Wade Trappe

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Education

6/99 – 5/02	**University of Maryland**, College Park, MD *Department of Electrical and Computer Engineering, Institute for Systems Research, and Applied Mathematics and Scientific Computation Program* Ph.D. Applied Mathematics and Scientific Computing
8/96 – 6/99	**University of Maryland**, College Park, MD *Department of Electrical and Computer Engineering, Institute for Systems Research, and Applied Mathematics and Scientific Computation Program* M.S. Applied Mathematics and Scientific Computing
8/91 – 12/94	**The University of Texas at Austin**, Austin, TX B.A. Mathematics, with Highest Honors

Professional Experience

- *Assistant Professor*, Rutgers University. Department of Electrical and Computer Engineering and the Wireless Information Networking Laboratory. 2002-Present.
- *Graduate Research Assistant*, University of Maryland, Department of Electrical and Computer Engineering, and Institute for Systems Research. College Park, MD. 1998-2002.
- *Engineering Intern*, Dialogic Corp. (a subsidiary of Intel), Parsippany, NJ. 1997-1998.
- *Graduate Teaching Assistant,* University of Maryland, Department of Mathematics. College Park, MD. 1998. Co-designed the curriculum for a new cryptography class offered jointly by the math and computer science departments, and co-authored the accompanying textbook.
- *Research Scientist Associate,* Applied Research Laboratories, The University of Texas at Austin, Austin, TX. 1995-1996.
- *Laboratory Research Assistant,* Applied Research Laboratories, The University of Texas at Austin, Austin, TX. 1991-1994.
- *Summer Intern*, 3M, Austin, TX. 1990.

Awards and Honors

- *George Harhalakis Outstanding Systems Engineering Graduate Student*, University of Maryland, 2002. Awarded to one graduate student per year for entire graduate program at the Institute for Systems Research.
- *Graduate School Fellowship*, University of Maryland, 1996-1998. Awarded to four out of 52 entering mathematics graduate students.
- *Highest Honors*, College of Natural Sciences at The University of Texas at Austin, Fall 1994. Awarded to top 4% of graduating seniors from the college.
- *Dean's Honored Graduate*, Department of Mathematics at The University of Texas at Austin, Fall 1994. Selected as the most outstanding graduating mathematics senior from the Fall 1994 semester.
- *Research Experience for Undergraduates (REU)*, The University of Texas at Austin, under NSF Grant: Topology, Geometry, and Physics, 1993-1994. Performed research into applying matching pursuits to the numerical solution of ordinary differential equations, under the supervision of Professor Karen Uhlenbeck.

- *Junior Fellows Honors Research Program*, The University of Texas at Austin, 1992-1993. Performed research into composite wavelet and chirplet transforms, under the supervision of Professor Joseph Lakey.
- *Dean's List*, College of Engineering at The University of Texas at Austin, 1991-1992.

Professional Activities

- Member of the Technical Program for the 2004 ACM Workshop on Wireless Security
- Member of the Technical Program for the 2005 IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks
- Reviewer for IEEE Trans. on Multimedia, IEEE Trans. on Signal Processing, IEEE Trans. on Communications, IEEE Trans. on Networking, IEEE Trans. on Wireless Communications
- Reviewer for Kluwer Wireless Personal Communications
- Reviewer for EURASIP Journal on Applied Signal Processing
- Participant at the MPEG-4 Intellectual Property Management and Protection (IPMP) Meeting, La Baule, France. Presented "Dynamic M^4: A Dynamic Multicast Key Management Scheme for Groups of Mobile Multimedia Users" to the MPEG-4 IPMP standards committee, October 2000.

Professional Affiliations

- IEEE Signal Processing Society
- IEEE Communication Society
- IEEE Computer Society
- Secure Mobility Forum

Research Grants

1. "NeTS-NOSS: PARIS: A Framework for Privacy Augmented Relaying of Information from Sensors", W. Trappe and Y. Zhang, *National Science Foundation*, $500K, 2004-2007. (Principal Investigator).
2. "ORBIT: Open-Access Research Testbed for Next-Generation Wireless Networks", D. Raychaudhuri, R. Yates, W. Trappe, M. Parashar, Y. Zhang, H. Kobayashi (Princeton), H. Schulzrinne (Columbia), S. Paul (Bell Labs), K. Ramaswamy (Thomson R&D), A. Acharya (IBM Watson), *National Science Foundation*, $5.4M, 2003-2006, (Participating Investigator).
3. "Security Architectures for Current and Future Wireless Networks", W. Trappe and D. Raychaudhuri, *National Institute for Communication Technology (NICT, Japan)*, $350K, 2001-2006. (Principal Investigator).
4. "A Collustion-Resistant Multimedia Fingerprinting Framework for Information Forensics," M. Wu, K.J.R. Liu, Z. J. Wang and W. Trappe, *Air Force Research Laboratories*, $45K subcontract, 2003-2004 (Participating Investigator)

Publications

Books:

1. W. Trappe and L. C. Washington, Introduction to Cryptography with Coding Theory. Prentice Hall, 2001.
2. K.J.R. Liu, W. Trappe, Z. J Wang, M. Wu, H. Zhao, Digital Fingerprinting for Multimedia Forensics, to appear 2005.

Refereed Journals:

1. W. Trappe, M. Wu, Z. Wang, and K. J. R. Liu, "Anti-Collusion Fingerprinting for Multimedia," *IEEE Transactions on Signal Processing*, vol. 51, pg. 1069-1087, 2003.

2. M. Wu, W. Trappe, Z.J. Wang, K.J.R. Liu, "Collusion-resistant Fingerprinting for Multimedia," *IEEE Signal Processing Magazine*, vol. 21, pg. 15-27, 2004.
3. Z. J. Wang, M. Wu, W. Trappe and K.J.R. Liu, "Group Oriented Fingerprinting for Multimedia Forensics," EURASIP Journal of Applied Signal Processing, pg. 2153-2173, October 2004.
4. W. Trappe, J. Song, R. Poovendran, and K. J. R. Liu, "A Dynamic Key Distribution Scheme Using Data Embedding for Secure Multimedia Multicast," *IEEE Transactions on Multimedia*, vol. 5, pg. 544-557, 2003.
5. Y. Sun, W. Trappe, and K. J. R. Liu, "Scalable Key Management for Secure Wireless Multicast," *IEEE Transactions on Networking*, vol. 12, pg. 653-666, 2004.
6. W. Trappe, Y. Wang, and K. J. R. Liu, "Conference Key Establishment for Heterogeneous Networks," to appear *IEEE/ACM Transactions on Networking*.
7. Z. J. Wang, M. Wu, H. Zhao, W. Trappe, and K.J.R. Liu, "Collusion Resistance of Multimedia Fingerprinting Using Orthogonal Modulation," to appear *IEEE Trans. On Image Proc.*
8. T. Lawrence, W. Trappe, and N. Bedford, "The Influence of an Offshore Rise on Low-Frequency Modal Propagation," *Journal of Underwater Acoustics*, Vol. 48, No. 1, pg. 29-36, January 1998.
9. P. McCarty, J. Gross, W. Trappe, and D. Grant, "Minimum Detectable Target Strength Using Spectral Estimation Methods for the Active Barrier Problem," *Journal of Underwater Acoustics*, vol. 45, no. 1, pg. 135-154, January 1995.
10. T. Lawrence and W. Trappe, "Analysis of an Active Barrier Experiment in a Stable Shallow Water Environment," *Journal of Underwater Acoustics*, vol. 45, no. 1, pg. 65-86, January 1995.

Refereed Conferences:

1. W. Xu, T. Wood, W. Trappe and Y. Zhang, "Channel Surfing and Spatial Retreats: Defenses Against Wireless Denial of Service," *Proceedings of the 2004 ACM Workshop on Wireless Security*, pg. 80-89, 2004.
2. W. Xu, W. Trappe and S. Paul, "Key Management for 3G MBMS Security," to appear at *IEEE Global Telecommunication Conference (Globecom)*, 2004.
3. Z. Li, Y. Zhang, W. Trappe and B. Nath, "Securing Wireless Localization: Living with Bad Guys," *2004 DIMACS Workshop on Mobile and Wireless Security*.
4. Z.J. Wang, M. Wu, H. Zhao, K.J.R. Liu and W. Trappe, "Resistance of Orthogonal Gaussian Fingerprints to Collusion Attacks," *Proceedings of the 2003 IEEE International Conference on Multimedia and Expo*, vol. 1, pg. 617-620, 2003.
5. Z. J. Wang, M. Wu, W. Trappe and K.J.R. Liu, "Anti-collusion of Group-oriented Fingerprinting," *Proceedings of the 2003 IEEE International Conference on Multimedia and Expo*, vol. 2, pg. 217-620, 2003.
6. M. Bohge and W. Trappe, "An Authentication Framework for Hierarchical Ad Hoc Sensor Networks," *Proceedings of the 2003 ACM Workshop on Wireless Security*, pg. 79-87, 2003.
7. C. Ozturk, Y. Zhang, W. Trappe and M. Ott, "Source-location privacy for networks of energy-constrained sensors," *Proceedings of 2nd IEEE Workshop on Software Technologies for Future Embedded and Ubiquitous Systems*, pg. 68-72, 2004.
8. Y. Sun, W. Trappe, K.J.R. Liu, "Topology-Aware Key Management for Wireless Multicast," *IEEE Globecom '03*, pg. 1471-1475, 2003.
9. W. Trappe, M. Wu, and K. J. R. Liu, "Joint Coding and Embedding for Collusion-Resistant Fingerprinting," *EUSIPCO* 2002, special session on Security Issues in Digital Watermarking.
10. W. Trappe, M. Wu, and K. J. R. Liu, "Anti-Collusion Codes: Multi-User and Multimedia Perspectives," *IEEE International Conference on Image Processing (ICIP)*, vol. 2, pg. 149-152, 2002.
11. W. Trappe, M. Wu, and K. J. R. Liu, "Collusion-Resistant Fingerprinting for Multimedia," *IEEE Int. Conf. on Acoustics, Speech, and Signal Processing*, vol. 4, pg. 3309-3312, 2002.
12. W. Trappe, Y. Wang, and K. J. R. Liu, "Establishment of Conference Keys in Heterogeneous Networks," *IEEE Int. Conference on Communications*, pg. 2201-2205, 2002.
13. Y. Sun, W. Trappe, and K. J. R. Liu, "An Efficient Key Management Scheme for Secure Wireless Multicast," *IEEE Int. Conference on Communications*, pg. 1236-1240, 2002.

14. B. Sun, W. Trappe, Y. Sun, and K.J.R. Liu, "A Time-Efficient Contributory Key Agreement Scheme for Secure Group Communication," *IEEE Int. Conf. on Communications*, pg. 1159-1163, 2002.
15. W. Trappe, J. Song, R. Poovendran, and K. J. R. Liu, "Key Distribution for Secure Multimedia Multicasts via Data Embedding," *IEEE Int. Conf. on Acoustics, Speech, and Signal Processing*, May 2001.
16. W. Trappe, Y. Wang, and K. J. R. Liu, "Group Key Agreement Using Divide-and-Conquer Strategies," *35th Conference on Information Sciences and Systems*, The Johns Hopkins University, March 2001.
17. J. Song, R. Poovendran, W. Trappe, and K. J. R. Liu, "A Dynamic Key Distribution Scheme Using Data Embedding for Secure Multimedia Multicast," *Proceedings of SPIE Security and Watermarking for Multimedia*, Vol. 4314, pg. 618-628, 2001.
18. W. Trappe and K. J. R. Liu. "Denoising via Adaptive Lifting Schemes," *Proceedings of SPIE Wavelet Applications in Signal and Image Processing VIII*, Vol. 4119, pg. 302-312, 2000 (Invited paper).
19. W. Trappe, H. Zheng, and K. J. R. Liu, "Adaptive Lifting Coding Scheme for Video Scene Changes," *IEEE Workshop on Multimedia Signal Processing*, September 1999.
20. W. Trappe and K. J. R. Liu, "Adaptivity in the Lifting Scheme," *33rd Annual Conference on Information Sciences and Systems*, The Johns Hopkins University, pg. 950-955, March 1999.
21. J. D. Lakey and W. Trappe, "Signal Analysis by Composite Wavelet Transforms," *Proc. Approximation Theory VIII*, World Scientific, 1996.
22. J. D. Lakey and W. Trappe, "Analysis of Chirp Signals by Time-Frequency Localization Frames," *Proceedings of SPIE Wavelet Applications in Signal and Image Processing IV*, Vol. 2825, pg. 551-560, 1996.

Patents:

1. J. Song, W. Trappe, R. Poovendran and K. J. R. Liu, "A Dynamic Key Distribution Scheme Using Data Embedding for Secure Multimedia Multicast," U.S. and international patent application filed June 2001, PCT/US01/19715.
2. Z. J. Wang, M. Wu, K.J.R. Liu, W. Trappe and H. Zhao, "Collusion-resistant Fingerprinting for Multimedia," U.S. provisional patent filed June 2004.