



# DISC 2014

## 28<sup>th</sup> International Symposium on Distributed Computing

DISC is held in cooperation with:



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## Full program at a glance

Saturday, 11 Oct

### BDA Workshop

10:00 – 12:20	Talks
12:20 – 13:30	Lunch break
13:30 – 15:00	Talks
15:00 – 15:30	Coffee break
15:30 – 16:30	Talks
16:30 – 18:00	Poster session

## Sunday, 12 Oct

<b>ADGA Workshop</b>		<b>BDA Workshop</b>		<b>BDA Workshop</b>	
08:30 – 09:30	Talks	08:00 – 09:00	Breakfast	08:30 – 10:00	Talks
09:30 – 09:45	Coffee break	09:00 – 10:30	Talks	09:00 – 10:30	Coffee break
09:45 – 10:45	Talks	10:30 – 11:00	Coffee break	10:30 – 12:00	Talks
10:45 – 11:00	Coffee break	11:00 – 12:30	Talks	12:00 – 13:30	Lunch break
11:00 – 12:00	Talks	12:30 – 13:30	Lunch break	13:30 – 15:00	Talks
12:00 – 13:30	Lunch break	13:30 – 15:00	Talks	15:00 – 15:30	Coffee break
13:30 – 14:30	Talks	15:00 – 15:30	Coffee break	15:30 – 17:00	Talks
14:30 – 14:45	Coffee break	15:30 – 16:10	Talks		
14:45 – 15:45	Talks	16:10 – 17:00	Discussion		
15:45 – 16:00	Coffee break				
16:00 – 17:00	Talks				

**18:00 – 20:00: DISC Reception**

## Monday, 13 Oct

08:00 – 08:30	Breakfast
08:30 – 08:45	Welcome remarks
08:45 – 09:55	Session I – Keynote Talk, Concurrency (Chair: Fabian Kuhn)
10:00 – 10:30	Coffee break
10:30 – 11:59	Session II – Chemical and Biological Networks (Chair: Amos Korman)
12:00 – 13:30	Lunch break
13:30 – 15:10	Session III – Agreement Problems (Chair: Victor Luchangco)
15:10 – 15:40	Coffee break
15:40 – 17:50	Session IV – Robot Coordination, Scheduling (Chair: Christoph Lenzen)
17:50 – 19:30	Award Ceremony & Business Meeting

## Tuesday, 14 Oct

08:00 – 08:30	Breakfast
08:30 – 09:59	Session V – Graph Distances and Routing (Chair: Dahlia Malkhi)
10:00 – 10:30	Coffee break
10:30 – 12:10	Session VI – Radio Networks (Chair: Bernhard Haeupler)
12:10 – 13:30	Lunch break
13:30 – 15:06	Session VII – Shared Memory (Chair: Yoram Moses)
15:06 – 15:40	Coffee break
15:40 – 17:09	Session VIII – Dynamic and Social Networks (Chair: Keren Censor-Hillel)
18:00 – 22:00	Conference Banquet

## Wednesday, 15 Oct

08:00 – 08:30	Breakfast
08:30 – 10:00	Session IX – Keynote Talk, Relativistic Systems (Chair: Fabian Kuhn)
10:00 – 10:30	Coffee break
10:30 – 12:10	Session X – Transactional Memory & Concurrent Data Structures (Chair: James Aspnes)
12:10 – 13:30	Lunch break
13:30 – 15:06	Session XI – Distributed Graph Algorithms (Chair: Jukka Suomela)
15:06 – 15:40	Coffee break
15:40 – 17:09	Session XII – Communication (Chair: Danupon Nanongkai)

# Detailed Program

**Saturday, 11 Oct**

## BDA Workshop

- 10:00 – 10:15 Introduction
- 10:15 – 10:45 *Insect Colonies and Distributed Algorithms; insect colony researcher viewpoint*  
Anna Dornhaus, University of Arizona
- 10:45 – 11:30 *Distributed Algorithms and Biological Systems*  
Nancy Lynch and Saket Navlakha
- 11:30 – 12:00 *Queen for a Moment: Collective Load Transport in Ants*  
Ofer Feinerman
- 12:00 – 12:20 Contributed Paper: *Studying House-Hunting in the Temnothorax Ant Using Distributed Computing Theory*  
Nancy Lynch, Cameron Musco and Tsvetomira Radeva
- Lunch break (served at the workshop)
- 13:30 – 14:00 *Distributed Information Processing by Insect Societies*  
Stephen Pratt
- 14:00 – 14:30 *Cells, Termites, and Robot Collectives*  
Radhika Nagpal
- 14:30 – 15:00 *Confidence Sharing: An Economic Strategy for Efficient Information Flows in Animal Groups*  
Amos Korman
- 15:00 – 15:30 Coffee break
- 15:30 – 16:00 *The Ecology of Collective Behavior*  
Deborah Gordon
- 16:00 – 16:30 TBA  
Laurent Keller
- 16:30 – 18:00 Poster session

**Sunday, 12 Oct**

## BDA Workshop

- 08:00 – 09:00 Breakfast
- 09:00 – 09:30 *A Neural Network for Linear Subspace Tracking*  
Dmitri Chlovskii
- 09:30 – 10:00 *From House-Hunting Honeybees to Neural Models and Psychophysics*  
James Marshall
- 10:00 – 10:20 Contributed Paper: *The Power of a Leader in the Stone Age*  
Yuval Emek, Stephan Holzer and Roger Wattenhofer
- 10:30 – 11:00 Coffee break
- 11:00 – 11:30 *Distributed Neural Codes for Navigation in Mammals*  
Ila Fiete
- 11:30 – 12:00 *Task Allocation in Ant Colonies*

- Alex Cornejo
- 12:00 – 12:20 Contributed Paper: *Distributed and Computationally Efficient Belief Propagation Based on Swarms of Foraging Bacteria*  
Shashank Singh, Saket Navlakha and Ziv Bar-Joseph
- 12:30 – 13:30 Lunch break
- 13:30 – 14:00 *Programmable Matter: Models and Problems*  
Andrea Richa
- 14:00 – 14:20 Contributed Paper: *Cellular Decision-making: How an Amoeboid Organism Solves the Two-Armed Bandit Problem*  
Chris Reid, Hannelore MacDonald, Tanya Latty, Richard Mann & Simon Garnier
- 14:20 – 14:40 Contributed Paper: *Towards More Realistic ANTS*  
Yuval Emek, Tobias Langner, David Stolz, Jara Uitto and Roger Wattenhofer
- 15:00 – 15:30 Coffee break
- 15:30 – 15:50 Contributed Paper: *Optimal Phermone Utilization*  
Yehuda Afek, Roman Kecher and Moshe Sulamy
- 15:50 – 16:10 Contributed Paper: *Numerical Methods within the Ant Colony: The Illuminating Case of Multi-Objective Macronutrient Regulation in Eusocial Insects*  
Theodore Pavlic and Stephen Pratt
- 16:10 – 17:00 General Discussion

### ADGA Workshop

- 08:30 – 09:30 *Distributed Algorithms as Combinatorial Structures*  
Keren Censor-Hillel
- 09:30 – 09:45 Coffee break
- 09:45 – 10:45 *Randomized Symmetry Breaking and the Constructive Lovász Local Lemma*  
Seth Pettie
- 10:45 – 11:00 Coffee break
- 11:00 – 12:00 *Efficient Information Dissemination despite Noisy Communication*  
Amos Korman
- 12:00 – 13:30 Lunch break
- 13:30 – 14:30 *Secret Bonus Topic*  
Bernhard Haeupler
- 14:30 – 14:45 Coffee break
- 14:45 – 15:45 *Distributed Shortest Paths and Related Problems*  
Danupon Nanongkai
- 15:45 – 16:00 Coffee break
- 16:00 – 17:00 *Lower Bounds for Local Algorithms*  
Jukka Suomela

### Tutorial Session

- 08:30 – 10:00 Part I - *Bitcoin: Concepts, Practice, and Research Directions*  
Emin Gün Sirer and Ittay Eyal
- 10:00 – 10:30 Coffee break
- 10:30 – 12:00 Part II - *Bitcoin: Concepts, Practice, and Research Directions*  
Emin Gün Sirer and Ittay Eyal
- 12:00 – 13:30 Lunch break

- 13:30 – 15:00 *Agents and Reagents: Distributed Systems in a Test Tube*  
David Doty and David Soloveichik
- 15:00 – 15:30 Coffee break
- 15:30 – 17:00 *Link Reversal Algorithms*  
Jennifer L. Welch

### General

- 18:00 – 20:00 DISC Reception

## Monday, 13 Oct

- 08:00 – 08:30 Breakfast

### Session I: Keynote Talk, Concurrency (Chair: Fabian Kuhn)

- 08:30 – 08:45 Welcome remarks
- 08:45 – 09:30 Keynote talk by K. Mani Chandy (Caltech)  
*Concurrent Computing over the Last 40 Years: What's Changed and What Hasn't*
- 09:30 – 09:55 Pierre Fraigniaud, Eli Gafni, Sergio Rajsbaum and Matthieu Roy  
*Automatically Adjusting Concurrency to the Level of Synchrony*
- 10:00 – 10:30 Coffee Break

### Session II: Chemical and Biological Networks (Chair: Amos Korman)

- 10:30 – 10:55 Ho-Lin Chen, Rachel Cummings, David Doty and David Soloveichik  
*Speed Faults in Computation by Chemical Reaction Networks*  
**(best paper award)**
- 10:55 – 11:20 Tobias Langner, David Stolz, Jara Uitto and Roger Wattenhofer  
*Fault-Tolerant ANTS*
- 11:20 – 11:45 Alejandro Cornejo, Anna Dornhaus, Nancy Lynch and Radhika Nagpal  
*Task Allocation in Ant Colonies*
- 11:45 – 11:52 Brief Announcement: Leander Jehl, Tormod Erevik Lea and Hein Meling  
*Replacement: The Smart Way to Handle Failures in a Replicated State Machine*
- 11:52 – 11:59 Brief Announcement: Panagiota Fatourou and Nikolaos Kallimanis  
*The Power of Scheduling-Aware Synchronization*
- 12:00 – 13:30 Lunch break

### Session III: Agreement Problems (Chair: Victor Luchangco)

- 13:30 – 13:55 Dan Alistarh, James Aspnes, Valerie King and Jared Saia  
*Communication-Efficient Randomized Consensus*
- 13:55 – 14:20 François Bonnet, Xavier Défago, Thanh Dang Nguyen and Maria Gradinariu Potop-Butucaru  
*Tight Bound on Mobile Byzantine Agreement*
- 14:20 – 14:45 Armando Castaneda, Yannai A Gonczarowski and Yoram Moses  
*Unbeatable Consensus*
- 14:45 – 15:10 Aris Pagourtzis, Giorgos Panagiotakos and Dimitris Sakavalas  
*Reliable Broadcast with Respect to Topology Knowledge*

15:10 – 15:40 Coffee break

**Session IV: Robot Coordination, Scheduling (Chair: Christoph Lenzen)**

- 15:40 – 16:05 Jurek Czyzowicz, Leszek Gasieniec, Thomas Gorry, Evangelos Kranakis, Russell Martin and Dominik Pajak  
*Evacuating Robots from an Unknown Exit in a Disk*
- 16:05 – 16:30 Yukiko Yamauchi and Masafumi Yamashita  
*Randomized Pattern Formation Algorithm for Asynchronous Oblivious Mobile Robots*
- 16:30 – 16:55 Shaolei Ren, Yuxiong He and Kathryn McKinley  
*A Theoretical Foundation for Scheduling and Designing Heterogeneous Processors for Interactive Applications*
- 16:55 – 17:02 Brief Announcement: Foto Afrati, Shlomi Dolev, Ephraim Korach, Shantanu Sharma and Jeffrey Ullman  
*Assignment Problems of Different-Sized Inputs in MapReduce*
- 17:02 – 17:09 Brief Announcement: Costas Busch, Maurice Herlihy, Miroslav Popovic and Gokarna Sharma  
*Scheduling Multiple Objects in Distributed Transactional Memory*
- 17:09 – 17:16 Brief Announcement: Konrad Siek and Paweł T. Wojciechowski  
*Relaxing Opacity in Pessimistic Transactional Memory*
- 17:16 – 17:23 Brief Announcement: Shahar Timnat, Maurice Herlihy and Erez Petrank  
*A Practical Transactional Memory Interface*
- 17:50 – 19:30 Award Ceremony & Business Meeting

## Tuesday, 14 Oct

08:00 – 08:30 Breakfast

**Session V: Graph Distances and Routing (Chair: Dahlia Malkhi)**

- 08:30 – 08:55 Merav Parter  
*Vertex Fault Tolerant Additive Spanners*  
**(best student paper award)**
- 08:55 – 09:20 Liam Roditty and Roei Tov  
*Close to Linear Space Routing Schemes*
- 09:20 – 09:45 Mohsen Ghaffari and Christoph Lenzen  
*Near-Optimal Distributed Tree Embedding*
- 09:45 – 09:52 Brief Announcement: Noy Rotbart, Søren Dahlgaard and Mathias Bæk Tejs Knudsen  
*On Dynamic and Multi-Functional Labeling Schemes*
- 09:52 – 09:59 Brief Announcement: Matthieu Perrin, Achour Mostéfaoui and Claude Jard  
*Update Consistency in Partitionable Systems*
- 10:00 – 10:30 Coffee break

**Session VI: Radio Networks (Chair: Bernhard Haeupler)**

- 10:30 – 10:55 Klaus-Tycho Förster, Jochen Seidel and Roger Wattenhofer  
*Deterministic Leader Election in Multi-Hop Beeping Networks*
- 10:55 – 11:20 Seth Gilbert, Calvin Newport and Chaodong Zheng

- 11:20 – 11:45 *Who Are You? Secure Identities in Ad Hoc Networks*  
Maurice Herlihy and Zhiyu Liu
- 11:45 – 12:10 *Approximate Local Sums and Their Applications in Radio Networks*  
Calvin Newport
- 12:10 – 13:30 *Radio Network Lower Bounds Made Easy*
- 12:10 – 13:30 Lunch break
- Session VII: Shared Memory (Chair: Yoram Moses)**
- 13:30 – 13:55 Kfir Lev-Ari, Gregory Chockler and Idit Keidar  
*On Correctness of Data Structures under Reads-Write Concurrency*
- 13:55 – 14:20 Claire Capdevielle, Colette Johnen and Alessia Milani  
*Solo-Fast Universal Constructions for Deterministic Abortable Objects*
- 14:20 – 14:45 Maryam Helmi, Lisa Higham and Philipp Woelfel  
*On the Space Complexity of Renaming*
- 14:45 – 14:52 Brief Announcement: Sebastiano Peluso, Roberto Palmieri, Paolo Romano, Binoy Ravindran and Francesco Quaglia  
*Breaching the Wall of Impossibility Results on Disjoint-Access Parallel TM*
- 14:52 – 14:59 Brief Announcement: Hillel Avni and Adi Suissa-Peleg  
*COP Composition Using Transaction Suspension in the Compiler*
- 14:59 – 15:06 Brief Announcement: Wei-Lun Hung, Himanshu Chauhan and Vijay Garg  
*ActiveMonitor: Non-Blocking Monitor Executions for Increased Parallelism*
- 15:06 – 15:40 Coffee break
- Session VIII: Dynamic and Social Networks (Chair: Keren Censor-Hillel)**
- 15:40 – 16:05 Calvin Newport  
*Lower Bounds for Structuring Unreliable Radio Networks*
- 16:05 – 16:30 Oksana Denysyuk and Luis Rodrigues  
*Random Walks on Evolving Graphs with Recurring Topologies*
- 16:30 – 16:55 Abbas Mehrabian and Ali Pourmiri  
*Randomized Rumor Spreading in Poorly Connected Small-World Networks*
- 16:55 – 17:02 Brief Announcement: Adam Sealon and Aikaterini Sotiraki  
*Agreement in Partitioned Dynamic Networks*
- 17:02 – 17:09 Brief Announcement: Christoph Lenzen and Pierre Bertrand  
*The 1-2-3-Toolkit for Building Your Own Balls-into-Bins Algorithm*
- 18:00 – 22:00 Conference Banquet

## Wednesday, 15 Oct

- 08:00 – 08:30 Breakfast

**Session IX: Keynote Talk, Relativistic Systems (Chair: Fabian Kuhn)**

- 08:30 – 09:35 Keynote talk by Phil Bernstein (Microsoft Research)  
*Project Orleans: A Programming Framework for Cloud Computing*
- 09:35 – 10:00 Seth Gilbert and Wojciech Golab

*Making Sense of Relativistic Distributed Systems*

10:00 – 10:30 Coffee break

**Session X: Transactional Memory & Concurrent Data Structures (Chair: James Aspnes)**

10:30 – 10:55 Hagit Attiya, Alexey Gotsman, Sandeep Hans and Noam Rinetzky  
*Safety of Live Transactions in Transactional Memory: TMS is Necessary and Sufficient*

10:55 – 11:20 Mohsen Lesani and Jens Palsberg  
*Decomposing Opacity*

11:20 – 11:45 Irina Calciu, Hammurabi Mendes and Maurice Herlihy  
*The Adaptive Priority Queue with Elimination and Combining*

11:45 – 12:10 Edward Talmage and Jennifer Welch  
*Improving Average Performance by Relaxing Distributed Data Structures*

12:10 – 13:30 Lunch break

**Session XI: Distributed Graph Algorithms (Chair: Jukka Suomela)**

13:30 – 13:55 Danupon Nanongkai and Hsin-Hao Su  
*Almost-Tight Distributed Minimum Cut Algorithms*

13:55 – 14:20 Magnús Halldórsson and Christian Konrad  
*Distributed Algorithms for Coloring Interval Graphs*

14:20 – 14:45 Shay Kutten, Danupon Nanongkai, Gopal Pandurangan and Peter Robinson  
*Distributed Symmetry Breaking in Hypergraphs*

14:45 – 14:52 Brief Announcement: Stephan Holzer, Sebastian Kohler and Roger Wattenhofer  
*k-Selection and Sorting in the SINR Model*

14:52 – 14:59 Brief Announcement: Stephan Holzer, David Peleg, Liam Roditty and Roger Wattenhofer  
*Distributed  $3/2$ -Approximation of the Diameter*

14:59 – 15:06 Brief Announcement: Lelia Blin and Pierre Fraigniaud  
*Space-Optimal Silent Self-Stabilizing Spanning Tree Constructions Inspired by Proof-Labeling Schemes*

15:06 – 15:40 Coffee break

**Session XII: Communication (Chair: Danupon Nanongkai)**

15:40 – 16:05 Erik Demaine, Piotr Indyk, Sepideh Mahabadi and Ali Vakilian  
*On Streaming and Communication Complexity of the Set Cover Problem*

16:05 – 16:30 Yi Li, Xiaoming Sun, Chengu Wang and David Woodruff  
*On The Communication Complexity of Linear Algebraic Problems in the Message Passing Model*

16:30 – 16:55 James Hegeman, Sriram V. Pemmaraju and Vivek B. Sardeshmukh  
*Near-Constant-Time Distributed Algorithms on a Congested Clique*

16:55 – 17:02 Brief Announcement: Mahnush Movahedi, Jared Saia and Mahdi Zamani  
*Secure Anonymous Broadcast*

17:02 – 17:09 Brief Announcement: Mahnush Movahedi and Mahdi Zamani  
*Privacy-Preserving Location-Based Services*