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Contact information

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Education

Ph.D. in Computer Science, Technion IIT, Israel (2001-2007)

Graduated from the direct Ph.D. track in April 2007.

Thesis Title: “*Competitive Evaluation of Switch Architectures*”.

My research deals with algorithmic aspects of high-performance switches and routers, and in particular competitive evaluation of switch architectures.

Advisor: Prof. Hagit Attiya

GPA: 95.3/100

B.A. in Computer Science, Technion IIT, Israel (1998-2001)

Graduated summa cum laude. GPA: 93.3/100

Post-doctoral Experience

Post-doc fellow in the department of Electrical Engineering, Politecnico di Torino, Turin, Italy (from March 2008)

Primarily, investigating algorithmic solutions to resolve bottlenecks in optical switches and delay-tolerent networks.

Post-doc fellow in Ben Gurion University of the Negev, Be'er Sheva, Israel (September 2007-February 2008)

Investigating the usage and implementation of highly-efficient parallel data structures such as *Ternary Content Addressable Memories (TCAMs)* in a network environment.

Recent Research Interests and Activities

My research is in **network algorithmics**—an interdisciplinary systems approach, focused on algorithmic thinking, that addresses contemporary and future network processing bottlenecks at or between networking devices (primarily, routers and switches). In particular, I was recently investigating the following subjects:

- Load Balancing and randomization in packet switching

- QoS provisioning (low delay, low jitter)
- Packet Classification
- Usage and implementation of *Ternary Content Addressable Memories* in networks
- Optical packet switches and networking
- Delay-tolerant networks (DTN)

Industrial Experience

Summer Intern in the *Data Center Business Unit*, Cisco Systems, San Jose, CA (July-October 2006)

This group headed by Dr. Flavio Bonomi, and is currently part of Cisco Research:

- Designed and developed light-weight simulation tool that allows performing large simulation at the network level.
- Studied efficient and fast algorithms to handle multicast traffic at the switch level, which are especially important for video/audio streaming.

Researcher and developer at IBM Haifa Research Labs (1999-2002)

Held a student position and then a staff member position at the “*System Applications*” and “*Industry Value Solutions*” departments. I worked on the research prototype of the *WebSphere Telecom Application Server*, *IBM Medical Content Management*, and *IBM Clinical Genomics*. These projects involve the design and implementation of large real-time, scalable and fault-tolerant systems that interface with other IBM and third-party products.

Teaching Experience

Adjunct Lecturer, the Interdisciplinary Center, Hertzelia (October 2007-February 2008)

Teaching the course “*Randomized and Approximation Algorithms*” (mostly for graduate students) in the Interdisciplinary Center during Winter 2008 semester.

Lecturer at the Department of Computer Science, Technion - IIT (2006-2007)

Teaching the course “*Logic and Set Theory*” in winter 2006-2007 semester. This course is given as a mandatory course for second-year undergraduate students (my classes had approximately 100 students).

Teaching Assistant at the Department of Computer Science, Technion - IIT (2001-2006)

Teaching the courses “*Logic and Set Theory*” (2002-2006), “*Distributed Algorithms*” (2005) and “*Logic for Computer Science*” (2001-2002). Since 2002, I was the teaching assistant in charge (leading 3-5 other teaching assistants) in the courses I taught. My responsibilities included preparing all the homework assignments, writing the final exams and maintaining the course web-page. In addition, I helped rebuilding a new course, “*Logic and Set Theory*”, following some Curriculum changes that took place in the faculty.

Supervising Graduate Students

- Josef Hai (Yossi) Kanizo (Technion), PhD, in progress. (Primary supervisor: Dr. Isaac Keslassy).

Awards and Honors

- Runner-up for the best INFOCOM paper award (2009)
One of the best 3 papers in the conference, out of 282 accepted papers and 1435 total submissions.
- Research fellowship for junior researchers (2008)
This fellowship is given for two years by Politecnico di Torino, Regione Piemonte and the CRT foundation
- Intel prize for excellent Ph.d. Students (2006)
- Special prize for excellent Ph.d. Students (2006)
- The Wolf Foundation prize for excellent M.Sc. Students (2004)
- Technion award for outstanding teaching assistant (three times, 2002, 2003, 2006)
- Technion scholarship for excellent graduate students (2001)
- Technion scholarship for excellent undergraduate students in computer science (2001)
- President's list of distinguished students, Technion (five times, 1998-2001)
- Dean's list of distinguished Computer Science students (1999)

Professional Activities

- Technical program committee member of INFOCOM 2010.
- Referee for *the Journal of the ACM*, *IEEE/ACM Transactions on Networking*, *SIAM Journal of Discrete Mathematics*, *IEEE Transactions on Parallel and Distributed Systems*, *IEEE Transactions on Computers*, *Computer Networks* and *Acta Informatica*.
- Reviewer in the following conferences: INFOCOM (2009), SPAA (2008), PODC (2007, 2008), IPDPS (2004, 2006), ICDCS (2005, 2006, 2008), SC (2004), WEA (2006), DISC (2006), OPODIS (2006), ESA (2008), WCNC (2009), HPSR (2009) and ISCC (2009).

Grants

- COLOR 2009, 11,800 Euros. "CRAS QUIDEM: Communication, Routing And Scheduling under QUasi DEterministic Mobility"
Joint grant of INRIA Sophia Antipolis Maestro team and the Telecommunication Networks Group of Politecnico di Torino.

List of Publications

Papers in Refereed Journals

- [J1] Hagit Attiya and David Hay. “The Inherent Queuing Delay of Parallel Packet Switches.” *IEEE Transaction of Parallel and Distributed Systems (TPDS)*, 17(9):1048-1056, September 2006.
- [J2] Hagit Attiya and David Hay. “Randomization does not Reduce the Queuing Delay of Parallel Packet Switches.” *SIAM Journal on Computing*, 37(5):1613-1636, February 2008.
- [J3] David Hay and Gabriel Scalosub. “Jitter Regulation for Multiple Streams.” Accepted for publication in *ACM Transactions on Algorithms (TALG)*.
- [J4] Hagit Attiya, David Hay and Isaac Keslassy. “Packet-Mode Emulation of Output-Queued Switches.” Submitted to *IEEE Transactions on Computers*.

Papers in Refereed Conferences

- [C1] Anat Bremler-Barr, David Hay, Danny Hendler and Ron M. Roth. “PEDS: Parallel Error Detection Scheme for TCAM Devices.” In *the 28th IEEE International Conference on Computer Communications (INFOCOM)*, 2009. **Best Paper Award Runner-up.**
- [C2] Yossi Kanizo, David Hay, Isaac Keslassy. “The Crosspoint-Queued Switch.” In *the 28th IEEE International Conference on Computer Communications (INFOCOM)*, 2009.
- [C3] Yossi Kanizo, David Hay, Isaac Keslassy. “Optimal Fast Hashing.” In *the 28th IEEE International Conference on Computer Communications (INFOCOM)*, 2009.
- [C4] Anat Bremler-Barr, David Hay, Danny Hendler and Boris Farber. “Layered Interval Codes for TCAM-based Classification.” In *the 28th IEEE International Conference on Computer Communications (INFOCOM)*, 2009. Earlier (poster) version appeared in *ACM SIGMETRICS*, pages 445-446, 2008.
- [C5] David Hay and Paolo Giaccone. “Optimal Routing and Scheduling for Deterministic Delay Tolerant Networks.” In *the 6th annual conference on wireless on demand network systems and services (IEEE WONS)*, pages 27-34, February 2009. **Best Paper Award Runner-up.**
- [C6] Hagit Attiya, David Hay and Isaac Keslassy. “Packet-Mode Emulation of Output-Queued Switches.” In *the 18th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 138-147, July 2006. (This is the preliminary version of [J4].)
- [C7] Hagit Attiya, David Hay and Jennifer L. Welch. “Optimal Clock Synchronization under Energy Constraints in Wireless Ad-hoc Networks.” In *the 9th International Conference on Principles of Distributed Systems (OPODIS)*, pages 221-234, December 2005.
- [C8] David Hay and Gabriel Scalosub. “Jitter Regulation for Multiple Streams.” In *the 13th Annual European Symposium on Algorithms (ESA)*, pages 496-507, October 2005. (This is the preliminary version of [J3].)

[C9] Hagit Attiya and David Hay. “Randomization does not Reduce the Queuing Delay of Parallel Packet Switches.” In *the 17th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 11-20, July 2005. (This is the preliminary version of [J2].)

[C10] Hagit Attiya and David Hay. “The Inherent Queuing Delay of Parallel Packet Switches.” In *the 3rd IFIP International Conference of Theoretical Computer Science (TCS)*, pages 139-152, August 2004. A revue paper appeared in *the 16th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, June 2004. (This is the preliminary version of [J1].)

Papers in Preperation

[I1] Gabriel Kliot, David Hay and Roy Friedman. “On Jittering Broadcast Transmissions in MANETs.” Submitted.

[I2] David Hay, Andrea Bianco and Fabio Neri. “Crosstalk-preventing Scheduling in AWG-based Switches.” Submitted.

[I3] Andrea Bianco, Jorge Finochietto, Luca Giraudo, David Hay, Marco Modesti and Fabio Neri. “Network Planning for Disaster Recovery.” In preperation.

Patents

[P1] Anat Bremler-Barr, David Hay, Danny Hendler and Ron M. Roth. “TCAM with Fast Error Detection”. U.S. Provisional Patent Application No. 61/130,129. May 2008.

[P2] David Hay, Danny Hendler and Roie Zivan. “Anonymous User-Centric Cross-Community Reputation”. Under submission. 2008.

[P3] David Hay, Danny Hendler. “Accountable Anonymous Peer-to-Peer Interactions”. Under submission. 2008.