

## Retsef Levi

Robert N. Noyce Career Development Professor  
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## EDUCATION

### **January 2002 – July 2005 -- Cornell University** **Ph.D. in Operations Research and Industrial Engineering**

GPA: 4.2368

*Co-Advisors:* Robin Roundy and David Shmoys.

*Minor Advisors:* James Renegar (Applied Math) and Shane Henderson (Applied Probability).

*Thesis:* "Computing Provably Near-Optimal Policies for Stochastic Inventory Control Models",  
under the supervision of Robin Roundy and David Shmoys

### **1996-1997 & 1999-2001 -- Tel-Aviv University** **B.Sc. in Mathematics, trend of Operation Research**

Final Grade: 96 (out of 100), Summa cum Laude

My B.Sc. studies were part of my service in the IDF (Israeli Defense Forces):

1996-1997 First Academic year completed

1997-1999 Upon requests from IDF went back to active service

1999-2001 Second and third Academic years completed (graduated in July 2001)

## RESEARCH INTERESTS

- Supply chain, inventory and revenue management
- Healthcare management
- Multistage Stochastic Optimization
- Data-driven algorithms
- Combinatorial optimization

(See more on my research at <http://web.mit.edu/retsef/www>)

## PROFESSIONAL EXPERIENCE

**September 2006-**

**Robert N. Noyce Career Development Professor**

**Assistant Professor of Management, Sloan School, MIT, Cambridge, MA**

**July 2005–August 2006**

**Herman Goldstine Postdoctoral Fellowship in the Department of Mathematical Sciences, IBM T.J. Watson Research Center, Yorktown Heights, NY**

**January 2002–July 2005**

**OR&IE Department, Cornell University, Ithaca, NY**

(Instructor of several courses)

**2001 - Business Development Consultant, Wisair Inc, Israel**

Wisair is an Israeli hi-tech start-up company (of the RAD Group), which develops wireless solutions based on Ultra Wide Band (UWB) technology. The position included initiating and leading the potential market analysis and business development: initiating and promoting three major funding channels from the European Commission (1m Euro), an Israeli venture capital company (\$5m), and the Israeli Chief Scientist.

**1990-2001 - Officer in the Israeli Defense Forces (IDF)**

Since 1991, served as an Officer in an elite unit of the Intelligence Corps of the IDF. Filled different positions throughout the years, which involved highly complicated analysis of interdisciplinary projects. Work was identified by high pressure and required high level of creativity and original thinking.

1991-1994 - Intelligence Analyst Officer (analyzing technical intelligence material)

1994-1996 - Captain, Head of Section, supervising 8 soldiers and officers. Designated as an extra merit officer (received prize from IDF Intelligence Department)

1997-1999 – Major, Head of Section, supervising more than 25 soldiers and officers.

Received prize for “Creative Thinking” (Head of IDF Intelligence Department)

1999-2001 – Tel-Aviv University

**PUBLICATIONS**

**Refereed Journals**

“Approximation Algorithms for the Multi-Item Capacitated Lot-Sizing Problem Via Flow-Cover Inequalities”, Retsef Levi, Andrea Lodi and Maxim Sviridenko, 2007 (To appear in Mathematics of Operations Research).

“First Constant Approximation Algorithm for the One-Warehouse-Multi-Retailer Problem”, Retsef Levi, Robin Roundy, David Shmoys and Maxim Sviridenko. Technical Report No. 1408, School of Operations Research and Industrial Engineering, Cornell University, 2006 (To appear in Management Science).

“Approximation Algorithms for Capacitated Stochastic Inventory Models”, Retsef Levi, Robin Roundy, David Shmoys and Van Anh Truong, Technical Report No. 1429, School of Operations Research and Industrial Engineering, Cornell University, 2005 (To appear in Operations Research).

“Algorithms for Capacitated Rectangle Stabbing and Lot-Sizing with Joint Set-Up Costs”, Guy Even, Retsef Levi, Dror Rawitz, Baruch Schieber, Shimon (Moni) Shahar and Maxim Sviridenko, 2006 (To appear in Transactions on Algorithms).

“A 2-Approximation Algorithm for Stochastic Inventory Control Models with Lost-Sales,” Retsef Levi, Ganesh Janakiraman and Mahesh Nagarajan, 2006 (To appear in Mathematics of Operations Research).

"Provably Near-Optimal Sampling-Based Policies for Stochastic Inventory Control Models", Retsef Levi, Robin Roundy and David Shmoys, Mathematics of Operations Research, Volume 32 (4), pages 821-838, November 2007

"Approximation Algorithms for Stochastic Inventory Control Models", Retsef Levi, Martin Pál, Robin Roundy and David Shmoys, Mathematics of Operations Research, Volume 32 (2), pages 284-302, May 2007. This paper was awarded first prize in the 2004 MSOM Student Paper Competition.

"Primal-Dual Algorithms for Deterministic Inventory Problems", Retsef Levi, Robin Roundy and David Shmoys. Mathematics of Operations Research, Volume 31, pages 267-284, February 2006.

### Refereed Conferences

"Online Make-to-Order Joint Replenishment Model: Primal Dual Competitive Algorithms (Extended Abstract)", Niv Buchbinder, Tracy Kimbrel, Retsef Levi, Konstantin Makarychev and Maxim Sviridenko, 2007 (To appear in the proceedings of SODA 2008).

"Approximation Algorithms for the Multi-Item Capacitated Lot-Sizing Problem via Flow-Cover Inequalities (Extended Abstract)", Retsef Levi, Andrea Lodi and Maxim Sviridenko, Proceedings of IPCO 2007, pages 454-468, 2007.

"Improved Approximation Algorithms for the One-Warehouse-Multi-Retailer Problem (Extended Abstract)", Retsef Levi and Maxim Sviridenko, Proceedings of APPROX 2006, pages 188-199, 2006.

"Provably Near-Optimal Balancing Policies for Multi-Echelon Stochastic Inventory Control Models", Retsef Levi, Robin Roundy and Van Anh Truong, (Presented in the 2006 Multi-Echelon Conference).

"Provably Near-Optimal Sampling-Based Policies for Stochastic Inventory Control Models (Extended Abstract)", Retsef Levi, Robin Roundy and David Shmoys, Proceedings of the 38th Annual ACM Symposium on Theory of Computing, pages 739-748, 2006.

"Approximation Algorithms for Stochastic Inventory Control Models (Extended Abstract)", Retsef Levi, Martin Pál, Robin Roundy and David Shmoys, Proceedings of IPCO 2005, pages 306-320.

"Inventory and Facility-Location Models with Market Selection (Extended Abstract)", Retsef Levi, Joseph Geunes, Edwin Romeijn and David Shmoys, Proceedings of IPCO 2005, pages 111-124.

"First Constant Approximation Algorithm for the One-Warehouse-Multi-Retailer Problem (Extended Abstract)", Retsef Levi, Robin Roundy and David Shmoys, Proceedings of SODA 2005, pages 365-374.

"Primal-Dual Algorithms for Deterministic Inventory Problems (Extended Abstract)", Retsef Levi, Robin Roundy and David Shmoys, Proceedings of the 36th Annual ACM Symposium on Theory of Computing, pages 353-362, STOC 2004.

"LP-Based Approximation Algorithms for Capacitated Facility Location (Extended Abstract)", Retsef Levi, David Shmoys and Chaitanya Swamy, proceedings of IPCO 2004, pages 206-218.

"Facility Location with Service Installation Costs (Extended Abstract)", David Shmoys, Chaitanya Swamy and Retsef Levi, proceedings of SODA 2004, pages 1081-1090.

### **Submitted Papers**

"A Model for Understanding the Impacts of Demand & Capacity on Waitlists in a Congested Recovery Room", Tor Schoenmyr, Peter F. Dunn, David Gamarnik; Retsef Levi, David L. Berger, Bethany J. Daily, Wilton C. Levine, and Warren S. Sandberg, 2007 (Submitted to Anesthesiology - Revised)

"New Policies for Stochastic Inventory Control Models - Theoretical and Computational Results", Gavin Hurley, Peter Jackson, Retsef Levi, Robin Roundy and David Shmoys, 2006 (Revised and resubmitted to Operations Research).

"Provably Near-Optimal Balancing Policies for Stochastic Multi-Echelon Inventory Control Models", Retsef Levi, Robin Roundy and Van Anh Truong, 2006 (Submitted to Operations Research - Revised).

"Revenue Management of Reusable Resources - Provably Near-Optimal LP-Based Policies," Retsef Levi and Ana Radovanovic, 2007 (Submitted to Operations Research - Revised)

"Adaptive Data-Driven Inventory Control Policies Based on Kaplan-Meier Estimator", Tim Huh, Retsef Levi, Paat Rusmevichientong and Jim Orlin, 2008 (Submitted to Operations Research)

### **Papers in Preparation**

"On-line Primal-Dual Algorithms for Multi-Item Make-to-Order Inventory Models", Niv Buchbinder, Tracy Kimberl, Retsef Levi, Konstantin Makarychev and Maxim Sviridenko. (Soon to be submitted to Operations Research)

"Sampling-Based Algorithms for Airline Revenue Management Problems", Tim Huh, Tiam Hai Lee and Retsef Levi. (Soon to be submitted to Operations Research)

"Dynamic Pricing with Learning – State-Space Collapse and Fully Polynomial Time Approximation Scheme", Vivek Farias, Retsef Levi, Jim Orlin and Georgia Perakis (Soon to be submitted to Operations Research)

"Inventory and Facility-Location Models with Market Selection", Retsef Levi, Joseph Geunes, Edwin Romeijn and David Shmoys. (Soon to be submitted to Operations Research)

"LP-based Approximation Algorithms for Capacitated Facility Location", Retsef Levi, David Shmoys and Chaitanya Swamy. (Soon to be submitted to Mathematical Programming)

"Provably Near-Optimal Sampling-Based Algorithms for Scheduling Surgeries", Retsef Levi and Maurice Queyrane

"Cost Allocation and Games in Multi-Echelon Stochastic Inventory Control Models", Retsef Levi and Nicholas Stier.

"Data-Driven Approaches for Newsvendor Revenue Maximization Models", Retsef Levi, Georgia Perakis and Joline Ann Villaranda Uichanco

"Provably Optimal LP-Based Subgradient Algorithms for Joint Pricing and Inventory Control Problems", Elodie Adida, Retsef Levi and Georgia Perakis

"An Inventory Model with Partial Unobservable Lost-Sales", Retsef Levi, Roman Kapuschinski and Wenjing Shen

### **Invited Talks**

"Non Parametric Data-Driven Policies for Stochastic Inventory Models" (Marshall School, USC, 2007; Cornell University, ORIE Department, 2007)

"The On-Line Make-To-Order Joint Replenishment Model" (INFORMS 2007)

"Flow-Cover-Inequalities and The Multi-Item Capacitated Lot-Sizing Problem" (ORIE Department, Cornell University, 2007; Department of Industrial Engineering, Technion, Israel, 2007, IPCO 2007; INFORMS 2007)

"Provably Near-Optimal Dual-Balancing Policies for Stochastic Inventory Control Models with Lost-Sales" (MSOM 2006; INFORMS 2006; MSE Department, Stanford University 2006)

"Provably Near-Optimal Sampling-Based Policies for Stochastic Inventory Control Models" (INFORMS 2006; Sauder School of Business, University of British Columbia, 2006; The Business School of Chicago University, 2006; Computer Science Department of Columbia University, 2006; Operations Research Seminar, Tel-Aviv University, Israel, 2005; Department of Industrial Engineering, Technion, Israel, 2005)

"Approximation Algorithms for Stochastic Inventory Control Models with Correlated and Evolving Demands" (The Industrial Engineering Department, Tel-Aviv University, Israel, 2007; The 2006 International Symposium of Mathematical programming (ISMP); IBM, Almaden 2006, IPCO 2005, INFORMS 2005, Workshop in Combinatorial Optimization, Oberwolfach, Germany, 2005)

"Improved Approximation Algorithms for the One-Warehouse-Multi-Retailer Problem (INFORMS 2006)

"Provably Near-Optimal Policies for Hard Stochastic Inventory Control Models" (IBM-NYU-Columbia Theory Day, 2005)

"The One-Warehouse Multi-Retailer problem – Improved Approximation Algorithms" (SODA 2005; INFORMS 2005)

"Inventory & Facility Location Models with Market Selection" (INFORMS 2005)

"The Joint Replenishment Problem – Primal-Dual Approximation Algorithms" (INFORMS 2004; STOC 2004)

### **Service**

- Referee for Mathematics of Operations Research, Operations Research, Manufacturing and Service Operations Management (MSOM), Naval Research of Logistics, Discrete Mathematics, European Journal of Operations Research, IEEE Transactions
- Referee in the 2006 and 2007 MSOM Student Paper Competition
- INFORMS 2007 - Inventory Cluster Chair

## GRANTS AND AWARDS

- 2008 - AFOSR Grant: An Optimization Framework for Air Force Logistics Models (\$522,000), with Tom Magnanti. Grant Duration: 2008-2011
- 2007 - NSF grant DMS-0732175: MSPA-MCS: Collaborative Research: Algorithms for Near-Optimal Multistage Decision-Making under Uncertainty: Online Learning from Historical Samples (\$172,330), with David Gamarnik (MIT), David Shmoys and Paat Rusmevichientong (Cornell University) and Tim Huh (Columbia University). Grant duration: 2007-2009
- 2007 - Singapore-MIT Alliance (SMA): Data-Driven Algorithms (\$160K). Grant Duration: 2007-2009
- 2007 - IBM Faculty Award (\$15K) - Awarded by the Department of Mathematical Sciences, IBM T.J. Watson Research Center, Yorktown Heights, NY
- 2006 – MIT Bauchsbaum Grant (\$50K).
- 2005 – IBM Herman Goldstine Postdoctoral Fellowship in the Department of Mathematical Sciences, T.J. Watson Research Center, Yorktown Heights, NY.
- 2004 – First Prize of the MSOM Student Paper Competition.
- 2001 - Award for Excellence, BA Studies at the School of Mathematics in Tel-Aviv University.
- 1999 - Received the prize of the Head of Intelligence Corps for “Creative Thinking”.
- 1996 - Designated as an Extra Merit Officer (Head of Intelligence Corps).

## COMPUTER and TECHNICAL SKILLS

Languages: Scheme

Mathematical Software and Programming: AMPL, MATLAB

Document Publishing: MS-Word, Power Point, and LATEX

Platforms: Windows, UNIX

Technical Background: Extensive knowledge and understanding of technical (and marketing) aspects of communication and computer networks (e.g. Wireless, cellular and wire technologies, ISDN, IN, etc).

## PERSONAL

Languages: Hebrew - mother-tongue; English - fluent, at mother-tongue level; Arabic - basic + level.

Married to Anat Nidar-Levi with 4 children (Yagev, Nov, Tia and Noea); Holds a Green Card, citizen of Israel.

Hobbies: Volleyball player (Israel National Youth Team, National League; Tel-Aviv University team); enjoys traveling, reading, listening to music, playing volleyball, soccer and basketball.