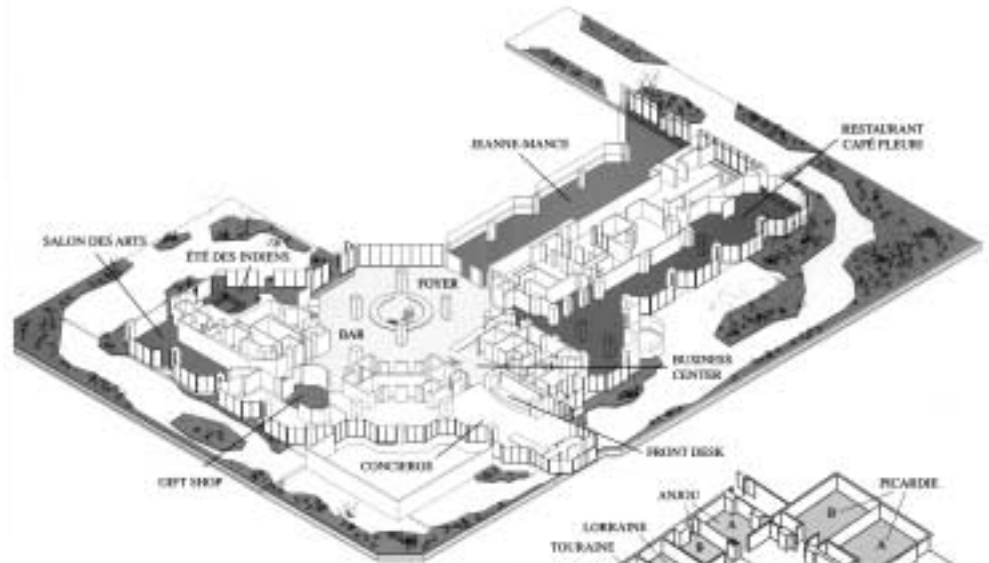
---

4:35 pm

*Near-optimal Linear-Time Codes for Unique  
Decoding and New List-Decodable Codes Over  
Smaller Alphabets*  
Venkatesan Guruswami and Piotr Indyk

< Event location map >

Lobby



Welcome Reception  
and Registration, May 18

*Wyndham Hotel, Room Salon des Arts  
(Lobby)*

Registration and Information, May 19-21

*Wyndham Hotel, Foyer Grand Salon  
(Mezzanine 1)*

Coffee Break, May 19-21

*Wyndham Hotel, Foyer Grand Salon  
(Mezzanine 1)*

Lunch, May 19-21

*Wyndham Hotel, Room Jeanne-Mance  
(Lobby)*

Banquet, May 20

*Marché Bonsecours,  
350 Saint Paul E. Street, Old Montréal  
(Salle de Bal)*

Internet Café and Connections

*Wyndham Hotel, Room Anjou AB  
(Mezzanine 2)*



Mezzanine 2

Mezzanine 1



---

## < General Information >

### *Local information*

#### *Hôtel Wyndham Montréal*

1255 Jeanne-Mance, C.P. 130

Montréal, Québec

Canada H5B 1E5

Tel.: 514-285-1450

Fax: 514-285-1/243

#### *Centre de recherches mathématiques (CRM)*

Université de Montréal

C.P. 6128, succ. Centre-ville

Montréal, Québec

Canada H3C 3J7

Tel.: 514-343-7501

Fax: 514-343-2254

### *Taxis*

Taxis La Salle                    277-2552

Taxis Diamond                    273-6331

## *Fire, Police or Ambulance                    911*

### *Air Lines*

Aeroflot	288-2125
Air Canada	1-888-247-2262
Air France	847-1106
Alitalia	842-5201
American Airlines	397-9635
British Airlines	287-9161
Delta	337-5520
Iberia	1-800-772-4642
KLM	939-4040
LOT	1-800-668-5928
Lufthansa	1-800-563-5954
Olympic Airways	878-9691
Swiss	1-800-221-4750
US Airways	1-800-428-4322
Japan Air Lines	1-800-525-3663