Amir Bennatan

208 Fine Hall,
Princeton University,
Princeton, NJ 08544

Phone: (609) 235-6443
Email: abn@princeton.edu
Web: http://www.pacm.princeton.edu/~abn/

Research Experience

Princeton University

2006 – 2008: Post-doctoral researcher
Working with: A. Robert Calderbank

Research Interests

Wireless networks

Information theory and coding theory, focusing on the following problems.

- **Multi-antenna downlink:** MIMO broadcast and "dirty-paper" coding
- **Cooperative communications:** Relay and interference channels
- **Bandwidth-efficient communications:** Non-binary LDPC codes

Education

Tel Aviv University

2002 – 2006: Ph.D., Electrical Engineering
Thesis: The Application of LDPC Codes to New Problems in Communications
Advisor: David Burshtein

2000 – 2002: M.Sc. (*magna cum laude*), Electrical Engineering
Thesis: On Generalized Low Density Codes
Advisor: David Burshtein

1991 – 1994: B.Sc. (*summa cum laude*), Mathematics and Computer Science

Academic and Professional Awards

2004: Intel Award for excellence in research and studies

2004: Weinstein Prize for an outstanding publication, Tel Aviv University

2002, 2003: Weinstein Prize for an outstanding student, Tel Aviv University

2002: Scholarship, Wolf Foundation

1999: Excellence award, Israel Air Force Information Systems Unit

1993, 1994: Special award to excellent students, Tel Aviv University, Faculty of Exact Sciences

1992, 1993, 1994: Dean's list award, Tel Aviv University

Teaching Experience

Tel Aviv University

2000 – 2006: Teaching assistant for the following courses:

- Introduction to Digital Signal Processing.
- Principles of Digital Computers
- Data Structures and Algorithms

Work involved teaching classes of approximately 50 students, giving and correcting homework assignments and exams.

Professional Experience

Siemens Corporate Research

2006 – 2007: Collaboration on contributions to IEEE 802.16j (WiMax) standard.

- Development of techniques for wireless relay networks.

Israel Air Force Information Corps

Software development, officer in the IAF, rank: captain.

2000: Systems Analyst

- Development of specifications for complex artificial intelligence algorithms.

1998 – 2000: Team leader

- Team of 8 programmers.

1995 – 1998: Software developer, including:

- Training of users at the user site.
- Liaison with organizations involved in the initialization of the system database.

Professional Membership and Service

- **Member**, *IEEE Information Theory Society*.
- **Session Organizer**, (joint with Elza Erkip) *Conference on Information Sciences and Systems (CISS'2008)*, Princeton, NJ, March 2008, special session on cooperative communications.

Skills

- **Computer:** Various programming languages and development tools.
- **Languages:** Completely fluent in English and Hebrew.

Publications

Journal Papers

A. Bennatan and D. Burshtein, “On the Application of LDPC Codes to Arbitrary Discrete Memoryless Channels,” *IEEE Transactions on Information Theory*, vol. 50, no. 3, pp. 417-438, March 2004.

A. Bennatan and D. Burshtein, “Design and Analysis of Nonbinary LDPC Codes for Arbitrary Discrete Memoryless Channels,” *IEEE Transactions on Information Theory*, vol. 52, no. 2, pp. 549-583, February 2006.

A. Bennatan, D. Burshtein, G. Caire and S. Shamai, “Superposition coding for side-information channels,” *IEEE Transactions on Information Theory*. vol. 52, no. 5, pp 1872-1889, May 2006.

A. Bennatan, D. Burshtein, “On the Fading Paper Achievable Region of the Fading MIMO Broadcast Channel,” *IEEE Transactions on Information Theory*. vol. 54, no. 1, pp 100-115, January 2008.

V. Aggarwal, A. Bennatan and A. R. Calderbank, “On Maximizing Coverage in Gaussian Relay Networks,” submitted to the *IEEE Transactions on Information Theory*, October 2007.

A. Bennatan, V. Aggarwal, Y. Wu, A. R. Calderbank, J. Hoydis and A. Chindapol, “Modified Dirty-Paper Techniques for Multicell Cooperation,” submitted to the *IEEE Transactions on Wireless Communications*, April 2008.

Refereed Conference Papers

A. Bennatan and D. Burshtein, “On the Application of LDPC Codes to Arbitrary Discrete Memoryless Channels,” *Proc. 2003 IEEE Int. Symp. on Inform. Theory (ISIT)* Yokohama, Japan, July 2003.

G. Caire, A. Bennatan, D. Burshtein and S. Shamai, ``Coding Schemes for the Binary Symmetric Channel with Known Interference,'' *41st Annual Allerton Conference on Communications, Control and Computing,* Monticello, IL, Oct. 1-3, 2003.

A. Bennatan and D. Burshtein, “Iterative Decoding of LDPC Codes Over Arbitrary Discrete Memoryless Channels,” *41st Annual Allerton Conference on Communications, Control and Computing,* Monticello, IL, Oct. 1-3, 2003.

A. Bennatan, D. Burshtein, G. Caire and S. Shamai, “Superposition Coding for Dirty-Paper Channels,” *Proc. The 23rd IEEE Convention of Electrical & Electronics Engineers in Israel (IEEEI)*, Herzlia, Israel, Sep. 6-7, 2004.

A. Bennatan, D. Burshtein, G. Caire and S. Shamai, “Superposition coding for Costa channels,” *Proc. Int. Symp. on Inform. Theory and its Applications (ISITA)*, Parma, Italy, Oct. 11-13, 2004.

A. Bennatan and D. Burshtein, “EXIT Charts for Nonbinary LDPC Codes Over Arbitrary Discrete Memoryless Channels,” *Proc. 2005 IEEE Int. Symp. on Inform. Theory (ISIT' 2005)* Adelaide, Australia, Sep. 2005.

A. Bennatan, D. Burshtein, “On the Fading Paper Achievable Region of the Fading MIMO Broadcast Channel,” *44th Annual Allerton Conference on Communications, Control and Computing,* Monticello, IL, Sep. 27-29, 2006.

V. Aggarwal, A. Bennatan and A. R. Calderbank, “On Maximizing Coverage in Gaussian Relay Networks,” *Proc. 2007 IEEE Information Theory Workshop (ITW’ 2007)*, Bergen, Norway, July, 2007.

Talks and Seminars

- The Hebrew University, School of Computer Science and Engineering, December 2007.
- University of Southern California, CSI Seminar, May 2007.
- Qualcomm-Flarion Technologies, March 2007.
- Princeton University, ISS Seminar, January 2007.
- Bar Ilan University, The School of Engineering, June 2006.
- Technion, The Faculty of Electrical Engineering, May 2006.
- Tel Aviv University, The School of Electrical Engineering, May 2006.

References

A. Robert Calderbank,
Princeton University
calderbk@math.princeton.edu
+1 (609) 258-8962

Shlomo Shamai (Shitz),
Technion - Israel Institute of Technology
sshlomo@ee.technion.ac.il
+972 (4) 829-4713

David Burshtein,
Tel Aviv University, Israel
burstyn@eng.tau.ac.il
+972 (3) 640-8057

Giuseppe Caire,
University of Southern California
caire@usc.edu
+1 (213) 740-4683

Dana Ron (specific for teaching),
Tel Aviv University, Israel
danar@eng.tau.ac.il
+972 (3) 640-6917