

BERK BIRAND

Department of Electrical Engineering, Columbia University
1300 S.W. Mudd, 500 West 120th Street New York, NY 10027
berk@ee.columbia.edu; www.berkbirand.com; (774) 452-0771

EDUCATION

Columbia University, Fu Foundation School of Engineering & Applied Sciences, New York, NY
Ph.D Candidate in Electrical Engineering, started August 2008

- Adviser: Prof. Gil Zussman
- Research focus: Cross-layer optimizations, performance optimization in mobile and ad-hoc networks
- Courses: Stochastic Modeling, Optimization Theory, Graph Theory, Approximation Algorithms, Control Theory, Queueing Networks

Columbia University, Fu Foundation School of Engineering & Applied Sciences, New York, NY
MS in Electrical Engineering, February 2010

- Concentration in Networking and Operations Research

Worcester Polytechnic Institute, Worcester, MA

Bachelor of Science in Electrical Engineering & Computer Science, May 2008, Major GPA: 3.92/4.00

- Concentration in Digital Design and Applied Cryptography

PUBLICATIONS

- B. Birand, M. Zafer, G. Zussman, and K-W. Lee, “Dynamic Graph Properties of Mobile Networks under Levy Walk Mobility,” to be published in *Proc. IEEE MASS’11*, Oct. 2011
- B. Birand, M. Chudnovsky, B. Ries, P. Seymour, G. Zussman, and Y. Zwols, “Analyzing the Performance of Greedy Maximal Scheduling via Local Pooling and Graph Theory,” in *Proc. ACM MobiHoc S³ Workshop’10*, Sept. 2010 [**Invited Speaker, Best Theory Session Talk Award**]
- B. Birand, M. Chudnovsky, B. Ries, P. Seymour, G. Zussman, and Y. Zwols, “Analyzing the Performance of Greedy Maximal Scheduling via Local Pooling and Graph Theory,” *IEEE/ACM Transactions on Networking*, Accepted, Oct. 2010
- S-H. Yoo, D. Karakoyunlu, B. Birand, and B. Sunar, “Improving the Robustness of Ring Oscillator TRNGs,” *ACM Transactions on Reconfigurable Technology and Systems*, Vol. 3, No. 2, May 2010
- B. Birand, M. Chudnovsky, B. Ries, P. Seymour, G. Zussman and Y. Zwols, “Analyzing the Performance of Greedy Maximal Scheduling via Local Pooling and Graph Theory,” in *Proc. IEEE INFOCOM’10*, Mar. 2010 [17.5% acceptance rate, among 8 papers that got **nominated for Best Paper Award**, out of 1575 submissions]
- G. Hammouri, E. Öztürk, B. Birand, B. Sunar, “Unclonable Lightweight Authentication Scheme,” in *Proc. 10th International Conference on Information and Communications Security (ICICS’08)*, in *Springer LNCS*, vol. 5308, pp.33-48, 2008

POSTER PRESENTATIONS

- B. Birand, C. P. Lai, G. Zussman and K. Bergman, “Cross-Layer Design of Access/Aggregation Protocols for Wireless Backhaul,” Poster presentation at the CIAN NSF-ERC site visit, San Diego, CA, Mar. 2010

- B. Birand, C. P. Lai, H. Wang, G. Zussman and K. Bergman, "Cross-Layer Design of Access/Aggregation Protocols for Wired and Wireless Backhaul," Poster presentation at the CIAN NSF-ERC site visit, Los Angeles, CA, Nov. 2009
- B. Birand, C. P. Lai, H. Wang, G. Zussman and K. Bergman, "Fiber-Wireless Convergence - Cross-Layer Design Approach," Poster presentation at the CIAN NSF-ERC yearly retreat, Tucson, AZ, May 2009

AWARDS/ACTIVITIES

IBM PhD Fellow, 2011-2012

Best Theory Session Talk Award, ACM MobiHoc 2010 S^3 Workshop, Chicago, IL, Sept. 2010
 Millman Award for Outstanding Teaching Assistant, Columbia University EE Dept., 2010
 Harold S. Black Award for Outstanding EE Senior, Worcester Polytechnic Institute, May 2008
 Charles O. Thompson Scholar for Outstanding Achievement in Freshman Year, Worcester Polytechnic Institute, May 2005
 Presidential Scholarship and International Scholarship, Worcester Polytechnic Institute, 2004-2008
 Dean's List, Worcester Polytechnic Institute, Spring 2008
 President, Eta Kappa Nu Electrical Engineering Honor Society, 2007-2008
 Member, Tau Beta Pi Engineering Honor Society, Upsilon Pi Epsilon Computer Science Honor Society

RESEARCH PROJECT AND WORK EXPERIENCE

Summer Research Intern, IBM Research T.J. Watson Research Center, May 2010-September 2010

- Member of the Wireless Networking Group under the supervision of Dr. Murtaza Zafer and Dr. Kang-Won Lee. Part of the International Technology Alliance for Network and Information Science (ITA) project
- Investigated the use of evolving graphs, a novel graph model, for characterizing structural properties of mobile networks
- Examined metrics for predicting network performance measures based evolving graph structure

Research Assistant, Columbia University WiM.Net Lab, August 2008-Present

- Proved throughput-optimality of greedy and distributed algorithms using graph theoretic properties known as local pooling
- Improved previously known lower-bound on throughput for small input-queued switches
- Current work: Investigating cross-layer protocols for resolving bottlenecks at the interface between wireless and optical networks, and for reducing the energy consumption of optical networking devices
- Current work: Enhancing current theoretical models for the analysis of wireless scheduling and routing algorithms for mobile networks using evolving graph sequences

Major Qualifying Project, WPI Cryptography Lab, August 2007-March 2008

- Implemented cutting-edge cryptographic circuit with VHDL on FPGA board
- Tested performance against resilience to side-channel attacks, such as temperature and voltage

Major Qualifying Project, WPI, August 2007-March 2008

- Independently developed location-based service application that uses Wi-Fi localization
- Employed the latest technologies, such as the Java Web Services API, Apache Axis2

Research Assistant, Worcester Polytechnic Institute, Worcester, MA, May-July 2007

- Investigated hardware implementation of True Random Number Generator
- Enabled a team of three to collect 3 times more data on test bed that I have written
- Simulated cryptographic circuit at the transistor-level
- Authored academic journal paper as result of research

Interactive Qualifying Project, Pilgrim Benefice, London, UK, May-July 2006

- Counseled the foundation on church restoration and maintenance
- Surveyed heritage skills, interviewed villagers and professionals
- Produced report submitted to the United Kingdom Parliament

Research Assistant, WPI CS Database Group, Worcester, MA, August 2006-2008

Software Engineering Intern, Garanti Teknoloji, Istanbul, Turkey

TEACHING EXPERIENCE

Instructor, Columbia University, Department of Electrical Engineering, New York, NY

- CSEE W4140 - Networking Lab, Spring 2011.

Teaching Assistant, Columbia University, Department of Electrical Engineering, New York, NY

- Millman Award for Outstanding Teaching Assistant, Columbia University EE Dept., 2010
- CSEE W4119 - Computer Networks, Spring 2010. Responsible for analytic aspects of the class.
- CSEE W4119 - Computer Networks, Spring 2009. Responsible for analytic aspects of the class.
- ELEN E3801 - Systems and Signals, Fall 2008. Performed review lectures as well as conducting laboratory sessions.

PROFESSIONAL ACTIVITIES

- Co-chair of ACM S³ 2011 Workshop co-located with MobiCom 2011
- Reviewer for *IEEE Journal on Selected Areas in Communications special issue on "Simple Wireless Sensor Networking Solutions," IEEE/ACM Transactions on Networking, IEEE Transactions on Wireless Communications, IEEE INFOCOM '09, ACM MobiHoc '09, IFIP Networking '10, IEEE INFOCOM '10*
- NSF CIAN-ERC Columbia University Student Leadership Council Vice-President, April 2009-Present
- Student Member, IEEE

TECHNICAL SKILLS AND LANGUAGES

Programming Skills: CLisp, Java, C, C++, Visual Basic, 8086 Assembly, Perl, SQL, VHDL

Experience with XML Web Services, Java-based Web applications, XML Technologies

Operating Systems: Linux, Apple Mac OS X, Microsoft Windows

Applications: MatLab, PSpice, Xilinx, L^AT_EX, Eclipse, Vim, Emacs

System Administration: Apache Web Server, QMail SMTP Server, Oracle DB Server, Tomcat

Foreign Languages: Fluent in English, French and Turkish, intermediate-level in German