

Lifeng Lai, Ph.D.

Department of Electrical Engineering, Princeton University
Princeton, NJ 08544
Cell:732-890-9560, Office: 609-258-9776
Email: llai@princeton.edu
Webpage: www.princeton.edu/~llai

EDUCATION & PROFESSIONAL EXPERIENCE

- **Princeton University**, Princeton, NJ
Postdoctoral Research Associate in Electrical Engineering, 2007 - Present
- **Ohio State University**, Columbus, OH
Ph.D. in Electrical and Computer Engineering, 2007
- **Zhejiang University**, Hangzhou, China
M.E. in Information Science & Electrical Engineering, 2004
B.E. in Information Science & Electrical Engineering, 2001

AWARDS

- **Best Paper Award**, *IEEE Global Communications Conference*, 2008
- finalist for **Best Student Paper Award**, *IEEE Symposium on Information Theory*, 2007
- **Distinguished University Fellow**, the Ohio State University, 2004 - 2007
- **Meritorious Award**, in International Mathematics Contest in Modeling, 2001

RESEARCH INTERESTS

- Cognitive Radio Networks
- Wireless Networks Security
- Cooperative Communications
- Protocol Design for Wireless Networks

ACADEMIC EXPERIENCE

Postdoctoral Research Associate, Princeton University, Oct. 2007 - Present

1. Designed the quickest detection algorithm for the detection of primary users in cognitive radio networks.
2. Developed an optimal learning rule for cognitive radios in networks using sequential statistics analysis and reinforced machine learning tools.
3. Authentication scheme design for wireless networks.

Research Assistant, Ohio State University, Dec. 2004 - Mar. 2007

1. Devised several information theoretically secure communication schemes for wireless networks.
2. Developed a novel cooperation scheme for the relay channel.

Research Assistant, Zhejiang University, Dec., 2000 - Mar. 2004

Developed a CDMA based satellite communication system. Algorithm implementation using C and Matlab.

INDUSTRY EXPERIENCE

Research Engineering, Universal Comm. Tech. Hangzhou, Co., Mar. 2004 - Aug. 2004

Participated a team to design and implement a WCDMA base station. Responsibilities include algorithm design, algorithm verification using Matlab, implementation using VHDL language and test code development using C/C++.

Research Intern, Motorola, Nov. 2003 - Jan. 2004

Participated a team to design and implement a DSP Chip for vehicle applications. Responsibilities include algorithm design and verification using Matlab, implementation using Verilog.

Part-time Software Engineer, Enjoys Networks, Aug. 2001 - Dec. 2001

Developed software modules for a Virtual Private Network project using C.

SKILLS

- Familiar with C, C++, Verilog, VHDL, Matlab, Protel.
- 6+ years experience in wireless communication systems design, familiar with CDMA, OFDM.

PUBLICATIONS

Published/Submitted Journal Papers:

- J1. **L. Lai**, S.-W. Ho and H. Vincent Poor, "Privacy-Security Tradeoff in Biometric Security Systems," *IEEE Transactions on Information Theory*. Submitted, 2008.
- J2. H. Jiang, **L. Lai**, R. Fan and H. Vincent Poor, "Optimal Selection of Channel Sensing Order in Cognitive Radios," *IEEE Transactions on Wireless Communications*. To appear.
- J3. **L. Lai**, H. El Gamal, H. Jiang and H. Vincent Poor, "Cognitive Medium Access: Exploration, Exploitation and Competition," *IEEE/ACM Transactions on Networking*. Revised, July 2008.
- J4. **L. Lai**, H. El Gamal and H. Vincent Poor, "Authentication over Noisy Channels," *IEEE Transactions on Information Theory*, vol. 55, no. 2, Feb. 2009.
- J5. **L. Lai**, H. El Gamal and H. Vincent Poor, "The Wiretap Channel with Feedback: Encryption over the Channel," *IEEE Transactions on Information Theory*, vol. 54, no. 11, pp. 5059 - 5067, Nov. 2008.
- J6. P. K. Gopala, **L. Lai** and H. El Gamal, "On the Secrecy Capacity of Fading Channels," *IEEE Transactions on Information Theory*, vol. 54, no. 10, pp. 4687 - 4698, Oct. 2008.
- J7. **L. Lai** and H. El Gamal, "The Relay-Eavesdropper Channel: Cooperation for Secrecy," *IEEE Transactions on Information Theory*, vol. 54, no. 9, pp. 4005 - 4019, Sept. 2008.
- J8. **L. Lai** and H. El Gamal, "The Water-filling Game in fading Multiple Access Channel," *IEEE Transactions on Information Theory*, vol. 54, no. 5, pp. 2110 - 2122, May 2008.
- J9. **L. Lai** and H. El Gamal, "On Cooperation in Energy Efficient Wireless Networks: the Role of Altruistic Nodes," *IEEE Transactions on Wireless Communications*, vol. 7, no.5, pp. 1868 - 1878, May 2008.
- J10. **L. Lai**, K. Liu and H. El Gamal, "The Three Node Wireless Network: Achievable Rates and Cooperation Strategies," *IEEE Transactions on Information Theory*, vol. 52, no. 3, pp. 805 - 828, Mar. 2006.

Conference Papers:

- C1. **L. Lai**, Y. Fan and H. Vincent Poor, “Quickest Detection in Cognitive Radio: A Sequential Change Detection Framework,” *Proc. of IEEE Global Communications Conference (Globecom)*, New Orleans, LA, Dec. 2008.
- C2. H. Jiang, **L. Lai**, R. Fan and H. Vincent Poor, “Cognitive Radio: How to Maximally Utilize Spectrum Opportunities in Sequential Sensing,” *Proc. of IEEE Global Communications Conference (Globecom)* 2008, New Orleans, LA, Dec. 2008.
- C3. **L. Lai**, H. Jiang and H. Vincent Poor, “Medium Access in Cognitive Radio Networks: A Competitive Multi-armed Bandit Framework,” *Proc. the Asilomar Conference on Signals, Systems, and Computers (Asilomar)*, Pacific Grove, CA, Oct. 2008. (**Invited**)
- C4. **L. Lai**, S.-W. Ho and H. Vincent Poor, “Privacy-Security Tradeoffs in Biometric Security Systems,” *Proc. of Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, Montecello, IL, Sept. 2008.
- C5. Y. Fan, **L. Lai**, E. Erkip and H. Vincent Poor, “Rateless Coding for MIMO Block Fading Channels,” *Proc. of IEEE Symposium on Information Theory (ISIT)*, Toronto, Canada, July 2008.
- C6. O. Koyluoglu, H. El Gamal, **L. Lai** and H. Vincent Poor, “On the Secure Degrees of Freedom in the K -User Gaussian Interference Channel,” *Proc. of IEEE Symposium on Information Theory (ISIT)*, Toronto, Canada, July 2008.
- C7. **L. Lai**, H. El Gamal, H. Jiang and H. Vincent Poor, “Optimal Medium Access Control in Cognitive Radios: A Sequential Design Approach,” *Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Las Vegas, NV, Apr. 2008.
- C8. **L. Lai**, H. El Gamal, H. Jiang and H. Vincent Poor, “Optimal Medium Access Protocols for Cognitive Radio Networks,” *Proc. of Intl. Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt)*, Berlin, Germany, Mar. 2008.
- C9. **L. Lai**, H. El Gamal and H. Vincent Poor, “Authentication over Noisy Channels,” *Proc. of Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, Montecello, IL, Sept. 2007.
- C10. **L. Lai**, H. El Gamal and H. Vincent Poor, “Secrecy Capacity of the Wiretap Channel with Noisy Feedback,” *Proc. of Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, Montecello, IL, Sept. 2007.
- C11. **L. Lai** and H. El Gamal, “Cooperative Secrecy: The Relay-Eavesdropper Channel,” *Proc. of IEEE Symposium on Information Theory (ISIT)*, Nice, France, June 2007.
- C12. P. K. Gopala, **L. Lai** and H. El Gamal, “On the Secrecy Capacity of Fading Channels,” *Proc. of IEEE Symposium on Information Theory (ISIT)*, Nice, France, June 2007.
- C13. **L. Lai** and H. El Gamal, “On Cooperation in Energy Limited Wireless Networks,” *Proc. of IEEE International Conference on Computer Communications (INFOCOM)*, Anchorage, AK, May 2007.
- C14. **L. Lai** and H. El Gamal, “Cooperation for Secure Communication: The Relay Wiretap Channel,” *Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Honolulu, HI, Apr. 2007.
- C15. **L. Lai**, P. K. Gopala and H. El Gamal, “Secure Communications over Wireless Channels,” *Proc. of UCSD Information Theory and Application (ITA)*, San Diego, CA, Jan. 2007. (**Invited**)
- C16. **L. Lai** and H. El Gamal, “Fading Multiple Access Channels: A Game Theoretic Perspective,” *Proc. of IEEE Symposium on Information Theory (ISIT)*, Seattle, WA, July 2006.
- C17. **L. Lai**, K. Liu and H. El Gamal, “On the Achievable Rates and Cooperation Strategies of Three-Node Wireless Network,” *Proc. of Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, Montecello, IL, Sept. 2005.
- C18. **L. Lai**, K. Liu and H. El Gamal, “On the Achievable Rate of Three-Node Wireless Networks,” *Proc. IEEE International Conference on Wireless Networks, Communications, and Mobile Computing (Wirelesscom)*, Maui, HI, June 2005. (**Invited**)

- C19. Z. Zhang and L. Lai, "A Practical Slotted Quasi-Synchronous CDMA Access System for LEO Micro-Satellite Short Message Transmission," *Proc. IEEE International Conference on Communications (ICC)*, Anchorage, AK, May 2003.
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INVITED TALKS

- "On the Design of Secure and Efficient Wireless Networks," **Stanford University**, Stanford, CA, Aug. 2008.
 - "Cognitive Medium Access: An Optimal Learning Approach," **Rutgers University**, North Brunswick, NJ, Feb. 2008.
 - "Secure Wireless Communications: A Physical Layer Approach," **Columbia University**, New York City, NY, Nov. 2007
 - "Multiuser Wireless Network: Cooperation, Competition and Security," **Rice University**, Huston, TX, Oct. 2006
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PROFESSIONAL ACTIVITIES

- Technical Program Committee Member: IEEE Wireless Communications and Networking Conference (WCNC) 2008, IEEE Global Communications Conference (GLOBECOM), 2008
 - Reviewer: IEEE Transactions on Information Theory, IEEE Transactions on Signal Processing, IEEE Transactions on Communications, IEEE Transactions on Wireless Communications, IEEE Transactions on Mobile Computing, ISIT, GLOBECOM, ICC, VTC, WCNC, CISS
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REFERENCES

- H. Vincent Poor
Professor, Department of Electrical Engineering
Dean, the School of Engineering and Applied Science
C230, Engineering Quadrangle, Olden Street
Princeton University,
Princeton, NJ 08544
Phone: (609) 258-2260
Email: poor@princeton.edu
- Hesham El Gamal
Associate Professor, Department of Electrical & Computer Engineering
The Ohio State University,
205 Dreese Labs,
2015 Neil Avenue, Columbus, OH 43210
Phone: (614) 292-4374
Email: helgamal@ece.osu.edu
- Robert Calderbank
Professor, Department of Electrical Engineering, Department of Mathematics
Director, the Program in Applied and Computational Mathematics
B318 Engineering Quadrangle, Olden Street
Princeton University,
Princeton, NJ 08544
Phone: (609) 258-6303
Email: calderbk@princeton.edu