

# STOC 2005

The 37<sup>th</sup> ACM Symposium on  
Theory of Computing

May 21-24, 2005  
Marriott Hunt Valley Inn  
Hunt Valley, MD, USA



## Program

# STOC 2005 Conference Organization

**SIGACT Chair:** Hal Gabow, *University of Colorado*

**Program Chair:** Ronald Fagin, *IBM Almaden Research Center*

**Tutorials Chair:** Cynthia Dwork, *Microsoft Research, Silicon Valley*

**SIGACT Executive Committee:** Rajeev Motwani (Vice Chair), *Stanford University*  
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**Local Arrangements Chair:** Christian Scheideler, *Johns Hopkins University*

**Program Committee:** Gerth Stølting Brodal, *University of Aarhus*  
Harry Buhrman, *CWI and University of Amsterdam*  
Jin-Yi Cai, *University of Wisconsin, Madison*  
Cynthia Dwork, *Microsoft Research, Silicon Valley*  
Ronald Fagin (chair), *IBM Almaden Research Center*  
Martin Farach-Colton, *Rutgers University*  
Anupam Gupta, *Carnegie Mellon University*  
Sariel Har-Peled, *University of Illinois, Urbana-Champaign*  
Russell Impagliazzo, *University of California, San Diego*  
Kamal Jain, *Microsoft Research, Redmond*  
Adam Tauman Kalai, *Toyota Technological Institute*  
David Karger, *Massachusetts Institute of Technology*  
Claire Kenyon, *Brown University*  
Subhash Khot, *Georgia Institute of Technology*  
Ravi Kumar, *IBM Almaden Research Center*  
Moni Naor, *Weizmann Institute of Science*  
Ryan O'Donnell, *Microsoft Research, Redmond*  
Toniann Pitassi, *University of Toronto*  
Tim Roughgarden, *Stanford University*  
Alistair Sinclair, *University of California, Berkeley*  
Amnon Ta-Shma, *Tel Aviv University*

**Local Arrangements Committee:** Rao Kosaraju, *Johns Hopkins University*  
Christian Scheideler, *Johns Hopkins University*  
Aravind Srinivasan, *University of Maryland at College Park*

# STOC 2005 Sponsors & Supporters

The conference is sponsored by the ACM Special Interest Group on Algorithms and Computation Theory

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# Overview

**Saturday, May 21: Larry Stockmeyer Commemoration**

**Sunday, May 22 – Tuesday, May 24: STOC Conference**

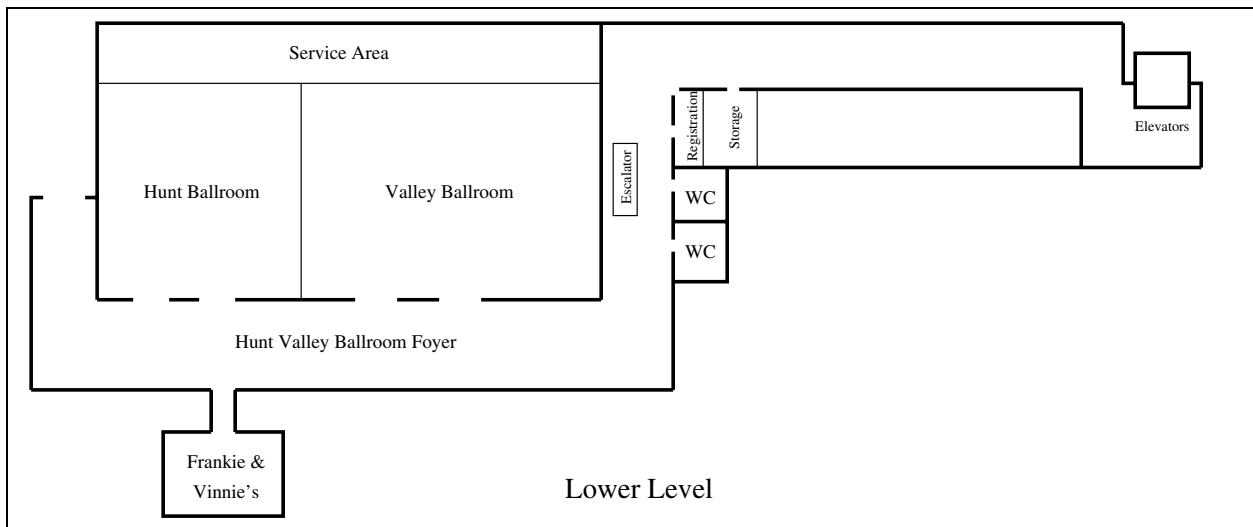
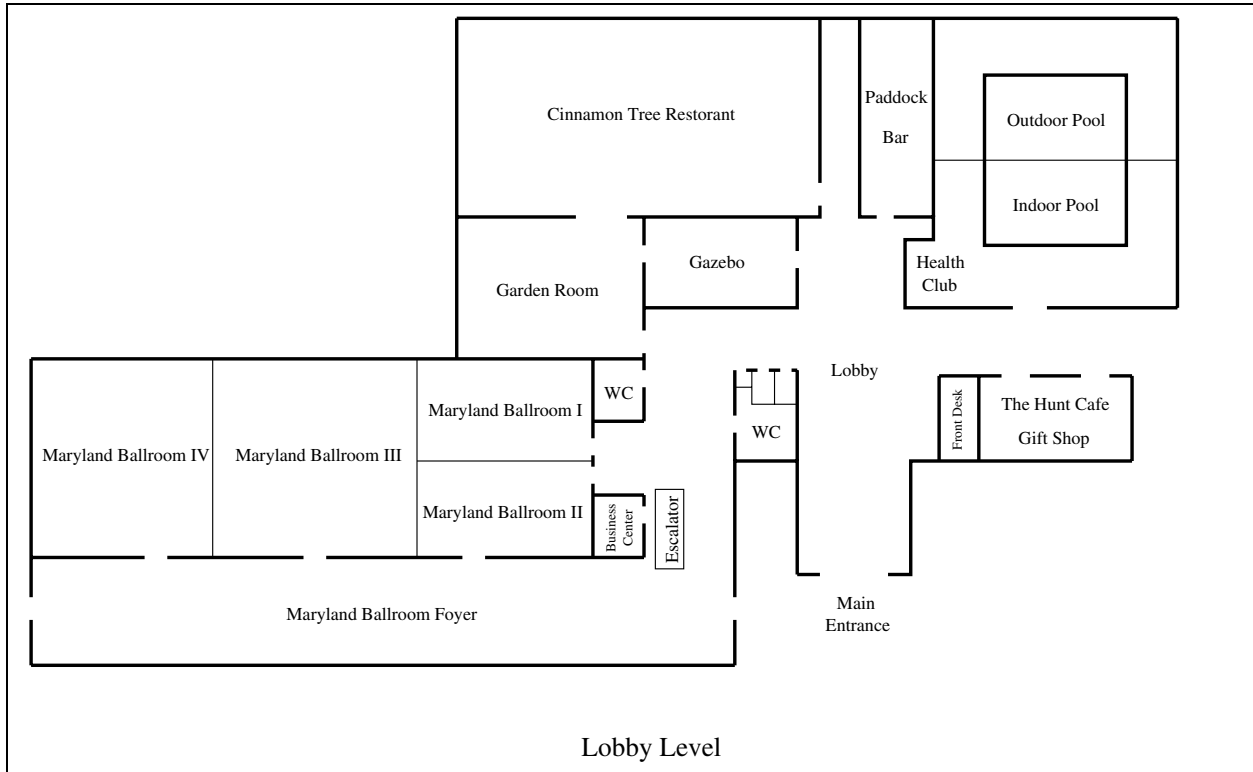
<b>Sunday, May 22</b>	<b>Monday, May 23</b>	<b>Tuesday, May 24</b>
7:30 – 8:30: Breakfast	7:30 – 8:30: Breakfast	7:30 – 8:30: Breakfast
8:30 – 10:10: Sessions 1A/B	8:30 – 10:10: Sessions 6A/B	8:30 – 10:10: Sessions 11A/B
10:10 – 10:35: Coffee Break	10:10 – 10:35: Coffee Break	10:10 – 10:35: Coffee Break
10:35 – 11:25: Sessions 2A/B	10:35 – 11:25: Sessions 7A/B	10:35 – 11:25: Sessions 12A/B
11:30 – 12:30: Invited talk	11:30 – 12:15: Session 8	11:30 – 12:15: Session 13
12:30 – 1:45: Lunch	12:15 – 1:45: Lunch	12:15 – 1:45: Lunch
1:45 – 3:25: Sessions 4A/B	1:45 – 3:25: Sessions 9A/B	1:45 – 3:25: Sessions 14A/B
3:25 – 3:45: Coffee Break	3:25 – 3:45: Coffee Break	3:25 – 3:45: Coffee Break
3:45 – 5:25: Sessions 5A/B	3:45 – 5:00: Sessions 10A/B	3:45 – 5:00: Sessions 15A/B
8:00 – 10:00: Business meeting	5:30 – 11:00: Social event	

## STOC 2005 Conference Awards

The STOC 2005 Program Committee selected two award papers:

- The **Best Paper Award** was given to **Omer Reingold** for his paper *Undirected ST-Connectivity in Log-Space*  
Monday, May 23, 11:30 – 12:15 pm
- The **Danny Lewin Best Student Paper Award** was given to **Vladimir Trifonov** for his paper *A  $O(\log n \log \log n)$  Space Algorithm for Undirected Connectivity*  
Tuesday, May 24, 11:30 – 12:15 pm

# Floor Plans



- **Registration desk (WLAN+storage):** Hunt Valley Ballroom Foyer
- **Larry Stockmeyer Commemoration:** Hunt Ballroom
- **Session A and plenary sessions:** Maryland Ballroom
- **Session B:** Hunt Ballroom
- **Breakout room (WLAN):** Garden Room
- **Lunch:** Valley Ballroom

# Larry Stockmeyer Commemoration

## Saturday, May 21



[Larry Stockmeyer](#), a founder of computational complexity, died on July 31, 2004, almost exactly thirty years after completing one of the most remarkable doctoral theses in computer science.

Stockmeyer's technical contributions are as broad as they are deep, spanning complexity theory, logic, interactive proofs, distributed computing, parallel computing, secure architectures, database privacy, and storage systems.

- 9:15 – 10:45 am: *Nicholas Pippenger*  
Larry Stockmeyer's Work in Computational Complexity Theory
- 10:45 – 11:15 am: Coffee Break
- 11:15 – 11:55 am: *Albert Meyer*  
What We Were Thinking: A Supervisor's Reminiscence
- 11:55 – 1:30 pm: Lunch (on our own)
- 1:30 – 2:10 pm: *Richard Karp*  
Fair Bandwidth Allocation
- 2:10 – 2:50 pm: *Anne Condon*  
What can be Proved to a Finite State Verifier?  
Larry Stockmeyer's Contributions to Interactive Proof Systems
- 2:50 – 3:30 pm: *Miklos Ajtai*  
Secure Computing
- 3:30 – 4:00 pm: Coffee Break
- 4:00 – 4:40 pm: *Christopher Umans*  
Optimization Problems in the Polynomial-Time Hierarchy
- 4:40 – 5:20 pm: *Cynthia Dwork*  
Larry Stockmeyer's Last Work et Sequelae
- 5:20 – 5:30 pm: Remarks (members of the community wishing to speak in this part should contact Cynthia Dwork at [dwork@microsoft.com](mailto:dwork@microsoft.com).)

# STOC 2005 Program

## Saturday, May 21

6:00 – 9:00 pm: Reception

## Sunday, May 22

7:30 – 8:30 am: Continental Breakfast

8:30 – 10:10 am: **Session 1A** (Chair: *Amnon Ta-Shma*)

8:30 am: Simulating Independence: New Constructions of Condensers, Ramsey Graphs, Dispersers, and Extractors  
*Boaz Barak, Guy Kindler, Ronen Shaltiel, Benny Sudakov, Avi Wigderson*

8:55 am: Extractors with Weak Random Seeds  
*Ran Raz*

9:20 am: Pseudorandom Generators for Low Degree Polynomials  
*Andrej Bogdanov*

9:45 am: On Uniform Amplification of Hardness in NP  
*Luca Trevisan*

8:30 – 10:10 am: **Session 1B** (Chair: *Tim Roughgarden*)

8:30 am: Approximation Techniques for Utilitarian Mechanism Design  
*Patrick Briest, Piotr Krysta, Berthold Vöcking*

8:55 am: Computing Correlated Equilibria in Multi-Player Games  
*Christos H. Papadimitriou*

9:20 am: The Price of Routing Unsplittable Flow  
*Baruch Awerbuch, Yossi Azar, A. Epstein*  
&  
The Price of Anarchy of Finite Congestion Games  
*George Christodoulou, Elias Koutsoupias*

9:45 am: Market Equilibrium via the Excess Demand Function  
*Bruno Codenotti, Benton McCune, Kasturi Varadarajan*

10:10 – 10:35 am: Coffee Break

10:35 – 11:25 am: **Session 2A** (Chair: *Jin-Yi Cai*)

10:35 am: On Lattices, Learning with Errors, Random Linear Codes, and Cryptography  
*Oded Regev*

10:50 am: Representing Hard Lattices with  $O(n \log n)$  Bits  
*Miklos Ajtai*

10:35 – 11:25 am: **Session 2B** (Chair: *Claire Kenyon*)

10:35 am: On Dynamic Range Reporting in One Dimension  
*Christian Worm Mortensen, Rasmus Pagh, Mihai Patrascu*

10:50 am: Worst-Case Update Times for Fully-Dynamic All-Pairs Shortest Paths  
*Mikkel Thorup*

11:30 – 12:30 pm: **Session 3** (Invited talk. Chair: *Ronald Fagin*)

Beyond NP: The Work and Legacy of Larry Stockmeyer  
*Lance Fortnow*

12:30 – 1:45 pm: Lunch

1:45 – 3:25 pm: **Session 4A** (Chair: *Ravi Kumar*)

1:45 pm: Every Monotone Graph Property is Testable  
*Noga Alon, Asaf Shapira*

2:10 pm: Testing versus Estimation of Graph Properties  
*Eldar Fischer, Ilan Newman*

2:35 pm: Testing Monotone High-Dimensional Distributions  
*Ronitt Rubinfeld, Rocco A. Servedio*

3:00 pm: Efficient Testing of Groups  
*Katalin Friedl, Gabor Ivanyos, Miklos Santha*

1:45 – 3:25 pm: **Session 4B** (Chair: *Tim Roughgarden*)

1:45 pm: Approximation Algorithms for Network Design with Metric Costs  
*Joseph Cheriyan, Adrian Vetta*

2:10 pm: On Non-uniform Multicommodity Buy-at-Bulk Network Design  
*Moses Charikar, Adriana Karagiozova*



2:35 pm: Multicommodity Flow, Well-linked Terminals, and Routing Problems  
*Chandra Chekuri, Sanjeev Khanna, F. Bruce Shepherd*

3:00 pm: Oblivious Routing in Directed Graphs with Random Demands  
*MohammadTaghi Hajiaghayi, Jeong Han Kim, Tom Leighton, Harald Rucke*

3:25 – 3:45 pm: Coffee Break

3:45 – 5:25 pm: **Session 5A** (Chair: *Sariel Har-Peled*)

3:45 pm: Optimal Approximations of the Frequency Moments of Data Streams  
*Piotr Indyk, David Woodruff*

4:10 pm: Coresets in Dynamic Geometric Data Streams  
*Gereon Frahling, Christian Sohler*

4:35 pm: Low Distortion Embeddings for Edit Distance  
*Rafail Ostrovsky, Yuval Rabani*

5:00 pm: Low-Distortion Embeddings of General Metrics Into the Line  
*Mihai Badoiu, Julia Chuzhoy, Piotr Indyk, Anastasios Sidiropoulos*

3:45 – 5:25 pm: **Session 5B** (Chair: *Ryan O'Donnell*)

3:45 pm: Tree-Walking Automata Do Not Recognize All Regular Languages  
*Mikolaj Bojanczyk, Thomas Colcombet*

4:10 pm: Balanced Boolean functions that can be Evaluated so that Every Input Bit is Unlikely to be Read  
*Itai Benjamini, Oded Schramm, David B. Wilson*

4:35 pm: Lower Bounds for k-DNF Resolution on Random 3-CNFs  
*Michael Alekhnovich*

5:00 pm: Bounded-depth Circuits: Separating Wires from Gates  
*Michal Koucky, Pavel Pudlak, Denis Therien*

8:00 – 10:00 pm: **Business Meeting**

**Topics:** STOC PC and local arrangements reports, STOC Best Paper Awards, Goedel Prize, CRA Outstanding Undergraduate Awards, state of NSF theory funding, etc.

## Monday, May 23

7:30 – 8:30 am: Continental Breakfast

8:30 – 10:10 am: **Session 6A** (Chair: *Sariel Har-Peled*)

8:30 am: Simple PCPs with Poly-log Rate and Query Complexity  
*Eli Ben-Sasson, Madhu Sudan*

8:55 am: Hardness of the Undirected Edge-Disjoint Paths Problem  
*Matthew Andrews, Lisa Zhang*

9:20 am: Hardness of the Undirected Congestion Minimization Problem  
*Matthew Andrews, Lisa Zhang*

9:45 am: Towards Strong Nonapproximability Results in the Lovasz-Schrijver Hierarchy  
*Mikhail Alekhnovich, Sanjeev Arora, Iannis Tourlakis*

8:30 – 10:10 am: **Session 6B** (Chair: *Jin-Yi Cai*)

8:30 am: Computing the First Betti Number and the Connected Components of Semi-algebraic Sets  
*Saugata Basu, Richard Pollack, Marie-Francoise Roy*

8:55 am: Polynomial Time Algorithm for Computing the Top Betti Numbers of Semi-algebraic Sets Defined by Quadratic Inequalities  
*Saugata Basu*

9:20 am: On Algorithms for Discrete and Approximate Brouwer Fixed Points  
*Xi Chen, Xiaotie Deng*

9:45 am: Convex Programming for Scheduling Unrelated Parallel Machines  
*Yossi Azar, A. Epstein*

10:10 – 10:35 am: Coffee Break

10:35 – 11:25 am: **Session 7A** (Chair: *Cynthia Dwork*)

10:35 am: The Round Complexity of Two-Party Random Selection  
*Saurabh Sanghvi, Salil Vadhan*

11:00 am: Hierarchies for Semantic Classes  
*Lance Fortnow, Rahul Santhanam, Luca Trevisan*

10:35 – 11:25 pm: **Session 7B** (Chair: *Ravi Kumar*)

10:35 am: Learning with Attribute Costs  
*Haim Kaplan, Eyal Kushilevitz, Yishay Mansour*

11:00 am: Learning Nonsingular Phylogenies and Hidden Markov Models  
*Elchanan Mossel, Sebastien Roch*

11:30 – 12:15 pm: **Session 8** (Best paper. Chair: *Ronald Fagin*)

Undirected ST-Connectivity in Log-Space  
*Omer Reingold*

12:15 – 1:45 pm: Lunch

1:45 – 3:25 pm: **Session 9A** (Chair: *Anupam Gupta*)

1:45 pm: Universal Approximations for TSP, Steiner Tree, and Set Cover  
*Lujun Jia, Guolong Lin, Guevara Noubir, Rajmohan Rajaraman, Ravi Sundaram*

2:10 pm: Saving an Epsilon: A 2-approximation for the k-MST Problem in Graphs  
*Naveen Garg*

2:35 pm: The Mixing Time of the Thorp Shuffle  
*Ben Morris*

3:00 pm: Approximately Counting Integral Flows and Cell-bounded Contingency Tables  
*Mary Cryan, Martin Dyer, Dana Randall*

1:45 – 3:25 pm: **Session 9B** (Chair: *Kamal Jain*)

1:45 pm: Spectral Norm of Random Matrices  
*Van Vu*

2:10 pm: On Random +/- 1 Matrices: Singularity and Determinant  
*Terence Tao, Van Vu*

2:35 pm: On the Average Case Performance of Some Greedy Approximation Algorithms for the Uncapacitated Location Problem  
*Abraham D. Flaxman, Alan M. Frieze, Juan C. Vera*

3:00 pm: Towards Asymptotic Optimality in Probabilistic Packet Marking  
*Micah Adler, Jeff Edmonds, Jiri Matousek*

3:25 – 3:45 pm: Coffee Break

3:45 – 5:00 pm: **Session 10A** (Chair: *Amnon Ta-Shma*)

3:45 pm: Tensor Norms and the Classical Communication Complexity of Nonlocal Quantum Measurement

*Yaoyun Shi*

4:10 pm: Fast Quantum Algorithms for Computing the Unit Group and Class Group of a Number Field

*Sean Hallgren*

&

Polynomial Time Quantum Algorithm for the Computation of the Unit Group of a Number Field

*Arthur Schmidt, Ulrich Vollmer*

4:35 pm: Fast Quantum Byzantine Agreement

*Michael Ben-Or, Avinatan Hassidim*

3:45 – 5:00 pm: **Session 10B** (Chair: *David Karger*)

3:45 pm: Quadratic Forms on Graphs

*Noga Alon, Konstantin Makarychev, Yuri Makarychev, Assaf Naor*

4:10 pm: Lower-Stretch Spanning Trees

*Michael Elkin, Yuval Emek, Daniel A. Spielman, Shang-Hua Teng*

4:35 pm: Edge Partition of Planar Graphs into Two Outerplanar Graphs

*Daniel Goncalves*

5:30: **Buses leave for social event at the Johns Hopkins University**



## Tuesday, May 24

7:30 – 8:30 am: Continental Breakfast

8:30 – 10:10 am: **Session 11A** (Chair: *Cynthia Dwork*)

8:30 am: Covert Two-Party Computation

*Luis von Ahn, Nicholas J. Hopper, John Langford*

8:55 am: On Obfuscating Point Functions

*Hoeteck Wee*

9:20 am: New and Improved Constructions of Non-Malleable Cryptographic Protocols

*Rafael Pass, Alon Rosen*

9:45 am: Collusion-Free Protocols

*Matt Lepinski, Silvio Micali, abhi shelat*

8:30 – 10:10 am: **Session 11B** (Chair: *Anupam Gupta*)

8:30 pm: Euclidean Distortion and the Sparsest Cut

*Sanjeev Arora, James R. Lee, Assaf Naor*

8:55 pm: Improved Approximation Algorithms for Minimum-Weight Vertex Separators

*Uriel Feige, MohammadTaghi Hajiaghayi, James R. Lee*

9:20 am:  $O(\sqrt{\log n})$  Approximation Algorithms for Min UnCut, Min 2CNF Deletion, and Directed Cut Problems

*Amit Agarwal, Moses Charikar, Konstantin Makarychev, Yury Makarychev*

9:45 am: Balanced Metric Labeling

*Joseph (Seffi) Naor, Roy Schwartz*

10:10 – 10:35 am: Coffee Break

10:35 – 11:25 am: **Session 12A** (Chair: *Russell Impagliazzo*)

10:35 am: Locally Decodable Codes with 2 Queries and Polynomial Identity Testing for depth 3 circuits

*Zeev Dvir, Amir Shpilka*

11:00 am: Limits to List Decoding Reed-Solomon Codes  
*Venkatesan Guruswami, Atri Rudra*

10:35 – 11:25 am: **Session 12B** (Chair: *Kamal Jain*)

10:35 am: Approximation Algorithms for Combinatorial Auctions with Complement-Free Bidders  
*Shahar Dobzinski, Noam Nisan, Michael Schapira*

11:00 am: Derandomization of Auctions  
*Gagan Aggarwal, Amos Fiat, Andrew Goldberg, Jason Hartline, Nicole Immorlica, Madhu Sudan*

11:30 – 12:15 pm: **Session 13** (Best student paper. Chair: *Tim Roughgarden*)

An  $O(\log n \log \log n)$  Space Algorithm for Undirected  $st$ -Connectivity  
*Vladimir Trifonov*

12:15 – 1:45 pm: Lunch

1:45 – 3:25 pm: **Session 14A** (Chair: *Russell Impagliazzo*)

1:45 pm: The Complexity of Agreement  
*Scott Aaronson*

2:10 pm: Concurrent General Composition of Secure Protocols in the Timing Model  
*Yael Tauman Kalai, Yehuda Lindell, Manoj Prabhakaran*

2:35 pm: Correcting Errors without Leaking Partial Information  
*Yevgeniy Dodis, Adam Smith*

3:00 pm: Key Agreement from Weak Bit Agreement  
*Thomas Holenstein*

1:45 – 3:25 pm: **Session 14B** (Chair: *Adam Tauman Kalai*)

1:45 pm: A New Strategy for Querying Priced Information  
*Ferdinando Cicalese, Eduardo Sany Laber*

2:10 pm: Aggregating Inconsistent Information: Ranking and Clustering  
*Nir Ailon, Moses Charikar, Alantha Newman*

2:35 pm: On the Bias of Traceroute Sampling, or, Power-law Degree Distributions in Regular Graphs  
*Dimitris Achlioptas, Aaron Clauset, David Kempe, Cristopher Moore*

3:00 pm: How to Spread Adversarial Nodes? Rotate!  
*Christian Scheideler*

3:25 – 3:45 pm: Coffee Break

3:45 – 5:00 pm: **Session 15A** (Chair: *Ryan O'Donnell*)

3:45 pm: From a Static Impossibility to an Adaptive Lower Bound: The Complexity of Early Deciding Set Agreement  
*Eli Gafni, Rachid Guerraoui, Bastian Pochon*

4:10 pm: An Optimal Multi-Writer Snapshot Algorithm  
*Prasad Jayanti*

4:35 pm: Cooperative Asynchronous Update of Shared Memory  
*Bogdan Chlebus, Dariusz Kowalski*

3:45 – 5:00 pm: **Session 15B** (Chair: *Claire Kenyon*)

3:45 pm: Every 2-CSP Allows Nontrivial Approximation  
*Johan Håstad*

4:10 pm: Tensor Decomposition and Approximation Schemes for Constraint Satisfaction Problems  
*W. Fernandez dela Vega, Ravi Kannan, Marek Karpinski, Santosh Vempala*

4:35 pm: On Strip Packing with Rotations  
*Klaus Jansen, Rob van Stee*